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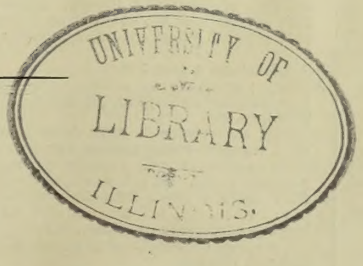
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THE BUILDING NEWS

AND ENGINEERING JOURNAL.

THE PAST YEAR.

YEARS and centuries are, as we know well enough, but artificial divisions whereby we mark the continuous web of Time; yet, perhaps, the least superstitious among us may be pardoned for hoping that the new decade on which we entered yesterday may bring better fortune than the closing years of its predecessor. Politically, socially, and commercially, the last five years have been periods of disaster and distress; and although, so far, the arts and industries more especially represented in our columns have probably suffered least, it has, of course, been impossible for them altogether to escape the general depression. Eighteen hundred and seventy-nine has particularly been undistinguished by the completion or commencement of many great architectural buildings, and much the same may be said of engineering; yet the members of each profession have been fairly occupied—busy, indeed, by comparison with the less fortunate followers of other callings. The New Year, too, in some respects opens under brighter auspices than could be discerned twelve months since—or two, or three years ago. Faint as are the indications of reviving trade, of returning peace abroad, and of a better state of things at home, it is, at any rate, cheering that they are in the right direction. We may have many months of patient endurance before us ere the full tide of prosperity sets in again, but such expectation is, at any rate, to be preferred to the uncertainty which must have prevailed in the minds of traders and manufacturers not many months since as to what might be the lowest depth things would reach. There is work enough waiting to be done by the architect, the engineer, and the builder in our midst, as soon as the nation has quite tired of wasting its resources, and returns again to the contemplation of such solid and splendid marks of national progress as have sprung up in the capital and the provinces during the past twenty years. Let it be the care of those who must undertake it to fit themselves, while leisure is to be had, for preparation.

One or two important public buildings have been practically completed, and several competitions of a more or less public character have been recorded by us during the same period. Of course, in the history of the year's work, the partial completion of the Law Courts cannot be overlooked. The eastern block of this structure has been brought into use for some months past, and we believe has fairly realised the anticipations of those for whom the building was intended. It is unnecessary here to revert again to the architectural effect of the completed portion, as we have frequently done so during its progress, though it would be an omission not to allude to an adjunct that has been already contemplated by the Corporation authorities which will, by its connnection with the eastern angle of the block of offices recently finished, appear to form an essential part of Mr. Street's design. We refer to the proposal to erect a structure on the site of Temple Bar. It is impossible for us not to entertain fears as to the probable form this structure will take, seeing that its design has been left to the Corporation, and from past experience we know what that means. We have but too good reason to apprehend that the proposed memorial has not been considered with any idea of its relation to the Law Courts, with which it will appear to be in close connection. We trust our apprehensions on this subject will not prove correct, but that by a timely regard for one of the greatest of our national buildings the civic authorities, if it is decided to erect the proposed memorial at all (and we really think it would be a waste of money), will give the commission to the architect of the Law Courts, who alone should be intrusted with this appendage to his work. Mr. Waterhouse's building for the Natural History Museum at South Kensington is another structure that has made considerable progress. Its external effect can now be realised; its centre entrance and flanking pavilions have been completed, and the perspective of its long front, well broken by roof and dormer, has an imposing effect upon the visitor who views it from either end. Our recent illustrations of the terra-cotta details, and more especially the general perspective published on p. 170, Vol. XXXVI., and descriptions of this building, render it unnecessary to say anything by way of praise or criticism of it, further than that its architect has boldly availed himself of a recently-introduced material and a style of architecture both of which have been treated in keeping with the purpose of the building. The sculptural detail, and the decorative effect obtained, show that terra-cotta can be applied with a near approach to the artistic capabilities of the older materials, and that so ancient a style as the Romanesque can be adapted in a modern spirit. The formation of new thoroughfares, such as those of the Northumberland-avenue and Theobald-road, has led to the erection of a few buildings of importance, although some of them can hardly be pronounced successful illustrations of modern architecture. The Grand Hotel at Charing-cross, from the designs of Messrs. Francis and Saunders, has, during the past year been so far advanced, that its magnitude and imposing elevation already overpower the surrounding buildings in its immediate neighbourhood. On the quality of its architecture we have already commented, and its arrangement has been fully described in our pages. As an hotel it will probably rank as one of the most complete in London, and its *salle-à-manger*, forming the centre area, will be one of the largest in this country. The construction of its staircase in concrete, supported on iron joists lined with marble treads and risers, and decorated with onyx, and the other details and appliances that have been introduced are noteworthy features. Another building has been lately completed in the Northumberland-avenue from Mr. J. Gibson's design, namely, the offices of the Christian Knowledge Society, in which the architect has chosen a columnar species of Italian, with good effect. Together with the new bank now in progress at the corner of Charing-cross and Spring-gardens, under Mr. Philip C. Hardwick, these three buildings indicate a decidedly new impulse for Classical architecture, and the three works may be taken as instances of the very different tendencies of the revived style. On the Embankment, Messrs. Barry and J. P. St. Aubyn's block of offices, in a style of Early French Renaissance, must be noticed as another more picturesque handling in the same direction. The new premises of the Art Union of London, which we illustrated, p. 236, Vol. XXXVI., also show a bold adaptation of Renaissance to a narrow street-frontage, in which the architect, Mr. E. M. Barry, R.A., one of the leading followers of the school, has imparted some dignity to the façade by the introduction of columns of the Corinthian order to the first story. In the new thoroughfare from Bloomsbury to Clerkenwell another sensibly-studied building in the same style has been erected for the new Holborn Town-hall by Messrs. Isaacs and Florence,

in which brick and stone have been agreeably combined with some originality and refinement in the detail.

Street architecture has made a little progress in some of our older thoroughfares. In Fleet-street and Ludgate-hill several new buildings and business premises have been completed during the year. As examples of these we may mention the rebuilding of Anderton's Hotel, in Fleet-street, by Messrs. Ford and Hesketh, an illustration of which we recently gave (page 706, Vol. XXXVII.); a large brick and stone block of offices and shops, in Farringdon-street, from the design of Mr. Vickery (see illustration, p. 38, last vol.), and another block of premises on Ludgate-hill, by Messrs. Joseph and Pearson, designed in a purer phase of Renaissance, and exhibiting a sensible treatment for a stone front. Fronting Ludgate-square several new business premises have been erected. In all these examples the style adopted has been more or less mixed, though showing decided elements of Renaissance in their composition, rather than Gothic or even Jacobean. In Cheapside we have only lately noticed in these pages several large warehouses and blocks of chambers, exhibiting a desire to meet the actual requirements of business with some success, and we cannot pass without noticing the large stone-fronted structure of Mercers' Hall, now in progress, which will present a long and imposing frontage to the street. The new Carpenters' Hall, London-wall, by Mr. Pocock, claims notice, as a bold adaptation of columnar Italian for a similar purpose. No summary of City architecture would be complete without reference to the Manchester Hotel, Aldersgate-street, by Messrs. Bateman and Corser (lately illustrated in our pages), in which Perpendicular Gothic has been chosen, as if in protest against the assumption that that style has little more interest for us. It is, indeed, more remarkable on this account than for any originality in the treatment. In the same street Mr. Vickery has been erecting a large block of offices and shops. A structure of considerable importance, devoted to judicial functions, has been in progress during the last twelvemonth—we mean Bow-street Police-court, from the designs of Mr. John Taylor. The elevation towards the street will be broadly treated in an Italian style, in which rustication of the piers will play a part. It may be noticed that dwellings for the middle classes have in some parts begun to assume an architectural character. We must not omit to mention the Alexandra Mansions, Victoria-street, by Mr. F. Butler, illustrated by us.

Business and warehouse architecture, of which we have named a few examples, has been pretty vigorous in London. We may just recall, as instances of a common-sense treatment, some warehouses in Bartholomew-close, by Mr. Aston Webb; in Watling and Bread-streets, by Mr. Alex. Peebles; in Devonshire-street, a large block in Southwark-street, by Messrs. Roumieu and Aitchison. Of a more ornate class we may mention a lofty building in a kind of Renaissance, recently erected in New Bond-street, from the design of Mr. Robert W. Edis, illustrated by us; and a large warehouse for Messrs. Waterlow, the stationers, now building under Mr. E. T. Hall, at Westminster. A new arcade in Old Bond-street, by Messrs. Archer and Green, may be mentioned in this category.

Of vestry-hall architecture our pages have illustrated one or two examples: one at Hampstead, lately erected by Messrs. Kendall and Mew; another at Kensington, by Mr. R. Walker; and a third at Bromley-by-Bow, by Messrs. Harston; all of them designed in an Italian style, though without any striking originality in conception. In the provinces several large and striking buildings have been either in progress of completion or commenced. We refer to our pages of illustrations for views of some of these, but we may here take a rapid glance at a few of them which exhibit architectural pretensions or claim notice on account of their design. Many town-halls have been commenced or are in progress, and some of these may be instanced as displaying architectural ability of no mean order. We may particularly mention the town hall and offices at Barrow-in-Furness now building, from the design of Mr. W. H. Lynn, whose drawing we reproduced some time ago, and also his Clark Hall, Paisley. Here Gothic of Mr. Waterhouse's favourite type has been cleverly adapted to the service of a building of public character. The Great Yarmouth Town Hall is proceeding, from the design of Mr. J. B. Pearce, and exhibits a more mixed style, though it is in a decided Renaissance spirit, with strongly-marked Elizabethan features. Ipswich has been very active in architectural improvement. During the year no less than three competitions have been decided—the post-office, the museum, and corn-exchange, the selected designs for which have already appeared in our pages. In all these cases Classic types have been selected, and the designs for the museum and corn-exchange displayed much skill. Mr. J. Johnson was successful in winning the post-office, Mr. H. Cheston the museum, and Mr. B. Binyon the corn-exchange. Tenders for the first two have been accepted, and the works will soon be commenced, while detailed drawings and specifications are being prepared for the corn-exchange. We may also mention the public buildings at Bootle and Staines, both from the designs of Mr. Johnson.

The public offices at Aston, near Birmingham, from Messrs. Alexander and Henman's design, must also be noticed as a building treated in a free Renaissance, and we are reminded that since this work the partnership has been dissolved. The town-halls at Kingston, by J. L. Robinson, at Reading, by Mr. Lainson, and Cliftonville, by Mr. Waterhouse, must not be forgotten. The Greenock Municipal Buildings competition resulted in a trial of skill in which some of our foremost architects engaged. Many of the designs sent in displayed skilful planning and considerable taste, and the adopted design of Messrs. H. and D. Barclay, and the one by Mr. B. Habershon, both illustrated by us (pp. 398, 642, Vol. XXXVII.) are distinguished, one as a correct Renaissance, and the other for a vigorous handling of that vernacular Classic in which it would be difficult to discover any particular style. Mr. Habershon's elevation is marked by considerable breadth and freedom of treatment. The Over-Darwen Town Hall and Market competition was another important contest of the year; the selected design by Mr. Charles Bell has been already given in our pages (p. 490, last vol.), and is a pleasing version of Renaissance with decidedly Late Gothic features.

North of the Tweed, a few great architectural works have been in progress. Besides Edinburgh Cathedral, which has been lately opened for divine service, and the spire of which forms a conspicuous feature of the city, the University buildings have made considerable headway, and exemplify the principle of allowing the functions of the plan to express themselves externally. Mr. Anderson, the architect, has cleverly varied his building, which is in a picturesque Italian style; at the same time he has preserved the dignified lines and details of the style in the composition (see illustration, p. 720, Vol. XXXVI.), and it is interesting to compare the late Sir G. Scott's design for Glasgow University, of which we gave an interior view on the 19th December, followed by the exterior, which we publish to-day. We must name the City of Glasgow Bank, by Messrs. Douglass and Sellars, as a striking structure in a bold Classic style with Corinthian order. The University College, Bristol, by Mr. Hansom, of the same city, the first section of which has been let to tender, and Mr. Stuart Colman's design for the same building we have reproduced, to show that Gothic has still a few adherents who have through changing fashions maintained the superiority of their style. Mr. Basil Champneys' Divinity School, Cambridge, just completed, and Mr. Waterhouse's Yorkshire College, Leeds, are two remarkable Gothic buildings, while we must not forget the Cavendish College, Cambridge, by Messrs. Giles and Gough, and the Wesleyan Theological College, Handsworth, by Messrs. Ball and Goddard, as other specimens of the same class. Buildings of a distinctly educational character are too numerous to mention. We may merely refer to the Museum and Library, Sunderland, by Messrs. Tillman, lately opened; the Examination Schools, Oxford, by Mr. T. G. Jackson; the Free Library, Derby, by Mr. R. K. Freeman; the Bradford Technical School, just commenced from the designs by Messrs. Hope and Jordan; the Scarborough Aquarium, by Messrs. Verity and Hunt; a class of structures which has taxed the resources of the architect in many points of planning and design. The schools and houses for Charlton Union, by Messrs. Magnall and Littlewoods, and some baths at Manchester, by Mr. Johnson, now building, may also be named. We may just notice that the Southport Market is being erected by a local architect, notwithstanding competitors were put to expense and trouble in sending in designs. It may be remembered Mr. Waterhouse made his award in Messrs. Coe and Robinson's favour, but the local magnates ignored the decision, and have not returned the competitors' designs, leaving them to understand the work was postponed. The same architects are engaged in the South Devon Hospital.

Few recent competitions have excited greater interest than that for the City of London Schools, and, as a typical trial of strength for a public educational establishment, it has an architectural significance beyond that which might be expected from its size. As we have so recently illustrated and described the selected design by Messrs. Davis and Emanuel, and four others, in our last volume, and give a sixth to-day, it is unnecessary to say anything more of the merits of the designs, except that the best of them were conceived in a style of Renaissance or Late English version of Classic that has become lately so closely connected with the Board Schools. It is gratifying, whatever may be said of the choice of style, that the selected design is free from any of the extravagances that have marked many recent works of a similar character. In hospital building the Holborn Union Infirmary, by Mr. H. Saxon Snell, the hospital for consumption at Hampstead, by Mr. T. Roger Smith; the Albert Asylum, Lancaster, and that now erecting in the Fulham-road, by Mr. T. H. Wyatt, and the Gloucester Infirmary, by Giles and Gough, must be noted as showing the most recent results of sanitary construction.

In Domestic architecture it would be impossible to notice more than a very few of the works which have been erected. We must, of course, head the list with Eaton Hall, the new residence of the Duke of Westminster, from the design of Mr. A. Waterhouse, R.A. As one of the latest works by that master of Gothic design in its more modern phase it occupies a prominent place, from its costly character and details. Next we may place Mr. A. W. Blomfield's design for Denton Hall, Grantham, now in course of erection for Sir W. E. Welby Gregory, Bart., M.P. In a Late kind of Domestic Gothic, well broken but divested of all incongruous features, it compares with Mr. Waterhouse's

great work, and the two may be taken as fairly representative of the capabilities of Gothic for domestic purposes in the hands of two leading architects. In the Queen Anne and Jacobean styles many large residences have been built, both on the Embankment and at Cadogan and Hans-place, Chelsea. Mr. Norman Shaw, R.A., is still leader of the style, though there are a few architects who have closely followed him. The same architect is now engaged in a mansion and church at Ilkley, and another house, "Adcote," Shropshire. Our illustrations of this class of architecture have been numerous. We may mention a mansion at Chelsea for the Right Hon. Sir R. Collier, from the design of Mr. R. Phené Spiers, and some houses in Cadogan-terrace and Hans-place, by Mr. R. Keirle; a house at Brighton, by Mr. Galsworthy Davies, in which coloured cements are introduced. Extensive street-improvements are in progress in London-street, Norwich, and High-street, Margate, leading thoroughfares of those boroughs, in Cardiff, and other towns.

But we must pass on to take a rapid glance at a few ecclesiastical buildings that have been commenced or erected during the year. Edinburgh Cathedral we have already mentioned; we may also refer to the restoration of Tewkesbury Abbey, lately completed; north porch of transept of Westminster Abbey, from a design by the late Sir G. Scott (now completing under Mr. Street); to the completion of St. Mary Abbotts, Kensington, and other buildings left by the same illustrious architect, and which have been carried out by his sons. There are a few remarkable edifices that claim notice in this category marked by some originality in the design; we may refer to the completion of the Greek church under Mr. J. O. Scott, a building designed upon quite a Byzantine model, and which we have fully described; the Jewish synagogue at Bayswater, by Messrs. Audsley, of Liverpool, an elaborate and costly structure with Saracenic detail; and a design has been prepared for St. James' Church, Westmoreland-street, Marylebone, by Mr. G. Gilbert Scott, F.S.A., a view of which we recently gave. Mr. Scott has adopted the Italian style; the original features are the arcade for bells, which forms a kind of parapet, and the architect has cleverly managed to connect the frontages on each side. The church of St. Michael and All Angels, Bedford Park, from the designs of Mr. Norman Shaw, show that gentleman's versatility in adapting Queen Anne to a building of this class, several changes from the original design have been made. We must not omit to notice a few works of interest by Mr. G. E. Street, R.A., illustrations of which have been given in our pages. Especially noteworthy is the munificent building and endowment, at the architect's own cost, of St. Mary, Holmbury, a picturesque church in Mr. Street's happiest manner. We may also name the restoration of St. Mary's, Monmouth, and a church at Speenhamland, and the completion of the fine church of St. Peter, Bournemouth. One of the many ecclesiastical works of interest to be recorded, especially as denoting the revival of the Renaissance, is Mr. H. Gribble's fine church for the Oratory, Brompton, the drawings of which have been reproduced in our pages. The design exhibits considerable grasp of the style, and the edifice, if carried out in the true spirit of the design, will rank high. Another very fine church has been completed during the year, namely, St. John's, Red Lion-square, by Mr. J. L. Pearson, A.R.A., the merits of which we have more than once descanted upon. We cannot forget to record also the proposed erection of Truro Cathedral, from the same architect's design; the cathedral at Melbourne, by Mr. Butterfield; a fine church at Leeds, by Messrs. Walker and Athron; and the adoption of Mr. J. Brooks' design for St. Mary's, Woolwich. The Metropolitan Cathedral remains as far as ever from completion. One step, it is true, has been made during the year, in a wrong direction, and the best wish we can utter is, as is most probable, it may come to nothing.

Altogether, as we pause in our retrospect, we cannot resist the conviction that the year just closed has been fairly fruitful; that a good deal less might have been done much worse, and that, in spite of much still to be learned, and perhaps more to be forgotten, English architecture may claim to have made a step or two forward—if not with the rapidity characteristic of previous years, possibly with a sureness and precision which may insure more lasting benefit.

NEW ARCHÆOLOGICAL AND SCRIPTURAL DISCOVERIES IN PHŒNICIA.

WHEN, four years ago, it was announced that an unostentatious French expedition was about to explore and unearth the archæology of the land known in ancient times as Phœnicia, few expectations were formed of the result. And, indeed, the earlier reports were far from satisfying the enthusiasm that had been awakened. It was thought that, long ago, travellers ranging the Syrian coast had exhausted the sites and ruins of Sidon, Tyre, Biblos, and Aradus—to give them their classic names—everywhere and between Mount Carmel and the river Orontes. No desolate cities were discovered, no temples or antique inscriptions, little more than indistinguishable fragments and nameless graves. Where the Hittites and the Hivites had flourished, at the foot of Lebanon, scarcely any definite remains were found, though the history of the Canaanites, at all events, dated from the age of the latter Pharaohs. But the spirit of investigation was not discouraged, and abundant riches of discovery rewarded it. Not to wander into speculation concerning the connection between this Scripturally-celebrated territory, and the monumental chronicles of old Egypt, it may be at once explained that these, the most recent researches, were aimed in four directions, in Aradus, Biblos, Sidon, and Tyre, the modern names of which are Ruad, Gebeil, Saida, and Tour. The first is an island, mentioned in the Book of Genesis, and was among the most venerable sanctuaries of Canaanites, and is little better than an isolated rock, sprinkled with habitations, separated by narrow alleys, exactly as in the time of Strabo. The buildings themselves are, in all likelihood, of no great antiquity, but they have preserved in many respects fashions which are among the oldest in the world. The inhabitants are Mohammedans at the present day, and bitterly opposed to all kinds of excavations on their soil. But the neighbouring coasts and plains were too rich in relics to allow of the archæologists being daunted by a repulse more wordy than real. They came upon miles and miles of mouldering shrines and towns, now the hiding-places of brigands, or the refuges of persecuted sects; but the iconoclastic fury of the Turk, aided by fanaticism of a different description, had battered out of recognition the temples of Adonis and Baal alike; of all the columns lying on the ground—and these were to be counted by hundreds—not one was unmutilated, and that evidently by design. There is no example upon earth, says the writer who reports these facts to the Academy at Paris, of a more complete and deliberate destruction. Yet the story which these ruins might have told must have been of unparalleled interest to the world. They would have spoken, after the lapse of centuries, through an utter confusion of languages and races. Some among them, no doubt, as the mythical Tomb of Adonis, the Monument of Ghineh, representing his fate and the Lamentations of Venus, and the Sanctuary of Apollo, buried among rocks and pines, belong to a distinctly Pagan period; but the modern City of Saida, the historical Sidon, is constructed almost exclusively of mouldering materials, every stone of which is a relic, recalling "the first-born of Canaan." Still, very few of them are of much value from an archæological point of view; there is, for the most part, nothing upon them to decipher. Separated, indeed, from this garden and cemetery—two inexhaustible mines of small antique objects—Sidon affords few evidences of its Phœnician history. Four times levelled to the ground, it would indeed have been a marvel had this city retained any, even the least, of its original form and features. So again with Tyre. The modern town is the work, built from ruins by the Saracens and the Crusaders in turn. The French expedition sought in vain, however, for any remains capable of absolute identification with those of its magnificent temples, vast port, royal palaces, great arsenals, or even high-storied private houses. But they recorded it as their belief that in these antique cities the inhabitants were far more closely packed together, and piled up more loftily, than in either nineteenth-century London or nineteenth-century Paris. They were cribbed within walls; pilgrims to the shrines were incessantly making inroads upon their space; they usually located themselves on the narrow heads of promontories jutting out into the sea, and thus the nature of their position determined in a considerable degree the character of their domestic as well as of their religious architecture.

Still, it was not with a view to these or similar generalities that the French Commission, on its first as in its latest venture, set to work. Its primary object was the discovery of objects of art and inscriptions which might have been preserved in these "cities of dust." Of Phœnician art, of course, there was never any in existence—that is, in the Egyptian, Greek, and Roman sense of the term. They were in the main a nation of utilitarians, but they borrowed a good many forms from the banks of the Nile not less than, in a later time, from Greece. The interest of the investigation consisted greatly, therefore, in the possibility of identifying and connecting in a direct chain these historical and traditional links. Nothing is more certain than that of the shrines of Adonis and Baal not a solitary trace was found. Those temples, in their second age of ruin, were the ruins of a Græco-Roman epoch; in fact, the Phœnicians were always copying, and in this circumstance is written a large chapter of their artistic and archæological history. Yet legends turned up in that country, so barren in art, of former splendours; of a shrine which might be compared with the celebrated one at Jerusalem; of stones and marbles, exquisitely quarried, of colossal pedestals, of bronze columns, with richly-wrought capitals, of precious woods and plates, of beaten metals; but nothing of this was dug up from amid the "powdered past." Some explanation is attempted here. To the geology of Greece was due, we are told, some of her long-enduring glory in architecture and sculpture. The marbles of the Syrian coast, rough and granular, and exceedingly irregular, both in their hardness and their density, could never be so finely wrought or last so long as those from the Grecian quarries. This in part gave rise to the practice of hewing monoliths out of enormous rocky masses, imitating to some extent the excavated temples and palaces of more antique times. Thus the architect became subordinate to the material, and not the material to the architect. Huge ancient structures became, indeed, quarries for more

modern builders to pillage, and fragments of Greek, Roman, Byzantine, Saracen, Templars, Hospitallers, and the Teutonic order are everywhere to be met with, though scarcely anywhere in a consistent form, They were all accustomed to plan their edifices on a Cyclopæan scale. Yet, dating from a period even anterior to the Greek, some treasures linger, in Ruad especially; fragmentary pavements of alabaster, painted with figures of griffins and sphynxes; Egyptian statuettes covered with hieroglyphic inscriptions; basalt blocks, supposed to be the pedestals of pillars, also decorated with archaic symbols; ruins of gigantic walls, of irregularly-sized stones, admirably arranged one in harmony with another, held fast by no cement, and to all appearance not artificially hewn or chipped into form. It was, however, at Amrit, in the building styled by the people of the country, in distinction to every other, "The Temple," that the most perfect example of Phœnician architecture survives. Neither at Paphos nor at Malta, says the scholarly chief of the commission, does anything exist approaching to it. In the centre of a vast quadrangular court, hollowed in the rock, rises on a solid square of stone a species of tabernacle, closed on three sides, with a mighty monolithic slab constituting its roof, and overlapping in front, and bearing traces of what to all appearance were columns that assisted in supporting it. High benches ranged on either hand along the entire length of the chamber, square hollows in the wall, apertures which have been intended to hold candelabra, projecting bands of stone upon which may have been nailed or riveted plates of metal inscribed with religious precepts or the tables of the law—all remains pretty much as Pococke saw it, suggesting the same idea as to him—that this strange interior once contained a sacred pond. To this day a fountain flows copiously in the near neighbourhood. The French archæologists, moreover, have discovered two ruins of temples which had escaped the notice of all former explorers. They had been buried out of sight these centuries past in a swamp, covered with rhododendron-bushes; both were planted on large cubical masses of the living rock; each contained a niche or retreat, above which the water could never rise; on each side are vestiges of staircases, conducting to a platform above. In one, however, a singular variation from the ordinary form was detected—a beautiful frieze running round the monolithic walls; at either end a pair of immense sculptured wings, with a globe and an eagle's head, the former encircled by a number of asps entwined together with the tails of carnivorous birds. Here were also reached the foundations and even the upper outlines of sepulchral pyramids, containing "furnace-chambers," which M. Ernest Renan goes so far as to identify with the day and generation of the Prophet Job himself; but some of the edifices were scarcely pyramidal in the accepted interpretation of the term; they had circular basements, flanked with images of lions, and surmounted by cylindrical monoliths, seven or eight yards in height, crowned in their turn by superstructures in a very composite taste, giving some hint, however, of the crenellated ramparts that are reputed to have engirdled Babylon, and bearing a strong resemblance to the Koyounditi relics to be seen at the Louvre. In some instances one pyramid is heaped on the summit of another, with colossal supports of stone sustaining the second weight, and ornaments somewhat grotesquely interspersed of alabaster slabs, coloured or engraven, animal figures, and other objects which, in the judgment of the French antiquarian might actually have been brought to this place from the valley of the Tigris or the valley of the Euphrates more than two thousand years age. There are bas-reliefs, too, entirely consonant, the one with the other; legends of Isis and Hathor; lunar discs and bull's horns. In presence of all this testimony, the French archæologists do not hesitate to affirm that, although they may not have dug among the ruins of those heathen temples, famous throughout the East in a remote era, to which dim Scriptural allusions are made, here was the shrine of Adonis—here was the Sanctuary of Baal, as stamped upon coins, as engraven on gems. It is impossible, no doubt, to distinguish, at present, amid the blended multitude of relics turning up at each stroke of the excavator's axe; but it is easy enough to separate a Roman or Grecian from an Egyptian or Assyrian group—Adonis in the costume of a Latin Emperor, and Irapta in that of a Babylonian Queen. Still, after all, most of these investigations have, hitherto, been made, comparatively speaking, on the surface. It is the subterranean Sidon that we may now expect to have brought to light, the great Necropolis, discovered a quarter of a century ago, but never yet thoroughly explored, with its cavern-tombs, mummies not in the least resembling those which have been exhumed from Egyptian graves, indications, indeed, of a state of life and manners far different from those of the Nilosia rulers or people; in fact, appearing to go beyond them and take us back to the earliest recorded annals of the human race. It is not pretended that the key to all these secrets, so intimately associated with our Biblical chronicles, has yet been found; but it is unquestionable that, even amid the pulverisation to which most of the ancient cities of Canaan have, through various causes, been reduced, outlines may be fitted together, from fragments and inferences, which may create for our imaginations something, at least, like a restoration of that marvellous life which followed the primitive times, and illustrated itself in the building of cities, and temples, and dwellings for the poor and the rich. The recent French discoveries are principally interesting as a promise of others to come.

THE GROSVENOR GALLERY EXHIBITION.

ALTHOUGH the winter exhibition of pictures at the Grosvenor Gallery cannot be said to equal the summer display, there are the usual evidences of discrimination in the selection of works which adorn the walls. The names of Alma-Tadema, Guido Bach, Boughton, Herkomer, Linton, Wimperis, Kilburne, Lessore, Poynter, Burne Jones, Watts, and some lady artists of acknowledged reputation, are sufficient guarantee to the ordinary visitor of the quality of the art-work. But the present exhibition derives additional value to the student by a choice collection of water-colour drawings contributed by the Society of Painters in Water Colours, of the Hague. Of these works it would be impossible to speak too highly. They are genuine water-colour drawings, devoid of all the artifices of style and manipulation so common among many of the artists of the English school, and as much removed from the Flemish precision as they are from the realistic effects and impressionistic handiwork of other masters. Notwithstanding all that we have said there is a mannerism in the style, but it is a mannerism distinguished for vigour and muscularity, and a fine breadth of handling in the management of the colour. Many of them one might mistake for oil-pictures, they are so full of tone and depth. The works of J. Maris, Joseph Israels, Mme. Mesdag van Houten, W. Roeloss, J. H. Weissenbruch, J. van Bakhuysen, and Miss Clara Montalba are remarkable for these qualities. No. 9, "Flowers," is a group of scattered roses, but painted with inimitable truth and feeling; the colours are broadly blended together and into the dark background, but there is nothing harsh, nor anything feeble. No. 21, "In the Park," is a broad study of foliage, by Weissenbruch; No. 24, a clever study of cows, spirited in the execution; No. 26 is a happy mingling of colour on rough paper, by J. van Bakhuysan, thoroughly truthful, though rough and broad in the tints. There is great depth of tone and breadth also in A. Neuhuys' "Baby's Dinner" (28). "Greenhithe" (30), by Miss Clara Montalba, is rather open to the charge of crudeness in finish; it is a rough sketch, in which opaque colour is largely employed in the lights. "The Embroideress," by A. Neuhuys (34), is a picture of a young girl plainly attired; it is a "tale unadorned," simply told, without accessories of any kind, the drawing being simply relieved by a background of dark colour. Miss Montalba's view of "Cannon Street Bridge," (41), is a masterly sketch in colour on straw paper, the rough surface of which, and the scumbled effect of the white pigment, helping the distant view of St, Paul's seen through one of the openings. No. 35, "At the Seaside," J. Bosboom's "Dutch Farmhouse" and "Church at Trier "(36 and 37) are bold sketches in which the colouring is exceedingly simple, but laid on with precision. Mr. Israel's picture (46), "A Workman," is oil-like in depth and opacity, a powerfully drawn face, with the lights brought out with body-colour. A. Artz and W. Roeloss exhibit two clever pieces; the latter is a fresh-looking scene, depicted with vigour. No. 40 and 47 are also both worth notice by the admirer of conscientious water-colours. Passing from these clever abstractions in colour, we come to the works of contributors many of whom have won a name by their brush. One of the first that strikes us is Madame Kate Bischop Swift's touching picture, "Où est mon Père?" a little girl asking her bereaved mother a question that has already brought tears to the eye. The tale is simply told with much depth of colour. Mr. Frank Dillon gives us a pleasing bit of Moorish architecture in his "House of the Sheikhes Sadât, Cairo" (57); the detail and sunlight in chequered spots on the wall, as it plays through the trees, are admirably rendered. One of the most striking pictures in the west gallery is Mr. Joseph Knight's grand mountain view of "Y-Garn, the Rock above Lake Idwal." (64) Mr. Knight is a consummate master of scenery of this kind, and he has here depicted, with graphic skill and impressive power, the half-concealed rock as it rises amid clouds of vapour, contrasting with the rocky and verdure-clad spur of mountain in the foreground, which projects on the right of picture. The grass and moss, and the gradation of green upon the distant slope, is a masterly piece of colour and aërial effect.

As an artist of atmospheric effects, Mr. C. E. Holloway ranks high. In this collection he has two companion pieces, No. 68, "Stormy Weather," and No. 70, "A Windy Evening," both clever renderings of sea and cloud. The latter, with its white, amber-tinted sea, and the outline of waves as they roll along the sea-wall, is very effective, while the former conveys admirably the effect intended. Few artists can be more truthful than Ed. H. Fahey is in his little picture, "The Fair Maid of the Farm." We lose, if we do not overlook, the meaning conveyed in the title, to dwell upon the charming truthfulness in the drawing of the old farm-house, one corner of which is shown, and the dexterous artifice in the opened casement, and the management of the light and reflection. Mrs. Carr Hastings contributes two small subjects of a decorative character, one entitled "Spring" (75), and the other "Winter" (80). There is certainly ability exhibited, but the ideal is spoilt by the rather unfortunate drawing

of the arm of one standing figure, while the types of beauty chosen do not commend themselves to us. Mr. H. Holiday's large picture entitled "The Rhine Maidens" (76), suggested from Richard Wagner's opera "Das Rheingold," is a fine composition. The subject represents the first part of the great German operatic composer's trilogy. The sea-nymphs, who are supposed to be at the bottom of the Rhine, are drawn with grace, and the drapery and rocky bottom is poetically conceived. The artist has fairly sustained his ideal picture by the bright green colouring. Technically, exception may be taken to the draperies and some of the details. Near this we notice a clever humoristic subject by Mr. Towneley Green, "In Difficulties" (84). The spendthrift, dressed as a young dandy of the last century, is the chief figure, and looks somewhat perplexed at the unexpected position in which he is placed, and the presence of the warrant officers, who have coolly taken their position at the door of the room, and with an insolent air of complacency are scanning their victim. A more forcibly-painted picture arrests the eye at this part of the gallery; it (85) is a life-size portrait of what appears to be a sturdy labourer, dressed in a loose shirt. The title given to the picture is "A Descendant of the Romans," and the work is by Mr. H. Herkomer, A.R.A. Without doubt, the drawing and execution of the study from real life maintains the reputation of this master of portraiture and character, as one of the most vigorous and truthful in the art of water-colour painting. The loosened shirt, the tanned and wrinkled face, are as forcibly delineated as an oil-picture, but Mr. Herkomer can wield his camel's hair-pencil with as much force as an oil-brush. Far too wild and thundery are the clouds to Mr. S. Lucas's picture, "The Road to the Mill" (87). A telling and pathetic picture is Mr. G. G. Kilburne's "A Tramp" (88). The girl giving the little fellow a mug of water, looks as pleased with her charitable office as the young shoeless urchin himself, who is sitting munching a crust near the fire, but the drawing of fireplace is faulty in perspective. Delicate in feature is No. 94, by Miss E. Martineau, a portrait of a young girl, though the drawing of neck and the shrivelled hands are indicative of age, and appear out of keeping with the theme chosen. Mr. Walter Crane exhibits, as usual, a subject of decorative character, "The Triumph of Spring" (96); it is certainly less successful than former compositions from his pencil. The goddess of Spring is seated in a car drawn by four lambs, attended by a procession, the figures in which scarcely do justice to the composition. We may pass by a few cleverly-handled subjects, such as "Dordrecht" (No. 95), a fine view; "The Dolphins," by J. Fulleylove, a clever bit of colouring; "Chrysanthemums," by J. J. Hardwick, treated with considerable discernment of colour; Mr. T. Ellis's "Music Lesson" (101), rather mannered in style, and with a touch of pre-Raphaelitism; Mr. W. E. Lockhart's "Herring Boats" (106), a masterly group of boats, boldly handled, with a skilful study of water; "Chestnuts," by Mr. W. G. Addison, who has expressively conveyed the poet's couplet—

"That hung
In masses thick with milky cones;"

a feeling study of a girl selling flowers, by Mr. E. J. Skill (110); and Mr. Jopling's "Wild Cherry Blossom" (113)—a pleasing bit of flower-painting. Among works representing themes of the poet and writer of fiction, is Mr. H. J. Stock's picture of "Sellner seeing the Spirit of his Dead Wife Playing on her Harp," from Theodor Körner's "Harp," a German drama. The artist has, with much power, conveyed the apparition, and the attitude and expression of Sellner intently looking for the image. The "View of Venice," by E. J. Poynter, recalling the lines—

"'Tis a day
Such as a day is when the sun is hid,"

is painted with much feeling. We must not omit to notice Mr. J. D. Linton's allegorical composition, No. 118, "Youth and Time," as a clever conception; the figures of the youthful lovers and Time are well drawn. Lady Lindsay's portrait, "A Child of the South" (121), is a dark beauty, with well-chiselled mouth and large black eyes, but the type of features chosen is not, perhaps, that of the loveliest. Mr. Arthur Severn gives a pleasing nocturne, "The Thames at Night, from Vauxhall Bridge" (122), bearing all the evidences of an oil-picture. A clever scenic effect is produced; the water, slightly ruffled by a breeze, reflects the hundreds of lamps along the Embankments, and the manner in which the roughened surface catches the light is cleverly handled. "Grey above the Green" (123), by A. Parsons, has some broadly-treated foliage, but we are more struck by Mr. Briton Rivière's "Daniel" (126), where the prophet is shown in the lion's den, a very ably-conceived work, admirably painted; and "Hannah's Vow," by F. Goodall, R.A., a classically-treated theme, painted with considerable feeling and taste. The figure of Hannah is gracefully drawn; she is seated on a raised platform or pedestal, and the architectural surroundings of columns, walls, and inlaid pavement are carefully introduced, so as not to obtrude upon the leading subject. We must also speak in praise of "Circe and the Friends of Ulysses," by B. Rivière, A.R.A., which equals his "Daniel," in refined work; of Miss Alice Haver's "Goosey Goosey Gander" (131); Mr. E. Wake Cook's charming study of a sunset reflection on a broad expanse of water (134); Mr. E. J. Brewtnall's "Summer Afternoon," rather spoilt in its balance of colour by the red dress; and Mr. P. R. Morris's "Silver Twilight," a feeling, silvery-toned bit, in which the meaning is cleverly conveyed. Mr. L. Lewis, in the "Gossips' Corner, Dinan," has a quaint bit of domestic architecture (143), while we must note, before passing out of this gallery, C. N. Hemy's "Sorrowful Mysteries," painted with realistic precision, and a fine effect of mountain, by J. M. Donne, in his view of the Val St. Nicholas. In the smaller gallery, devoted to water-colours, we note a few exquisite drawings; Mr. J. H. Mole has a pleasing landscape in 168, Mr. S. Green contributes a cabinet picture in his "Orchard"; while one or two, by Mr. Walter Severn, claim notice as truthful renderings of coast-scenery; such are the views of the Island of Sark, with its granitic masses of rock and syenite. Two clever pictures, by Guido Bach, "Forbidden Fruit" (199), and "A Brown Study" (219). "A Bit of Old Chelsea" (191), by T. C. Farrer, and a wonderful "Study of Sunlight" (248), by H. Herkomer, A.R.A., are also to be seen in this pleasing little gallery of the Grosvenor. In the vestibule we observe a design for the decoration of dome of staircase of Dorchester House by Sir Coutts Lindsay, showing a figure composition; a few cartoons for decoration by H. S. Marks, R.A., bold and graceful in the drawing of the figures; and some grey and white studies of classical subjects, by T. E. Harrison. Mr. G. Boughton, A.R.A., also contributes some clever works.

Not the least valuable part of the exhibition are the studies in chalk and pencil contributed by many of our leading artists, including Mr. Holman Hunt, A. Legros, Alma Tadema, Richmond, Poynter, Burne-Jones, G. F. Watts, Sir F. Leighton, and other Royal Academicians. For anatomical accuracy and foreshortening and vigour of sketching the sketch-studies of Legros must be placed in a prominent rank. They are chiefly in pencil, shaded in a very effective manner by cross lines. The sketches from life drawn before the students of the Slade School are particularly interesting; we note Nos. 299, 304, 321, 323, as inimitable works of the kind. The studies by E. Burne-Jones of figures and draperies for several of his recent pictures, such as "The Annunciation," "Sleeping Beauty," and the series illustrative of "Perseus," are also particularly good examples of painstaking work and delicate drawing; most of these are in silver point. We note also some clever decorative studies by Sir Coutts Lindsay, in white chalk on brown paper, and a few masterly studies by Sir F. Leighton, G. F. Watts, and E. J. Poynter. Many of the sketches by the latter artists are remarkable for power of composition and boldness of drawing, and a few of them are executed in black or red chalk upon brown paper. We may more particularly refer to Nos. 359, 382, 391, 393, 397, 406, 415, 419, 432. The sketches of L. Alma Tadema, R.A., exhibit, on the other hand, exquisite and elaborate drawing and detail, and to the student of art we would particularly call attention to the very suggestive and instructive lessons to be derived from these rough studies of our leading masters.

ROADS AND BRIDGES.

THE treatise recently published, written by Lieut.-Gen. H. St. Clair Wilkins, R.E., on mountain roads and bridges, will probably have a special kind of interest for readers of a military turn, who are looking forward to engineering enterprise in mountainous countries. The author has had some experience in work of this nature, and his book contains several chapters of useful information upon road-surveying and bridge-building, that will be welcome to the engineer and surveyor. General Wilkins' observations on road-construction are, it may be thought, a little too arbitrary and didactic; but they are certainly more scientific in their character than some remarks we have seen upon the same subject lately. The author takes some pains to elucidate principles, and to show the divergence of practice among engineers, and the first two chapters are devoted to the consideration of the two methods usually employed in tracing out a line of road. It is clearly shown that as a road has two directions, a lateral direction and a vertical direction, two imaginary planes, intersecting one another, must be used to fix these directions, the line so determined being the axis of the road. In short, the two planes, by the intersection of which an engineer can fix on the ground his line of road are the real plane of the earth's surface, and an ideal vertical plane passing through the axis of the intended road. "By means of the imaginary vertical plane a line is obtained on the ground which is coincident with, above or below, the axis of road which lies in the vertical plane; and by means of the imaginary horizontal plane a line is obtained which is coincident with, on one side of or on the other side of, the axis of a road which lies in the horizontal plane." These two methods of tracing out a road are defined as the vertical and horizontal methods: the first is that generally used by engineers in tracing out roads or railways on ordinary ground; by it the vertical plane passing through the centre of road is lined out, and by the second method, the inclined plane or surface of road is traced, and this is the system that prevails among road engineers. By the latter method the line traced out represents the intersection of the surface of country and a horizontally inclined

* A Treatise on Mountain Roads, Live Loads, and Bridges. With numerous Plates. By Lieut.-Gen. H. St Clair Wilkins, R.E. London: E. and F. N. Spon Charing-cross.

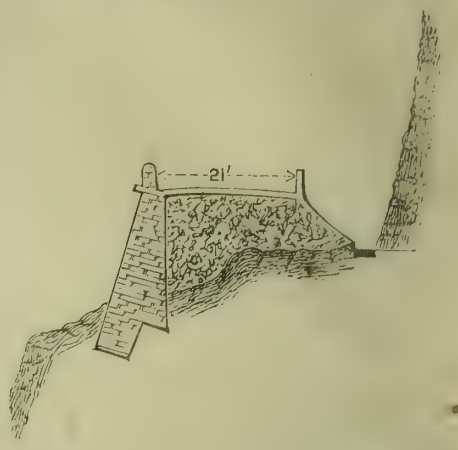
plane coincident with the surface formation of road. The author observes, and our readers will endorse the remark, that "neither method is so infallible as to be completely independent of the other;" in some cases the engineer must combine both. In side-long ground, that is on the side of a hill, the horizontal method is to be preferred; but when the ground is flat it is inapplicable, and the vertical method is to be adopted. Of course the limiting angle would be 45°; that is, for ground sloping transversely between this and the horizontal the vertical system is indicated, and ground with greater slopes than 45°, the horizontal. These two methods are next discussed in detail, into which we cannot enter here. The operations necessary for a survey are placed in the following order: 1. Reconnoissance of the country; 2. Trial longitudinal section, or rough levelling of line selected; 3. Survey plan; 4. Correction of longitudinal section; and 5. Tracing the line on the ground. It will be perceived, from what has been said of the two systems, that the vertical method is most exact in determining the lateral direction of a road, or its curvature, and the horizontal the best for giving the grades, as the section of the road is marked out by a gauge-path, and afterwards widened to the required road width. We skip over the chapter on ordinary roads, and dip at random into the principles and practice of mountain roads, which make up a large part of the treatise before us, and about which the author speaks with experience. A mountain road cannot, as a rule, be straight or level; the engineer has, therefore, to construct such a road as will entail the least expenditure of motive power, to do which he must adopt a ruling gradient suitable for the traffic to be conveyed. A gradient of 1 in 35 has been fixed for quick traffic, and even 1 in 30 fulfils the requirements of good roads. For continuous ascents 1 in 24 may be employed.

We commend to the student's attention the remarks on gradients. The author quotes Rankine, Telford, Macneill, and other writers, and some useful tables will be found, giving the vertical rise per mile at different grades. For the width of mountain roads 21ft. is recommended generally, and the sections given by the author adopt this width. The ruling gradient, or the steepest rate of inclination, is of considerable moment to be determined, as the steepest gradient that can be used makes the cheapest road. As regards sections of roadway, the opinions of Telford, Macadam, H. Law, Sir H. Parnell, Mahan, Kinnear Clark, Col. Pollard, and others are given. These are very diverse, and the author prefers the convex section to the inclined inward slope section advocated by many; he also advises for a road with a gradient of 1 in 24 a rise of 5in. for a width of 21ft.

Chapter V. contains some general instructions for the survey of a mountain road, as that, for instance, required to connect two towns on opposite sides of a mountain range some 2,000 to 4,000 feet to its summit ridge. The choice of a suitable pass or road, or the trial line, must be made by reconnoissance on horseback, with the aid of a good map; the spurs of the mountain and the streams, ought to be marked, and the clinometer may be used for the run of the trial line. It should start from the summit of the pass selected, and not be run up hill, but carried downwards. The ruling gradient must of course guide the engineer in running this trial-line, and if he can take advantage of a favourably-formed spur, he may run down into the valley and join his road to some previously-made road. As regards the scales suggested for survey plans, 1 mile to an inch for an index map and 600 feet to an inch for a survey map is recommended for slightly undulating countries. Longitudinal sections may be drawn to 600 feet to an inch for horizontal lines and 40 feet to an inch for the vertical. For very hilly ground the index map may be 600 to 1,000 feet to an inch, and the survey map 200 feet to an inch, the latter scale being also used for horizontal distances in the longitudinal sections. General Wilkins, as we have said, fixes the ruling gradient for road at 1 in 24, or 220 feet rise in a mile horizontal, and gives some very desirable hints about crossing sharp ravines, as, for instance, that the culvert or bridge should be built so as to give a level crossing. In turning sharp salients on the hills it will save trouble afterwards and give an easy turn if the chord of the curve is taken through on a level. Acute-angled zig-zags are prohibited as dangerous, and the author adduces the instance of the St. Gothard Pass on the Alps, as to the ill consequences. Traffic is impeded or stopped, and there is no room for a turn which will not reverse the traffic. Instead of zig-zags the spurs may be followed, the straight horizontal distances travelled being so much deducted from the whole direct length to be covered. Of course, in tracing a mountain road the engineer must use care and observation, so as to avoid loss of height by having recourse to a rise in a descending line, every ascent thus made to clear any obstacle is so much lost, as he is obviously no nearer the foot of the mountain than he was before he made it. If a road has to pass over such an obstacle or point, it is better to ease the ruling gradient so as to bring the line direct to it. Such are some of the practical points the engineer has to consider in planning roads over hilly districts, and which are dealt with by the author with clearness. Suitable halting-places, of course, are necessary, and advantage may be taken of plateaux for this purpose.

To overlook a slightly awkward alliteration in the heading of Chapter VI., there are a few further hints furnished on the formation of mountain-roads. The sketch plans given showing the lines of curvature, the re-entering and salient angles, and the road surface drains, and especially the road sections for roads in hard and soft soils for different slopes, will be found serviceable by engineers engaged in hilly countries or districts. The formation of catch-pools and cross-drains, culverts, &c., is explained very fully. A few useful hints as to masonry retaining-walls will be found in this chapter. Masonry retaining-walls are recommended to be at least 2ft. thick at top with a front batter of 1 in 6 and perpendicular to the rear. "The courses should be laid perpendicular to the face batter, and be built in properly-bonded courses." Weep-holes should be provided at a slope every 4ft. in every third course; the packing behind the weep holes should be of stone debris. Dry stone retaining-walls are recommended to be not less than 3ft. thick at the top, with a face batter of 1 in 4. For filling in behind these walls stone and chips are preferable to soil, and if earth is thrown in it should not be rammed, but allowed to settle. The author strongly condemns the practice of building walls with rectangular-faced stones tailing off behind, laid in rows one course upon the other, the rear portions being of chips and rough stones set at random. There is little transverse strength in such construction. Retaining-walls built with dry stone are self-draining and cheap, and, if they are carefully packed behind, seldom yield from pressure. A road must sometimes be made in cutting, sometimes embanked, and it is not necessary that it should be formed on neutral section throughout its course. We append a sketch of a good form for an embanked road given as one of the author's examples. The maintenance of roads is fully dealt with, and the various kind of rollers discussed. It may be useful to bear in mind that an 8-ton steam-roller gives an inch-width pressure of 224lb., a 10-ton roller a pressure of 280lb., and a 15-ton roller a pressure of 420lb. The estimates of cost for mountain or ordinary roads will be of service, but the bullock-carts and traffic on Indian-roads are destructive.

The larger half of the work before us



treats on road-bridges of masonry, timber, and iron, and the theory of the strains on beams and trussed girders. There is not much that can be called new in the treatment of this subject; but the tables of formulæ and dimensions of girders, and the practical working out of some of the problems are useful, and will be an acquisition to the student. A considerable space, more than can be deemed desirable, is devoted to the theory of live loads, and we may here give a few instances of the manner the subject is treated. "The effect of a moving load is so much greater," the author says, "than that of a dead load of the same weight, that different factors of safety should be applied to these loads. Thus the live load should be multiplied by

$$\frac{\text{Factor of safety live load}}{\text{Factor of safety dead load}}$$

in order to bring them both to similar conditions. This fraction is generally 10-5 for timber, 6-3 for iron, and $\frac{3}{4}$ for masonry." Live loads are classified as: 1st, the live load of a weight per foot run of roadway; 2nd, the live load of a weight per square foot of roadway; 3rd, the live load of a single moving load; 4th, the load, composed of two or more loads, moving at fixed distances apart, longitudinally, such as steam-rollers and vehicles on four wheels. Of course, the engineer must not suppose the same live load per foot run can be taken for spans of different length, as this would give too much strength to large spans. Mr. Unwin's table is given here, which gives for spans of 25 feet a live load of 2 tons; 30 feet, $1\frac{3}{4}$; 40 feet, $1\frac{1}{2}$; and 60 feet, $1\frac{1}{4}$ tons per foot run for each line of way. The author proceeds to compare these live loads, and the formulæ are afterwards illustrated by examples. These go to show that the breadth of a bridge may be such that the effect produced by the two live loads, viz., per foot run and per square foot of roadway, as that of a crowd, may be the same; when it is less than that breadth, the effect of the first kind is greater than that of the latter; and that, when the breadth exceeds it, the live load per square foot is the greater. This consideration is important in calculating the bearing capacity of bridges and passages; and the effects of passing loads, like steam-rollers, upon girders of different spans, have been more fully detailed by General Wilkins than we have seen in many other similar works. The strains on beams receive full consideration, while the formulæ for finding sectional areas have been carefully worked out, and Rankine's formulæ for deflection are used. The tables furnished, giving the strains on parts of trussed girders of different forms, are useful; these have been calculated trigonometrically; but as many students are

not proficient in trigonometrical analysis, it is to be regretted the graphic mode has not been introduced. The practical illustrations of this part may be consulted with advantage by the student, though the worked-out formulæ are rather distracting, and might have been condensed with advantage.

The effect of contracting a river by bridge-piers is well known to raise the level of the river, and the author gives some tables and data of afflux, to enable the designer to determine the space of waterway. In the chapter on masonry bridges the student will find a pretty clear exposition of the principles that should guide him in the design of abutments, piers, cut-waters, and arches, but the illustrated examples are not up to the mark. In speaking of jointing arch-stones it is stated that it is a practice to insert sheet-lead between them, and that in the Chester bridge the lead sheets are wedge-shaped, and are placed at the springing 1½ inches thick at the intrados sloping to nothing at the back. The last chapter treats on oblique or skew bridges, and a suggestion for comparing the cost of bridges is given and based on the rate of cost per cubic foot of the waterways or voids. The title of General Wilkins's work might have been simplified with advantage, and the discussion of live loads would have more rationally followed, as it is embraced under, the head of Bridges. The student will find it, however, form a useful link between the theoretical manuals like those of Rankine, and the more practical works of the engineer and surveyor.

THE CERAMIC ART OF JAPAN.

WE have received the last part of this superb work on the Art-industry of the Japanese, and may congratulate both the authors, Messrs. Audsley and Bowes, and their publishers, in producing, regardless of study and cost, so admirable a work, and the subscribers on possessing in the two volumes just completed one of the most charming books on Oriental art published in England within this century. In the part before us we have the preface, the concluding portion of the preliminary essay, and the chapters on the Kioto and Owari wares, including a list of the examples illustrated by the chromo-litho and autotype plates. The list of marks and monograms will give the work a greater value to the collector. It would be needless to say much more than we have already done as to the intrinsic merits, from an art point of view, of this work. The authors undertook a subject, however congenial and interesting it must have been to them, that required immense labour and presented many difficulties in its performance; the most elaborate processes of printing were necessary to give the work the character for truthfulness in the rendering of the originals; photography had to be brought into requisition by the artist, so as to insure, by direct means, the accurate copies of the objects, while in the chromos the same process has been used in reducing the objects for the artists employed. In their preface the authors express their acknowledgments for the services of "M. Racinet, Chevalier of the Legion of Honour, under whose personal supervision all the coloured plates have been produced, in the art-printing establishment of MM. Firmin-Didot et Cie, of Paris." In the literary part of their task it will be admitted the authors have been no less successful, considering the very scanty materials to their hands, and the orthographic difficulty in the way of translating the Japanese language correctly. But the work of classifying the varieties of porcelain and other wares has involved also ceaseless labour, requiring a careful study of the art; and the subscriber has now the advantage of studying Japanese art with more certainty than it was ever possible for him to do before Messrs. Audsley's work was published, notwithstanding the previous labours of Kœmpfer and the Department at South Kensington. In the part of the introductory essay before us the authors give an interesting description of some of the household deities of the Japanese. One of the most remarkable is Ben-zai-ten-njo or Benten, the goddess of love, beauty, and wealth. "This divinity," says the author, "does not appear to be looked upon, like the Aryan Venus, as the goddess of mere physical beauty and sensual love, but rather as the type of perfect womanhood, an accomplished, staid, and motherly individual. She is generally represented seated, in a contemplative mood, running her fingers over a stringed instrument of her own invention. As the personification of the sea, that fertile source of food and wealth to the Japanese, she is frequently represented standing or sitting on the sea-shore, playing some heavenly melody to the wave accompaniment. Where she is depicted without the instrument she carries in one hand a key and in the other the priceless pearl, and is richly attired in a blue mantle, with the sacred stole, and wears a diadem." It is said that women of all creeds pray to Benten for attractiveness, ability, and riches, and the day of the snake (held sacred to Benten) is considered to be the most propitious on which to visit her shrines, which are built near the water or on small islands. The description given of the Buddhist Inferno is also of interest, both to the artist and to the student of historic creeds. It is clear the Japanese have an idea equally terrible with that of the Christian demon. The demons are chiefly represented painted in red, blue, or green, or some rich colour; they sometimes have horns, and the horrible cruelties inflicted upon the wretched in the infernal regions present a picture of demonology at once revolting to the senses in its studied elaboration of misery. But we pass on to notice a few of the unique and superb specimens illustrated in the part. The plate of Satsuma faience contains a teapot and vase of exquisite outline and colour, made in a fine, light-tinted pâte, covered with a glaze. The finish of the vase in the possession of Mr. James L. Bowes is said to resemble polished ivory; the principal device is the Chinese imperial dragon. The teapot belongs to Sir F. Leighton, and is decorated with flowers and leaves in detached masses. Another, in which the decoration consists of horizontal lines of conventional ornament, is even more beautiful. Four Satsuma vases of the middle period, and with exquisitely simple outlines, adorn plate XIX., which is alone worth framing as a work of illustrative art of the most elaborate kind. The first vase reminds us of Late Egyptian; the ornament is thoroughly conventional and classical, and the vase itself, belonging to Mr. Val. C. Prinsep, is a priceless treasure of art; but the very mats on which the examples are shown contain a fund of suggestion for the decorative artist. We pass to an illustration comprising a few choice specimens of Ise ware; one of the dishes belongs to Mr. R. Phené Spiers; it has a drab ground, with a figure and flowering shrub, and a peculiar depression of the rim occurs on one side thoroughly Japanesque in spirit. Plate XXV. shows a rich variety of similar ware. The plate illustrating Kagu ware is very unique; the quaint dishes, and the teapot, with a rich blue scroll ornament on grey ground, are particularly rich. The Kioto ware, and particularly the deep blue Owari ware, shown on plates XXXVIII. and XLVII., are curious varieties of ceramic art.

No less interesting as studies of outline and colour are the vases and tea-bowl in Awagi and other wares on plate XLVIII. The splashed vases of blue and yellow are fine Awagi specimens. The chromo-lithos in the last part are equal in every way to the former examples; and it is not too much to say that the subscriber to the volumes of this work is really richer in the numerous specimens furnished in these elaborate and beautiful reproductions, than the owners of the treasures themselves, as he has here in classified order a pictorial museum of objects, that belong to various individuals, and are scattered over the whole kingdom.

THE INSTITUTION OF CIVIL ENGINEERS.

THE annual general meeting was held on the 23rd of December, being the Tuesday previous to Christmas-eve, as fixed by the by-laws, Mr. Bateman, F.R.S., the President, occupying the chair.

In the report of the Council it was stated that there was no more important subject for for the consideration of the members than the question whether the objects of the Society had been adequately fulfilled, and, if not, then in what way they could hereafter be more properly carried out.

A succinct account was first given of the periodical meetings for the reading of papers and for the discuss on of engineering topics, leading to a review of the publications of the Institution, which for the past five years had comprised four volumes of "Minutes of Proceedings" annually.

The members were again urged to contribute the particulars of the mode of execution, the details of construction, and the cost of works at home, as well as to furnish short notes of useful facts and deductions acquired in the course of practice and observation.

The next means that might be pointed to for promoting the objects of the Institution was the library. Tracing its gradual progress, it was remarked that at present the collection contained 15,500 separate volumes, besides about 420 volumes of pamphlets. The members were reminded that the advanced position of this unrivalled collection of technical literature could only be preserved unimpaired by suggesting the titles of important professional treatises not already in the library, and particularly by presenting copies of their own works and reports as published or printed.

An account of the operations and conditions of the Institution during the past twelve months was then rendered. From this it appeared that there had been twenty-four ordinary meetings, at which sixteen papers were read and discussed, the authors of eight of these receiving Telford premiums for their communications. Twenty-five other papers were selected for publication, and the authors of four of these had been similarly rewarded. There had also been eight student meetings, when as many papers were read, and Miller prizes had been bestowed upon four of these authors.

During the year the Council were engaged in effecting the separation of the professional from the non-professional associates, in accordance with the directions of the Special General Meeting of the 2nd December, 1878. The qualifications and antecedents of 1,670 Associates had to be separately considered, of whom 1,080 had been transferred to the group of Associate Members, leaving a residue of 590 in the original class. The elections had comprised 1 honorary member, 40 members, and 152 associate members, besides 23 associates not entitled to the privileges of corporate membership; while 68 associates had been transferred to the class of members. On the other hand, the deductions had been, by deaths, resignations and erasures, 71 members, associate members, and associates. There had been an addition in the twelve months of 1 honorary member, 79 members, and 65 associate members or associates, representing a total increase of 145. The gross numbers on the 30th of November last were: 17 honorary members, 1,140 members, 1,221 associate members, and 582 associates, making a total of 2,960, irrespective of the students. This aggregate was more than double that it was twelve years ago. The student class now numbered 584, of whom 150 were admitted last session, when 42 students were elected associate members, and 24 ceased to remain on the lists, so that the net increase had been 84.

The statement of accounts showed that the

receipts, grouped under three heads, were—from annual subscriptions and from dividends on Institution investments, £10,960 11s. 9d., from admission fees and life compositions, £2,837 12s. 6d., and from trust funds, £431 13s. 5d., together with £14,229 17s. 8d. On the other hand, the disbursements, similarly distributed, were — for ordinary expenditure, £9,826 10s. 7d. (including £4,568 19s. 3d. on account of "Minutes of Proceedings"), for Institution investments, £4,093 1s. 2d., and for trusts, £530 18s. 9d., making a total of £14,450 10s. 6d. The difference between the two sides of the account was met by the bankers' balance being less by £220 12s. 10d. than it was twelve months ago. The accumulated property of the Institution now amounted to £31,094 1s. 8d., the interest on which constituted rather more than one-tenth of the annual income. The nominal or par value of the trust funds, held for the purpose of awarding premiums, was £14,642 13s. 10d., the whole of which stood in Government securities.

In conclusion, the belief was expressed that, both in its organisation and in its method of procedure, The Institution of Civil Engineers was distinctly and definitely dedicated to the promotion of science, that its present prosperous condition might be taken as a convincing proof of the high esteem in which it was held, and that a confident hope might therefore be entertained that its practical and useful character would be as fully and as completely maintained in the future as in the years gone by.

The report having been adopted, the premiums and prizes awarded at the close of last session were presented by the President, to whom the thanks of the meeting were unanimously voted, the services of the Vice-Presidents and Council, and of the Auditors, being similarly acknowledged.

The Scrutineers (to whom a vote of thanks was passed by acclamation) reported that the following gentlemen had been duly elected to fill the several offices in the Council for the ensuing year:—Mr. William Henry Barlow, F.R.S., President; Mr. J. Abernethy, Sir W. G. Armstrong, C.B., F.R.S., Sir J. W. Bazalgette, C.B., and Mr. J. Brunlees, Vice-Presidents; Mr. G. Berkley, Mr. F. J. Bramwell, F.R.S., Mr. G. B. Bruce, Sir John Coode, Mr. E. A. Cowper, Mr. A. Giles, M.P., Sir Charles A. Hartley, Mr. H. Hayter, Dr. W. Pole, F.R.S., Mr. R. Rawlinson, C.B., Dr. C. W. Siemens, F.R.S., Mr. D. Stevenson, Sir W. Thomson, F.R.S., Sir Jos. Whitworth, Bart., F.R.S., and Mr. E. Woods, other Members of Council.

ARTISANS, AMATEURS, AND ARTISTS.

MR. T. GAMBIER PARRY delivered a Presidential address to the students of, and subscribers to, the School of Art, Gloucester, on Monday week, in connection with the annual distribution of prizes. Having expressed his gratification at the large number of drawings by the pupils retained for national competition, and at a national prize-medal having been awarded to Miss Mary Garland's monochrome picture of the figure from the Medicis tomb at Florence, Mr. Gambier Parry passed on to more general subjects. A school of art is, he remarked, designed for the benefit of three distinctly different courses of life—that of the artisan, the amateur, and the artist. It would be to the advantage of the first of these if he realised, and, if after doing so, he cared for, the sort of profit to be got from such a school. Everything is profit or loss to him. The trade view of life is right when it regards nothing so good for a beginner as apprenticeship and tough experience. That view is altogether right; the only questions are, What is the best sort of apprenticeship, and What is the shortest road to experience? One thing appears to be very certain: in all such matters as relate to the artisan, namely, that if the principles of trades-unions are to dominate the country, all good work must be squeezed out of the artisan by that fundamental rule, of which it is scarcely an exaggeration to say that in each distinct department of every trade it measures and restrains the work and value of the best and ablest man by the calibre of the worst and weakest, destroying all interest in the work itself, cutting all heart out of a man's life, by restrictions not only on his hands but on his gains, scattering to contempt all thought of conscientious reward, and cutting at the very root of all moral excellence in industry, energy, or perseverance. If there be any institution based on principles and actuated by motives the very opposite of all these, it is an art school. Its leading purpose is to engage both heart and mind in every branch of work, to help and encourage the weak, and give direction to the strong. It teaches to all the reasons for what they do, it lightens labour by the interest thus thrown into and around it, and it brightens all drudgery by intelligence. But all this is only to be got by work. An art school is no mere place for amusement. All the success to which it can lead depends on courageous perseverance. What is it that an artisan most requires, but that knowledge and experience which make him master of his trade?—but on what do this knowledge and experience depend but the training of the faculties of head and hand? An art school affords that training. Its one great ultimate end and object is that training. As an institution aided by Government grants, or in other words supported in a degree by public taxation, an art school would have no excuse for its existence but on the grounds of its educational power and value to all classes of the population. If artisans would freely avail themselves of all taught in these schools their power would be great. It may be that a man would be set to some work in the school that would seem to have little or nothing to do with the trade he intended to pursue. The difficulty is to make people understand the meaning of education. It seems most natural to make all education special; but experience has long since proved that just as to know one thing perfectly a man must first know a great many other things well, so it is with all manual labour. Any perfect work, no matter of what sort it be, is simply and in truth the focus on which a wide and laborious education has been concentrated. No work, even the most mechanical, has much value unless it has a certain amount of brains mixed up with it. The child of the commonest labourer gets his money's worth out of the parish school by the increased intelligence he is enabled to bring to bear on the labour for which he is paid. It is the skilled artisan, or the pupil who is to be one, for whom our art schools are designed. He will get his money's worth by his work therein. For what is the effect of the training in the first principles of delineation but that of clearing off all mental cobwebs by the practice of observation? No one can delineate anything that he does not understand. What is all bad drawing but simply a want of understanding what is drawn? Your mind must first analyse the component parts of any object before you can delineate it. If, then, anyone goes seriously to work to do so, I beg you to realise what a step in his education he has made. His perception is so far cleared, because his eye has been turned to analyse, and his handiwork is all the firmer by the increased firmness of his brain. Such is the theory on which the education of a skilled artisan is based. If a man will only have the confidence and the industry to bear the discipline to which he would be called on to submit in the classes of geometry, perspective, and construction, and then pursue those subjects to their ultimate object, to wit, that clear comprehension on which the correct representation of all objects depends, he will have laid a most certain foundation of success in any trade or business where study, thought, trained eye, and skilled hand, would earn his honourable livelihood. Now, I will turn to the second class of persons for whom an art school is intended:—the amateur. In doing so, I confess I have very considerable difficulty, because it is extremely difficult to give a definition of an amateur. In the first place, it may be said there are two classes of amateurs: one, the amateur proper, the other, the dilettante. The latter is an exceedingly pleasant fellow, a sort of cosmopolitan, who knows just enough about everything to enjoy life; but, while he is a very pleasant, he is, too often, an extremely ignorant fellow. The amateur proper goes further beneath the surface of things in art, and devotes himself, in a certain degree, to it. The amateur proper occupies somewhat the same relation to the Royal Academician as a half-fledged does to a full-fledged bird. The amateur, however, sometimes knows more than the Royal Academician, because he often has more leisure and means; but the dreadful part of the business with regard to the amateur, and one of the reasons why he is so entirely inferior to the professional artist, is that the unfortunate amateur is always miserably out of practice. Whilst, Mr. Gambier Parry added, he recognised the great accomplishments of the Royal Academicians who were appointed to the Slade professorships at the University, he yet thought it would be of very great value to many of the pupils if occasionally a distinguished amateur were made a Slade professor, because he considered the freshness and freedom of the ordinary amateur's mind would very likely be the means of finding avenues to the sympathies of many pupils, and touch chords in their hearts and raise music in their souls which the more careful and cautious Royal Academician would fail to produce. He had said enough about the amateur, and now he would proceed to the artist himself, in regard to whom he would prefer to say but little. Fortunately, in that room he was not talking to professional artists, but to pupils who possibly intended to be professional artists, and that was a very different matter. At the risk of appearing to weary them by repetition, he would urge them to give their utmost diligence to what he would term the pothooks and hangers of art, construction, perspective, and geometrical drawing, and also to become so familiar with the materials of their art that they would avoid the great fault of young artists of looking more to their drawing than they did to nature. These simple things he had indicated were what they should keep in mind if ever they wished to become professional artists. There was a certain amount of mechanism and method to be mastered before attaining any art. A man might have a soul bursting with poetry, and yet he would make but a poor artist unless he had mastered his tools. Another thing he urged upon the pupils was to take great care to master the first principles of design, and, as soon as they possibly could, to commence figure-drawing, as a preliminary help to which he again advised the study of geometry. In conclusion, he said: The noblest ambition of an artist is not his own distinction. His work is to contribute to human happiness, and his best work is that which does so by the power of a pure and noble motive, which animates his heart because it animates himself. His work is a form of poetry. No work that can be worthy of the name of fine art can be otherwise. His choice of means is as wide as Nature, but his power of expression is bounded by himself. It is not everyone that has the power to originate; but it is no mean talent so to hold the mirror up to Nature as to reproduce in others the poetry which he learns from the things about him. It may be the talent of another man to affect his fellows by the ideal creations of his own imagination. But whatever it may be, whatever form fine art may assume, realistic or ideal, all its worth and power depends on the embodiment and expression of an artist's own sympathies, on the vital force which his work exerts in other minds; to fascinate and elevate them by his own devotion for all that is purest best and noblest—that lies not merely upon, but deep below the surface of our mortal life.

THE SHRINE OF THOMAS À BECKET.

A SOMEWHAT interesting addition has just been made to the library of Canterbury Cathedral, in the shape of a reconstructive drawing, by Mr. Watson Warman, whose large work on the organ (now publishing in the *English Mechanic*) we have once or twice had occasion to mention.

The drawing—which is to scale—represents the shrine-tomb of Thomas à Becket, as it stood complete from the date of its first construction, until its demolition, by order of Henry VIII. The representation is, of course, partly conjectural; it cannot, however, be far from the truth, for the chief dimensions are set by the actually existing marks and channelings left by the shrine-base itself; and also by the large blocks of marble which formed the lower courses or steps of this base—which steps, fortunately, yet remain, having been employed to make up the huge gap in the pavement left by the demolition of the shrine. The fact of the present pavings consisting of these fine blocks of marble does not seem to have been suspected till recently, and the credit of its discovery is, we believe, to be attributed to one of the officers of the Cathedral.

The detail of the drawing is filled in from the representation of the shrine, which is given in

one of the stained-windows—which was executed while the shrine was yet standing.

The Dean and Chapter will, doubtless, have the five steps raised and replaced as far as possible in their original position; and this might bring to light some portions of the shrine itself—possibly stored away in the pockets of the crypt-vaulting beneath.

A photograph of Mr. Warman's drawing may be obtained in Canterbury.

INARTISTIC JEWELLERY.

IN a thoughtful paper—the first of a series, on Decorative Art, in the *Magazine of Art*, Mr. Lewis F. Day writes about jewellery as follows:—

"Look at the jewellery we wear. There, if anywhere, is an opportunity for the exercise of refined and delicate appreciation of what is beautiful, for in most cases beauty is the only excuse for its existence. If we cannot afford to wear intrinsically beautiful trinketry, we can do very well without it. Not that there is any reason why it should be costly. The jewellery until recently worn by the peasant women of Normandy, Norway, Switzerland, and other European countries, now in imminent danger of being altogether superseded by the attractions of more modern, showier, and altogether worthless Parisian and Viennese manufactures, was strictly peasant-jewellery—the metal chiefly silver, and the stones chiefly garnets; but it was good work and well designed, worth transmitting from mother to daughter, and not fit only to be flung under foot when the fashion had passed by. Men of taste have been collecting and buying up the old examples of this kind of work. Will anyone be likely to buy up the flimsy trumpery that has superseded it?

"Even the costly work now found in our best shops will be chiefly valuable for the weight of its gold and the water of its diamonds. There is this to be said of the better class of modern English goldsmith's work, that a certain honesty characterises it. It suggests 'value received.' But this very character shows how little the artistic element in design is considered or sought after. The Indian jeweller, according to Dr. Birdwood, thinks nothing of the intrinsic value of the precious stones he employs. He is an artist, and to him the value is in their colour, sheen, effect; he cares as much for them as a painter cares for his pigments, and no more. They are simply a means to his decorative end. The consequence is that he is able to use rich emeralds and rubies as lavishly as if they were enamel, and wherever he wants a point of light, bits of diamond are at hand, commercially of no value, but artistically as valuable as though they were priceless.

"Our idea of jewellery is altogether the reverse of this. We must have fine and flawless stones, and thick masses of heavy gold. At great cost we succeed in producing poor, cold, lifeless rings of gold, more like gilded fetters, studded with isolated stones; or we throw rare diamonds together *en masse*, producing, at fabulous cost, an effect far less gorgeous than the comparatively inexpensive Eastern work. The art among us appears almost to decrease in proportion to the increase of the value of the materials. Sometimes we see a gem that a collector might envy, more often a diamond that is not ill-set, but never a ring that Holbein or Cellina might have been proud to have designed. With regard to diamonds, the greater the quantity of precious stones, the more closely they seem to have been put together, after the pattern of the flaring illuminations which draw attention to the entrances of the London theatres.

"The root of all evil here, and in so many other arts, is the innate and seemingly irrepressible passion for display, which finds vent among the poorer classes in Brummagem jewellery, and shows itself in rich ones in the choice of watch-chains, necklets, tiaras, and bracelets, whose sole value and sole interest consist in the number of rare diamonds and the weight of gold. Only in so far as they are beautiful do such things deserve the slightest attention from a decorative point of view. Diamonds may be a valuable investment, a convenient form of settling money on one's wife, a ready means of advertising one's wealth; but this has nothing to do with art. The Indian craftsman is altogether in the right, and every artist among us must sympathise with him. Those who do not, those to whom money value is more than beauty, can lay no claim to any feeling for art. The clumsy ornaments so much in vogue with us are none the less blunders that the blundering is peculiarly British. It is always dangerous to dogmatise, but I dare to say that, in pure luxuries like jewellery, the value of the art expended on an object should invariably be in excess of that of the mere matter on which it is expended. The fact that a thousand pounds' worth of diamonds are thrown together without a thousand pennies' worth of art is conclusive proof in itself that the wearer does not put on jewels for the sake of ornament. The love of show which is here so unpleasantly prominent steps in everywhere in decorative and domestic art, and leads us astray from the simplicity and modesty that are at the bottom of all good work, and that should especially characterise the art that we live with every day."

ARCHÆOLOGICAL.

IMPORTANT ANCIENT INSCRIPTION IN THE RUINS OF DJERABIS.—The *Cologne Gazette* has received from Professor Edward Sachau, who is travelling in Asiatic Turkey, a letter dated Biredjik, on the Euphrates, November 29, in which the writer says:—"During a stay of two days I have examined the ruins of Djerabis more closely and inspected the excavations which Mr. Henderson, the representative of England in Aleppo, has been carrying on there for the past two years. He is now on the point of commencing his third season on the work. Djerabis or Jerabis (not Djerabolos or Jerabolos, as it is written in English papers) is an extensive field of ruins, a town with a citadel, on the western bank of the Euphrates, a short day's journey south of Biredjik. The ruins consist of a soft and very porous limestone, which in the course of time has become quite gray and covered with fungous accretions. These ruins are the remains of the Macedonian settlement, Europus (Εὐρωπος), Djerabis or Jerabis being the Arabian pronunciation of Europus. This was a city which played its chief part under the Byzantine Emperors as a frontier fortress of the Eastern Empire against the Persians and Arabians. Since the excavations carried out by Mr. Henderson, it is now beyond doubt that Europus was built out of and upon the ruins of a considerably older city, and the latest excavations identify the latter with the city called in the Scriptures Karchemish, and which in the Assyrian arrow-headed inscriptions appears as Gargamis. This was the chief city of the nation of Hethites, who for centuries prevented the Assyrians penetrating westward to the Mediterranean. Not long before 700 B.C. they were subjugated by the Assyrians, and Karchemish became a provincial town of the great empire of the Assyrians. Let this deduction, however, be confirmed or not, the results of Mr. Henderson's excavations are before us and require an explanation. I have seen on the spot the following three monuments:—First, a large square limestone block; upon it is a high relief representing a lion stretched out at length, against which two persons are advancing. Secondly, the lower halves of two great basaltic blocks, representing in high relief the lower halves of three persons. Thirdly, a column-like stone of a similar kind, with an inscription on one side and on the other apparently the figure of a woman. The inscription is perfectly clear, and consists of the pictures of animals, animals' heads, and many other signs or characters which for the present are quite enigmatical. In spite of some similarities with the writing on the often-mentioned stones from Hamath, now preserved in the Stamboul Museum, the above inscription is not all in the same character or language as the latter. At first sight the costumes appear purely Assyrian, but on careful inspection numerous details are discovered which are not at all Assyrian. These monuments will probably soon be floating on rafts down the Euphrates, and then find their way over the sea to the British Museum."

ROMAN REMAINS.—At Salisberg, between Hanau and Kesselstadt, the foundations of a Roman house have been discovered, the walls of which were a yard thick and about 31ft. and 37ft. long respectively. In the middle of the enclosed space a vaulted room was found, and in the neighbourhood several earthenware vessels, very perfectly finished. About 35 paces away a considerable portion of the walls of another Roman house was previously discovered, and also at various times Roman coins, tombs, and a legionary stone. Dr. Albert Duncker concludes from all these *data* that the place is the site of a considerable Roman settlement, and that a careful exploration would bring many interesting objects to light.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

LEEDS ARCHITECTURAL ASSOCIATION.—The third annual report, for the session 1879-80, has just been forwarded to us. The Committee congratulate members on the fact that the past session has been the most successful yet passed through. Efforts have been made, in arranging the series of papers for the new session, to provide as much variety of subject as possible, and the Committee urge upon members a punctual and regular attendance at the meetings, in order to promote the welfare and interests of the Guild. Some advice is given to the younger members, now serving their articles in architects' offices, to make judicious use of their leisure time, and to perfect themselves in the many branches of the profession, the importance of a knowledge of construction and of sanitary arrangements being specially insisted upon. During the past session papers were read on iron-roof construction, fire-resisting structures, Elizabethan architecture, parallels of English architecture, the Paris Exhibition and its lessons, house-planning, theatre constructing, sanitary appliances, fireproof construction, and Renaissance architecture, and visits were paid to Wakefield, Leeds, Kirkstall Abbey, Lincoln Cathedral, Nottingham Science Schools, Ilkeley, and York. The class meetings of construction and design were again held during the winter months, but the attendance was small, and the class of work done at them not so satisfactory as might have been expected. At a meeting for the election of officers, Mr. Alexander Crawford was again elected president, and Mr. G. Corson and Mr. H. Walker vice-presidents; the only changes on the Committee were the election of Mr. G. B. Bulmer, in place of Mr. D. Dodgson, resigned, and Mr. T. Ambler in place of Mr. H. Perkin. Mr. G. B. Bulmer was appointed librarian in place of Mr. J. R. Watson; and Mr. J. W. Connon and Mr. C. H. Thornton were elected auditors. In point of numbers the Association remains in a nearly stationary condition, now numbering 86 members, as against 85 last year. The smallness of the increase is attributed to the continued depression in trade, necessitating removals from the neighbourhood of some members. The result of the competition for the prizes was as follows:—The best set of measured drawings—the silver medal of the association to Mr. G. Beaumont. For sets of sketches produced at the class meetings—first prize to Mr. W. Riley; second prize to Mr. H. Brown. Figure drawing from the cast—prize to Mr. W. Riley. For designs for a mechanics' institution for a small town, Mr. W. Riley's and Mr. J. Jackson's designs were considered equal in merit, and they were together awarded the first and second prizes, to be divided between them. For drawing of antique oak cabinet—prize to Mr. W. Riley. The next meeting of the association will be held on Thursday week, the 15th inst., when Mr. Maurice B. Adams, A.R.I.B.A., of London, will read a paper entitled "Art in the Conservatory and Greenhouse."

A serious slip occurred on Tuesday week on the North Cliff, Scarborough. A section of the cliff, 80 yards in length, and averaging 9ft. in breadth, with the footpath, kerbstone, and railings, fell upon the flat that existed between the top and the sea level, and which flat, since it was laid out a few years ago from the plans of Mr. J. F. Fairbank, C.E., as a public pleasure-ground, has been known as the Rock Gardens. The Corporation have directed the borough surveyor to fence off the road and take other temporary means for protecting the public, and to bring up a report as to the best measures for preventing an extension of the subsidence.

At a meeting held at Durham, on Tuesday week, resolutions were passed, approving of the erection of the proposed North-Eastern Middle Class County School on a site at Barnard Castle, and pledging the meeting to take steps for raising the remainder of the sum required to meet the offers of endowment from a legacy, local charities, and subscriptions in hand. The scheme is for lower-class boarding-school for 300 boys, and the estimated outlay is £1,500 for site, £15,000 for building, and £2,000 for furnishing.

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ILLUSTRATIONS.

SECOND PREMIATED DESIGN FOR THE CITY OF LONDON SCHOOL. — ST. MARY'S CHURCH, BRIGHTON. — ROYAL ACADEMY GOLD-MEDAL DESIGN FOR A BAPTISTERY.— S.E. VIEW OF GREAT HALL, GLASGOW UNIVERSITY.—THE HOSTELRY AND STORES AT BEDFORD PARK.

OUR LITHOGRAPHIC ILLUSTRATIONS.

CITY OF LONDON SCHOOL.

WE illustrate this week the design, under the motto "Playgrounds," submitted by Mr. T. E. Knightley, of 106, Cannon-street, E.C., and which obtained the second premium of £200. Mr. Knightley placed the large hall in the rear portion of the site taken up by the buildings, with its sides parallel to the proposed side street, and designed it to be approached from the Embankment, through the entrance-hall, containing the main staircase. The class-rooms were placed on either side of the large hall at the ground and one-pair floor levels. The laboratory and chemistry class-rooms were placed in the front portion of the building, on the one-pair floor; the lecture-room on the same floor, facing the side street, and the dining-rooms on the opposite side, the kitchen, &c., being on the two-pair floor, over the dining-rooms. The basement was set apart entirely for covered playgrounds, hat and cloak-rooms, and lavatories, and the large open spaces on two sides of the block of buildings were left as playgrounds. The style, adapted to modern requirements, was that of the French Renaissance, an attempt having been made to impart to it a collegiate aspect. The drawing from which our illustration was photo-lithographed was prepared by Mr. William Penstone from the coloured perspective view submitted in the competition.

ST. MARY'S CHURCH, BRIGHTON.

THE exterior view is to show design of proposed future tower. The lower portion forms porch, and above the ringer's loft, belfry, and water-tank, in case of fire. The church is built of red bricks and red stone dressings outside, and is faced internally with red and white bricks and Bath stone dressings. It is arranged to accommodate 900 persons. The plan consists of nave and aisles, transepts and apsidal-ended chancel with chapels, a baptistery at west end with two entrances—one in tower and one in porch, giving access to nave and aisles. There are also two other entrances, one in each chancel chapel. The vestries are connected by a passage behind reredos. The chancel is floored with marble mosaics, in patterns of flowers and three figures representing Faith, Hope, and Charity. These figures are two-thirds life size. The stalls and reading-desk are richly carved with foliage and figures in American walnut-wood. The pulpit is of Caen stone, octagon in shape, on columns and vaulting, with beautifully-carved panels in low relief of three scenes from the life of Christ. The font is of alabaster, also sculptured by Mr. Nicholls, and the inscription says it is in memory of the Rev. Julius Elliott, a former incumbent of the church, a son of the founder of the old St. Mary's, which this one replaces. The chancel, transepts, and aisles are vaulted, and the nave has a boarded wooden roof.

ROYAL ACADEMY GOLD-MEDAL DESIGN FOR A BAPTISTERY.

WE illustrate to-day the Gold Medal Design from the Royal Academy of Arts, for a Baptistery, the author being Mr. Frank T. Baggallay. Our double-page plate includes the several plans of the building, and in an early number we propose to give the author's large-scale detail drawing, as well as the extra-medal plan for the same building which was designed by Mr. Ince. Mr. Baggallay won his prize honestly and well, and in a competition where all the designs submitted were of unusual merit. We reviewed the series in the BUILDING NEWS for Dec. 12th. The following extracts from the Dictionary of the "Architectural Publication Society" may be of interest. "By a Baptistery is to be understood an octagonal building . . adjacent to a church but no part of it. All the middle part of this building was one large hall, capable of containing a great multitude of people: the sides were parted off and divided into rooms. . . In the middle of the great hall was the octagon bath, which, strictly speaking, was the Baptistery, and from which the whole building was denominated. Water was conveyed to one or more of the side rooms for the separate baptism of women. Some of these surrounding rooms were vestries, schoolrooms, &c." From "Hope's Historical Esssay": "Baptisteries are usually polygonal, as distinguished from the sepulchral chapels, which are circular." Mr. Baggallay's motto was "Detur Digniori."

THE GREAT HALL, GLASGOW UNIVERSITY.

IN our Christmas Double Number, a fortnight since, we gave a double-page plate illustrating the interior of this building as at first intended, but in execution some modification took place in the interior planning. To-day we give the exterior view of the same building, as executed, together with a block plan of the whole university as carried out, the large or "Bute Hall" being in the centre of the buildings dividing the two quads. This hall formed an important feature in the original design for the college buildings, but was postponed at the time for want of funds to complete the scheme. By the generosity of the Marquis of Bute the college authorities were enabled to proceed with the hall, and the present scheme is the fourth of a series of designs prepared by their late architect, Sir Gilbert Scott. The hall measures 100ft. in length by nearly 70ft. across, and has a height of about 75ft. It is lighted by two ranges of windows on each side, the lower ones being beneath the gallery. The roof is supported by iron columns, which divide the hall into a wide central span and aisles. These columns support arches of wood, divided by niches containing figures; above runs an ornamented cornice, from which the vault of the roof, which is richly panelled, springs. At one end of the hall is placed a large apartment opening into it through a lofty arch. This will not, however, be commenced immediately, as will be the case with the grand staircase, designed to occupy a corresponding position at the opposite end. The hall is raised above the ground level by an open cloister. The external elevations of the hall are flanked by massive circular turrets, rising the full height of its walls, and crowned by pyramidal roofs. These are simply and severely treated, so as to contrast with the elaborate windows and buttresses of the hall. The total cost of the hall, as given by the Marquis of Bute, will be nearly £45,000, while that of the sub-story, which is being built by the University, is about £18,000. The works are being carried out by Mr. John Thompson, of Peterborough, who was the contractor for the whole of these buildings, under the direction of Messrs. G. Gilbert and John Oldrid Scott, who were appointed by the University to succeed their late father, Sir G. G. Scott. The building has now made considerable progress, the walls having been erected to nearly half their full height.

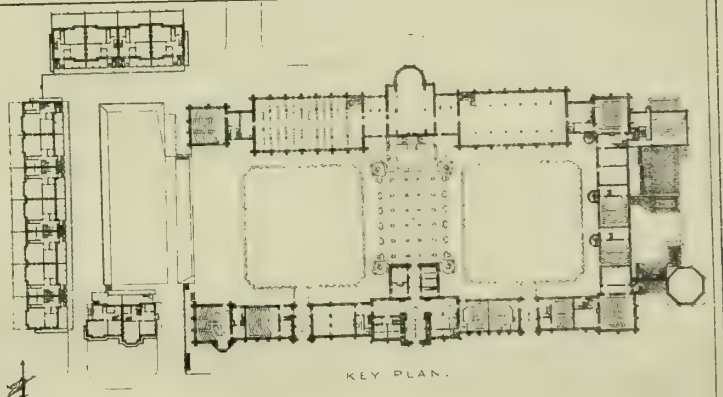
THE HOSTELRY AND "THE STORES," BEDFORD PARK, CHISWICK.

AMONG our lithographic plates to-day we illustrate an interesting block of buildings now in course of erection at Bedford Park, Chiswick. The row comprises the inn or hostel and "the stores," adjoining which is a private house, intended probably as a residence for the manager of "the stores." The site at the rear abuts on to the garden of the station-master, and the frontage faces the Bath-road, on the opposite side of which stands the church, now approaching completion. The present design, like the rest of the buildings on the estate, is the production of Mr. R. Norman Shaw, R.A., whose work at Bedford Park, taking it as a whole, will ever be associated with his most conspicuous undertakings, possessing, as it does, a freshness of purpose and novelty of idea not found probably in any similar contemporary enterprise. The drawing-room of the club-house has been made available during the present winter for a series of "evenings," and for the meetings of the B. P. Musical Society, but as the club-house is so continuously used by the members, a meeting-hall elsewhere is very much needed, and so a suitable room is provided on the first floor of the hostelry which we illustrate to-day, and it will be seen by reference to the plans that a private or hotel-entrance is arranged, to secure the use of the meeting-room distinct from the business of the house. "The stores" will be conducted on the same principles as the "Civil Service" and other large co-operative establishments, so that the residents of Bedford Park will have a series of shops all within one building, without leaving the boundary of the estate. Red brick will be used for the faced work, the upper portions being executed in rough cast, except the gables of the inn, which are to be tile-hung. Tiles will also be used for the roofs. The sign of the inn is suspended from the front of the building, as shown on the elevation.

COMPETITIONS.

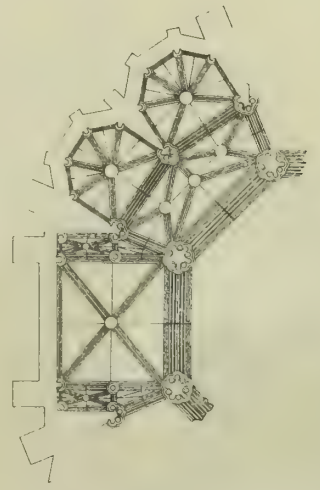
HULL BOROUGH LUNATIC-ASYLUM.—A meeting of the Hull Asylum Committee was held on Monday week at the Town Hall. The minutes referred at considerable length to the interview between the committee and the Justices on the previous Friday, and the points placed by the committee to induce the Justices to alter their decision, and accept the least expensive of three selected plans for a new asylum. On the motion of Ald. Chapman, seconded by Dr. Gibson, the following resolution was adopted:—That, considering, 1st, That Mr. Hartley, in his report on the competitive plans for the proposed new Borough Asylum, states—"It has not in some cases been an easy task to fairly balance their good features or disadvantages in comparison with each other," and only "after much deliberation," selected the design marked "Argus;" 2nd, that the plans of "Lucidus Ordo," to which the third prize has been awarded, are less expensive in cost of construction by £10,000, with room for the same number of patients, and the working expenses of an asylum built according to these plans are estimated to be at least £200 a year (equal to £5,000 capital) less than an asylum built according to the design of "Argus;" 3rd, that, although it had been arranged when the Justices met to decide on the plans to be adopted, this committee was to be present in the interests of the ratepayers, yet the Town Clerk's letter to the Magistrates' Clerk of the 6th inst., asking for an interview for this purpose, remained five days in the possession of that gentleman previous to the meeting at which the design "Argus" was selected, without any information being conveyed to this committee as to when and where such meeting was to be held; 4, that while not disputing Mr. Hartley's award of prizes, the plans of "Lucidus Ordo" are for all practical purposes most suited to the wants of the town. The committee, under these circumstances, and in the interests of the ratepayers, most respectfully beg the Lunacy Commissioners to approve of the design of "Lucidus Ordo," in preference to the much more costly one of "Argus." It was also resolved that the Town Clerk forward a print of this and all resolutions bearing on the matter since the 29th September to the Lunacy Commissioners, and requesting an interview to a deputation from the committee.

GLASGOW UNIVERSITY BUILDINGS
S.E. VIEW OF GREAT HALL, *as proposed.*



ROYAL ACADEMY GOLD MEDAL FOR ARCHITECTURE 1879

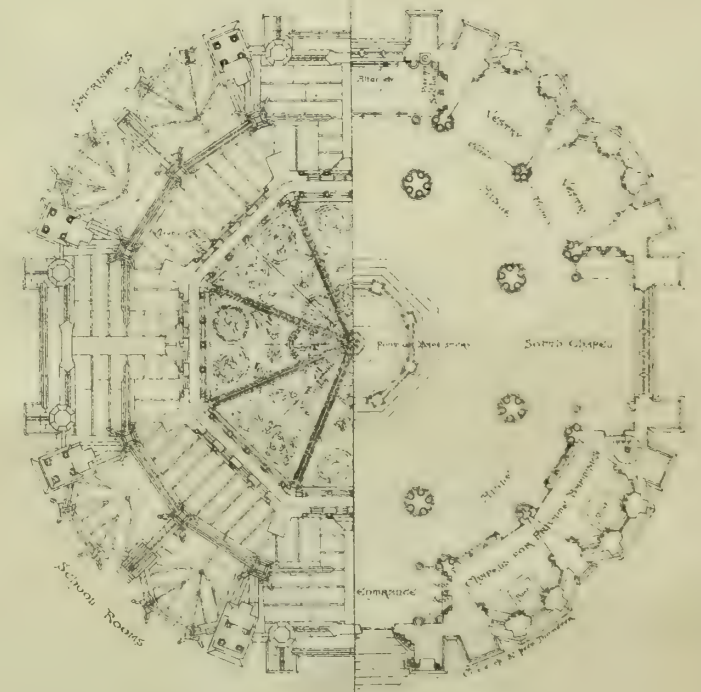
THE PRIZE DESIGN BY F.T. BAGGALLAY.



Quarter Section Plan of Vaulting to Nave and Chapels



Quarter Plan at Triforium level


Sacristy
Altar
Vestry
Nave
Aisle
Choir
Nave
Aisle
Vestry
Sacristy
Organ
Choir
Nave
Aisle
Vestry
Sacristy
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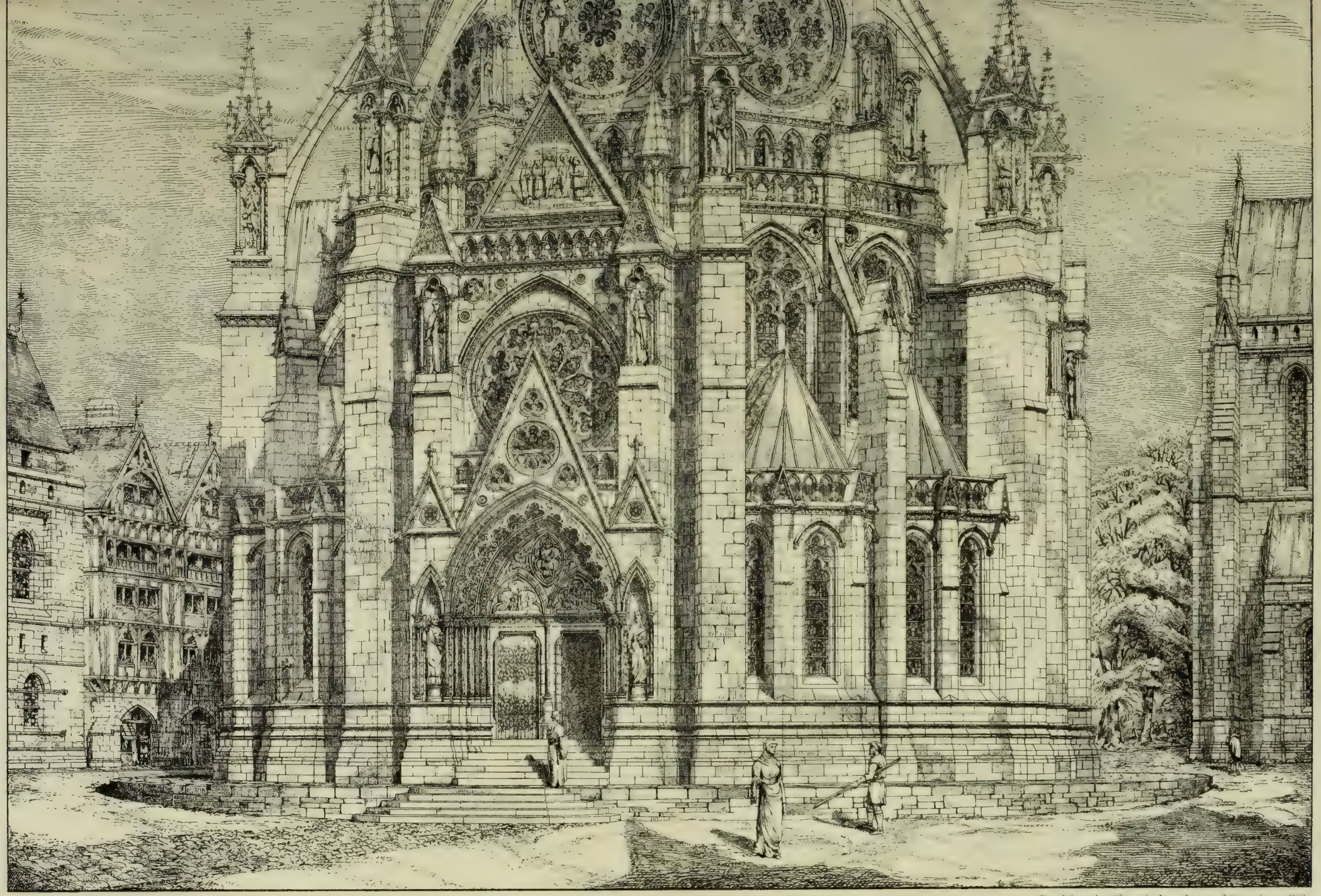


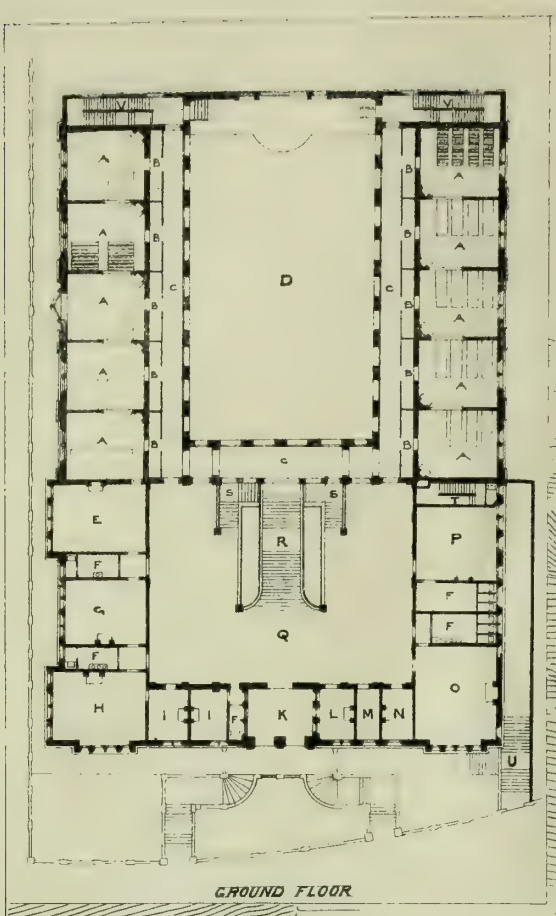
Plate Lithographed Printed by James Akerman 6 Queen Square W.C.

Design for a Baptistery

Design Plate

CITY OF LONDON S

SECOND PREMIATED DE

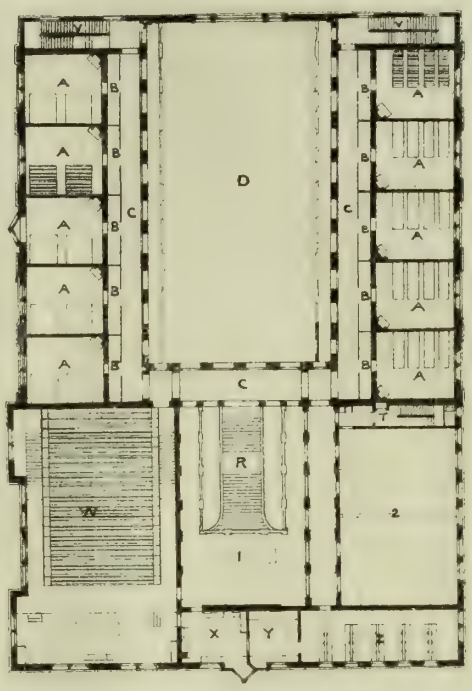


GROUND FLOOR

Wm Penstone, del.

HOOLS

GN. T.E.KNIGHTLEY
ARCHITECT



FIRST FLOOR

Photo Lithographed & Printed by James Akerman 6, Queen Square W C

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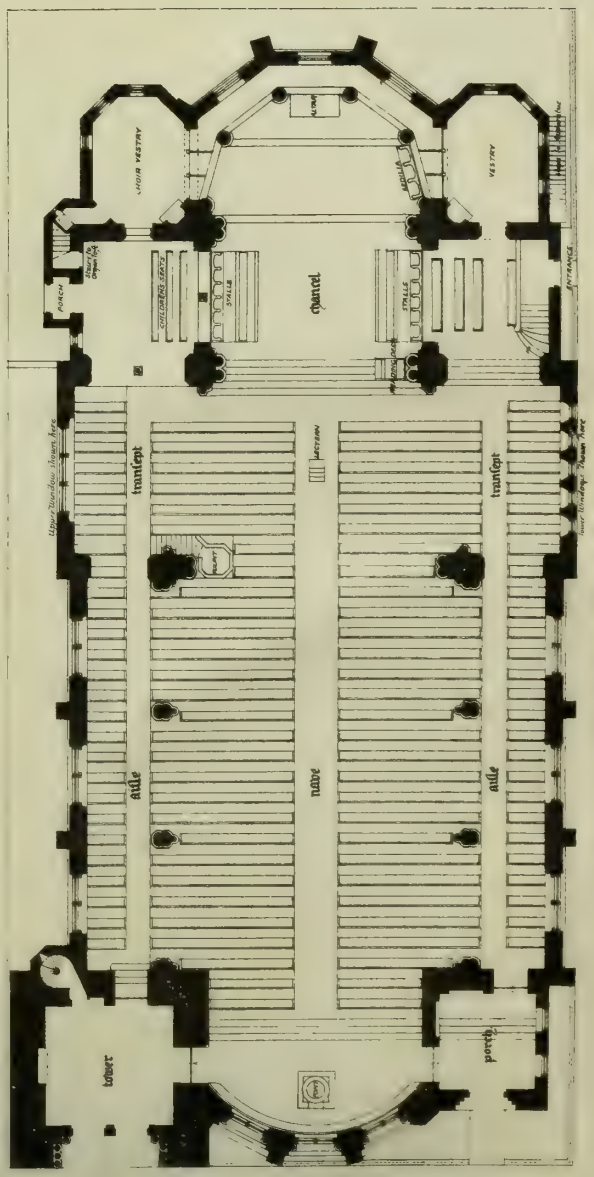

chancel
transept
transept
aisle
aisle
nave
tower
porch



Photo Lithographed & Printed by James Akerman 6 Queen Square W.C.

S. MARY'S CHURCH BRIGHTON

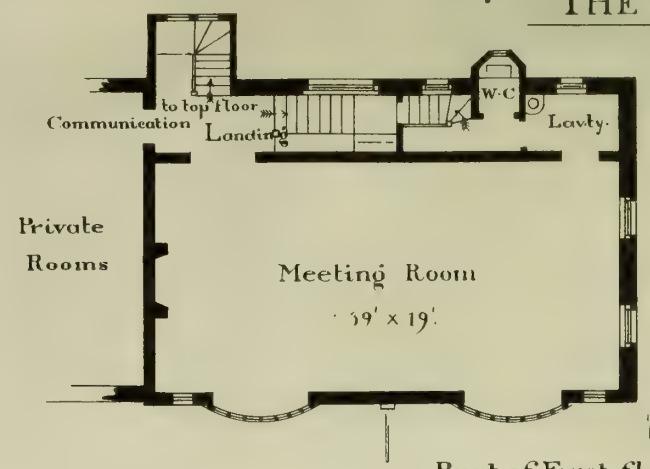
W. EMERSON ARCHT



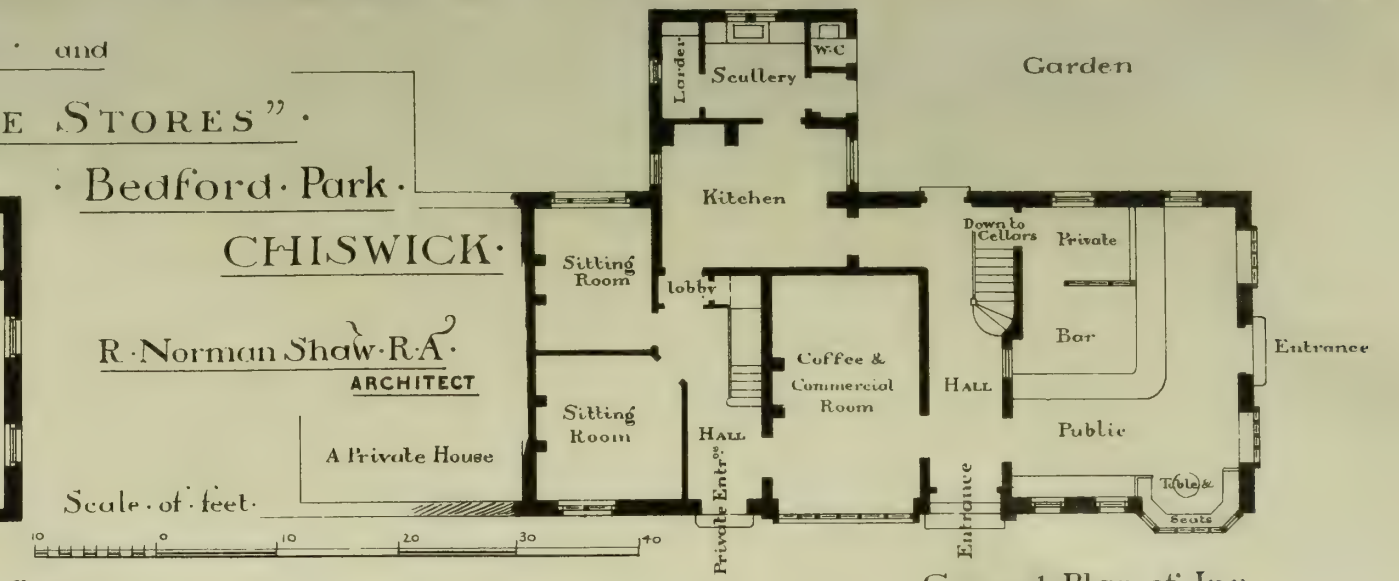
SOCIETY · OF · ARCHITECTURAL · HISTORIANS · 1940 ·
UTICITAS
FIRMITAS
VENUSTAS

The · HOSTELRY · and · "THE STORES" · Bedford · Park · CHISWICK ·

R · Norman Shaw · R.A ·
ARCHITECT



Part of First floor ·



Ground · Plan · of · Inn ·

BATH ROAD



MAVRICE B ADAMS DELT ×

"The STORES" × Private House × Ye HOSTELRY ×

ST. MARK'S, VENICE.*

A THOROUGH examination of the Church of St. Mark, with the explanations and in the company of the architect and the directors of the repairs of the mosaics, enables me to assure those who have shown so much interest in the fate of the building that the alarm as to the repairs in contemplation was much exaggerated, but at the same time to satisfy myself that what is proposed is, in the main, actually indispensable, and will in all probability be carried out according to the plans laid before the Commission appointed for that purpose.

Commendatore Meduna, architect of the church, has not only courteously, but with great satisfaction, gone over the building with me outside and inside, and given me the fullest details of all that has been done in the last 10 years and of every step proposed to be taken to assure, as he believes, the complete security of the building so far as a site gravely compromised by the tides will permit anticipation on this score. It must be understood that the character of the ground on which the church is built was always treacherous, as records still in existence prove, and the architects of St. Mark's are shown clearly not to have understood construction as well as they knew art. The foundations as uncovered in the repairs of the baptistery are utterly insufficient, and a study of the building shows that a gradual subsidence, which is still going on, had begun while the church was still in course of construction, and, in all probability, nothing but the tenacity of the massive brickwork which forms the body of the whole structure has prevented it from falling to pieces centuries ago, the equality of instability of the soil allowing the whole mass to sink with an approach to level subsidence, the floors, weighing less on the substratum, being bulged up by the greater subsidence of the piers through the whole extent of the structure.

A glance at a photograph of the church will show even those who know nothing technically of architecture that the central dome and the domes of the nave are supported by a series of vaults, of which the four chief—those of the nave, apse, and two transepts—carry directly the weight, being supported in turn by a secondary series, which are again supported by a lower series, in which, on the south side, the baptistery is situated. On this side the main vault of the transept is cracked open by the yielding of the secondary supports and the outer wall of the baptistery which takes the thrust in the last instance. This crack, now repaired as well as it can be, was, however, extending before the late repairs on that side, and it is easy to see that the further yielding of the foundations of the outermost wall and piers beyond a small limit must have brought the whole of the south side of the nave with the corresponding transept into ruin. And it was precisely in these foundations that the most negligence was shown by the builders in preparing their work, as may be seen by the floor of the baptistery, which rises in the centre many inches above its margins.

Before the repairs of this south flank began, I think about 1865, the wall on this side was cloven apart vertically so as to be sustained principally by the iron clamps used in the construction, and which were by oxidation reduced in places to a thickness of less than half an inch. The lovely little canopy which forms the southern extremity of the façade had its outer columns reared on a foundation of rubble extending scarcely beyond the bases of the columns and only a foot and a half thick. The whole south flank, as may be seen by the cornice which runs the length of the façade, has sunk several inches more than the north flank, the worst result of which appears in a serious crack over the central door of the main edifice.

The first thing to be done, then, was to arrest this greater subsidence of the southern wall, and as this menaced a fall into total ruin from the fissures in the brickwork underneath the shell of beauty which alone seems to have excited the anxiety of the public, there was no choice but to take the old wall down and reconstruct it on solid foundations. The shell had to be taken down and the brickwork renewed, in the course of which operation it was found that the builders, to procure temporary cohesion of the masonry, had laid short beams of wood in the work, which time and his helping had reduced to dust. This brickwork relaid and braced strongly to the inner wall which remained, the shell was restored to its place as well as could be. This is the renovation at which the lovers of art, some ignorantly and some from the feeling that it were better to let the building go into slow and complete decay than to mingle new with old, have cried out against. On this score Commendatore Meduna justifies himself, I think, satisfactorily by showing, firstly, the photograph of the portion in question before it was disturbed side by side with one taken recently, and that in the photograph there are only two visible alterations—viz., the abolition of a 16th century monument in sufficiently bad taste which had been obtruded there, and the restoration of the northern small window to its original shape, indicated by the remains of the mullion and tracery, which he has religiously preserved; and secondly by showing the condition to which the shell had been reduced, the slabs composing the veneer of the wall being reduced to fragments (where not fallen away in dust), which it was impossible to handle, much less restore to their places. This may be understood by any one who will look at the condition of the adjoining doorway on the façade, where the marble slabs are in some cases so corroded as to crumble under the touch, and only held to the brickwork by bolts and braces, many in fragments, and all gaping so as to show the extensive erosion of the brickwork underneath. But in the restoration this veneer is, with the exception of two small columns in the colonnade above and some capitals, the only new material used in the whole restoration, every column of the lower range being of the original and nearly every capital; some of the latter being the original bolted and cemented together to preserve as far as possible every fragment of the old work, some capitals being in half-a-dozen pieces, only two being new; and the old columns are not even recut, at most having their inner surfaces, less acted on by the sea air than the outer, turned outward.

The mosaics on this flank have been religiously preserved, as well as all the sculpture in the arches; the two niches above having been filled with wood and canvas solidly fastened together in a block and the wall cut away from behind them, and when the new masonry was ready they were restored to their places. Unfortunately, the portion which strikes the eye of the visitor is the new veneer of gray marble identical with that which was originally used, but the new surface of which jars on the sense of colour. Time will harmonize it, but meanwhile a wash of sulphate of iron would remove the rawness without injury, as there is no sculpture or design of any kind in it. One must go over this section of work, already finished ten years, piece by piece, as I have been, to understand the extraordinary zeal with which the architects have laboured, not to renew, but to preserve, every fragment of the old handiwork, the substitution of new sculpture being a fraction of 1 per cent., if things may be so stated, of the old retained. Your space would not permit me to detail all the precautions taken by the architect to preserve the exact relations of all the parts, even to the curve of the great window on this side.

On the north side, again, the decay of the veneer compelled the renewal of most of it; but every piece of sculptured stone is restored to its original place, and the veneer in general is of the same stone as the original, the only exception being that verde antique, the quarries of which are unknown, is replaced by the nearest approach to it which was attainable in Europe.

So much for what has been done. As to what was proposed by the architect's plan, so far from a general demolition of the façade being intended, the plan of immediate operations consists in removing the veneer and its relative columns of the doorway nearest the south-west angle, the refacing of the corroded brickwork, and the restoration of the old columns, cornice, &c., to their place, with replacing of such slabs of the veneer as are absolutely unfit for further use. The whole of this is now held in place by wooden supports and iron and copper bolts, without which, and especially the huge beams of wood which now carry the whole of the upper columns on one side, the entire shell would fall in. Here the substitution of new material will be very slight and involves no sculpture or column. The second doorway, adjoining the central, needs and will receive at some not far distant time, the same treatment, but the employment of new material there will be even less than in the southern doorway. The whole veneer, not only on the façade but in the portico and on the front of the church proper, is falling away from decay of the bricks in the masonry within, but the walls themselves are regarded as sufficiently secure, nor has there been, the architect assures me, any plan entertained for a demolition and reconstruction of the front of the church, or for the disturbance of any part beyond the facing of marble and the columns which flank each doorway in two tiers, unless in removing this shell the brickwork should be found to be more gravely compromised than is now suspected. The northern canopy is much more displaced than any other part of the façade, but as it does not affect the stability of the church it will not be disturbed, though much disfigured by the iron bars necessary to keep it from falling.

The only step which the most fastidious person who desires the stability of the church can object to is the levelling of the cornice which runs the whole length of the façade of the portico, and which, while keeping the true line, has sunk at the south end several inches, evidently during the construction of the church, as the irregularities of the foundation are most apparent, as well as the correction of them, by making the space between the keystones of the arches and the cornice above them of unequal breadth. In the reconstruction of the southern canopy this portion of the cornice has been raised to a level with the northern extremity, a change which I think to be regretted, as the irregularity of the building throughout, though mainly due to bad foundation and construction, had been condoned and compensated for in the subsequent operations, and this alteration will necessitate the bringing up of the portion of the cornice over the next doorway to the same level to avoid the break in the line.

As to the mosaics, the same system has been followed. Every part of the mosaic which could be kept together has been preserved, and the work now going on in the baptistery is merely the removal of parts of the mosaic which are actually crumbling, and cannot be secured to the wall by any device. The ceiling is cracked in every direction by old cracks, now arrested, and these cracks have involved the mosaic in strips and patches, which are being restored, and in general so well that from the scaffold on which the mosaicists are at work it was difficult to distinguish the old from the new, even when pointed out to me.

I am sure that the public will receive with pleasure the positive assurance that the stability of the church is not menaced, and that no general demolition of the front is or has been contemplated, and that what will be done will be only the removal bit by bit of the facings of the dooways, and the replacing, almost without the exception of a stone, of the original material in its original place. If the architect will only respect the irregularities which exist and which were due to the original construction, no reasonable fault can be found with his plans, nor with his execution of them. It is impossible for an architect to be more completely a *laudator temporis acti* than is the Commendatore Meduna, and he may safely be trusted to preserve what can be preserved and to do as little as the stability of the church will permit. Artists may object to the loss of picturesque tints and pictorial decay, but the duty of the architect is to preserve the building from the ravages of time as long as is possible. I think that any captious architect who will employ Meduna's courtesy as I have will find little room for fault-finding. I wish as much could be said for the renovations at Florence.

* From a correspondent of the *Times*.

THE TAY BRIDGE DISASTER.

THE terrible disaster to the Tay Bridge, which for eighteen months has been looked upon as one of the greatest achievements of railway engineers in the kingdom, must induce very careful reconsideration of the conditions of safety under which such structures can be maintained. The bridge, which was fully described in these pages at the time of its completion, was opened in May, 1878, after inspection by Col. Hutchinson, when it was tested by running three heavy North-British engines over at the rate of 40 miles an hour. The bridge is altogether 10,612ft. long, in 85 spans, the largest of which measures 245ft. Of these there are eleven, and they are about 130ft. above high-water mark. The platform on the top of the bridge is but 15ft. wide, and there is only a single line of rails. Opinions differed at the time of its erection as to the advisability of

making the bridge with only one line, and it was urged that the greater width required for two lines would give more stability. The bridge was built from the designs of Sir Thomas Bouch by Messrs. De Bergue and Co., of London, and Hopkins, Gilkes, and Co., of Middlesborough, and a considerable quantity of cast-iron was used in its construction.

A number of theories are being advanced to account for the accident. The displacement of one of the metals in consequence of the strain from the heavy gale causing the engine to leave the line, is considered by many to have been the first cause which led to the catastrophe; while with others the hurricane alone is credited with having blown the whole mass over bodily, the slow rate at which the train was moving giving the wind greater power over the whole structure. There is another theory, to the effect that the sudden thaw caused a displacement of the brickwork, and this, combined with the fearful pressure of the gale, completed the work of demolition.

A curious letter appears in the *Birmingham Daily Post* of Tuesday, from a Mr. Thomas Lawlor, of Camp Hill, Birmingham, who asserts that one of the divers engaged on the bridge during its construction "described to him minutely the great difficulty they encountered in their endeavours to reach a secure and solid foundation, which, he stated, they failed in doing in several parts of the bridge." What struck Mr. Lawlor most at the time was the diver's astounding assertion that the bridge was not safe. He said it might hold for some time, but ultimately was sure to come down with a crash. Mr. Lawlor related this conversation to a gentleman who had held an important position in the construction of the bridge. He ridiculed the diver's and stated that solid rock, or secure foundation, was reached in every instance where the iron columns rested. We do not believe, for a moment, the statements of the diver referred to.

Mr. Frank Beattie, of Soho, Birmingham, we notice, states, for Mr. Lawlor's information, that more than half of the piers in the bridge are founded merely in the sand, and do not rest on anything solid at all.

The cause of the catastrophe, Mr. E. R. Robson, the architect to the London School Board, points out in Wednesday's *Times*, is apparent:—

"The bridge, being designed for a single line of rails only, was narrower than usual, and its lateral strength consequently less. Its great length constituted another element of lateral weakness. The inclination of the rails towards the middle formed yet a third. Lattice-girder construction has, of itself, little to fear from wind, which can pass freely through its open work with comparatively little resistance. It may even be affirmed that, had no train passed over the bridge, the latter would probably yet be standing. The presence of a train at its central or weakest point would, on the contrary, form for the moment a solid wall, present a large surface of resistance to the wind. During violent gusts, wind possesses a certain dynamic force beyond the mere pressure which can be measured; and a tremendous wind-blow has manifestly struck the side of the train just when it reached the weak point of the bridge, with the appalling results now too well known."

What the force of the wind-blow which struck the ill-fated train must have been may be gathered from an interesting communication from Col. J. D. Shakespear, which also appeared in the *Times* of the same date.

"Assuming the train to have been 100 yards long, and the height 3 yards, there would have been 300 square yards of surface to the gale, or, say 2,700 square feet. Now, whatever the pressure was in so tremendous a gale, we shall not be far wrong in putting it at 56 lb. to the square foot, or near 70 tons lateral pressure on the whole train to blow it over. It is, then, quite possible that the velocity of a gust produced a greater pressure than the weight of the train, which we may estimate at 100 tons; and if that was the case, what else but chance or good luck would have kept it on the rails? My belief is that lateral pressure forced the train off the line, and that it dashed against the girders. I should like to know what girders would successfully resist 100 tons dashed against them at rate of even 10 miles an hour."

The bridge will probably be rebuilt; but, we trust, not of such narrow dimensions as at present. The Government inquiry will, in due course, put us in possession of facts which cannot but prove of great value, and may possibly lead to some modifications of opinion on the part of engineers—especially with regard to the use of cast iron for piers in such situations as that occupied by the Tay Bridge. Some particulars of a similar bridge in Holland, but erected on different principles, given by Mr. Charles B. King, of Westminster, are worth quoting:—

"The bridge crosses an arm of the sea, known as the 'Hollandsch Diep.' The breadth of the bay is one mile and five-eighths, but by means of piers and iron superstructure this has been reduced to seven-eighths of a mile. The channel is then crossed by fourteen iron girders, each with a span of 330ft. (the Tay-bridge spans were 245ft.); the waterway is 15ft. from high-water mark (the Tay-bridge was, according to Major-General Hutchinson's report, 92ft.); the foundations of the thirteen stone buttresses or piers which support the bridge (each 50ft. long by 10ft. in width) were laid on the pneumatic system, and are carried down some 40ft. or 50ft. below low water. The platform of this bridge is therefore nearly 30ft. in width—a much better proportion, I submit, than that of the Tay Bridge, with girders 27ft. high. The cost was nearly half a million sterling; that of the Tay-bridge is put down at £350,000."

The Directors of the North British Railway met in Edinburgh on Wednesday, and resolved to postpone action until the Board of Trade has reported on the accident; but preparations are to be made at once for re-establishing through communication by way of the Bridge. Mr. Barlow, the President of the Institution of Civil Engineers, has been appointed by Lord Sandon to form part of the Court of Inquiry, which Court will therefore consist of Mr. Rothery, Colonel Yolland, and Mr. Barlow. It is hoped to open the inquiry at Dundee on Saturday, but this—except formally—we imagine, will hardly be possible.

Mr. E. Ingress Bell thinks:—

"It is strange that no one should have referred to what was to my mind its weak point, to which the recent catastrophe was probably mainly attributable. I mean the want of continuity of the deep side girders, broken as it was by the elevation of the central bays. If the bridge had been designed with a gradual rise to the centre equal to the additional height required there for navigation purposes, and if its deep lattice girders had been continuous from end to end, the enormous tensile strength of the whole would have been beyond the disruptive power of any gale. But the actual structure consisted of a little bridge perched upon the separated sections of a larger bridge, and, being unassisted at its extremities, was torn away bodily from its points of attachment by the force of the hurricane acting on the surface of the train. It is a new and terrible confirmation of the truth of the axiom that the weakest point is the measure of strength."

Of course, as usual after the event, the wisdom of the prophets of misfortune is being made apparent. One forecast, however, published in the *Dundee Advertiser* in 1870 has come nearly enough true as regards time to be worth quoting. It was written by a Mr. Patrick Matthew, of Dundee, and ran as follows:—

"It is not our usual strong gales of wind that such a rainbow bridge as that proposed must sustain, but the very strongest winter tempests that are found to occur every few years. These generally take place in January, when the frigid air condensed by the cold has so much more impulsive force." Mr. Matthew proceeded to recount reminiscences of several Scotch storms which he had cause to remember. He mentioned one in particular in which a bridge had been swept away by the previous Moray flood. In such a storm as this, he concluded, the proposed bridge would have no chance of surviving, and would disappear with the tempest like the northern bridge with the Moray tempest and flood.

THE ASSESSMENT OF MACHINERY*.

A SMALL pamphlet, dealing with the assessment of rateable value on hereditaments containing machinery, has been written by Mr. Joseph Potts, jun., architect, surveyor, and valuer, of Sunderland, who has stated in concise terms the principles involved in making assessments of this nature. The remarks appear to have originated from a consideration of the interests endangered by the recent decision of the Court of Queen's Bench in Laing v. the Overseers of Bishopswearmouth. Factory occupiers in Sunderland and other parts have combined for the purpose, and have thought that the decision in the case cited will settle the law and affect every user of machinery by doubling the rateable value of cotton and other mills. They appear to have thought that machinery will henceforth be held to be rateable in itself, even though not fixed—at least, such a conclusion seems evident from the circular of the National Association of Factory Occupiers. Mr. Potts observes, "as a matter of fact the decision will not alter the law, neither will it settle or unsettle it. It will not inaugurate any new practice, nor will it enable machinery to be rated as such." The author, in fact, contends that in Laing's case the Court did not hold that the rateable value therein estimated and set down was a correct one. "What the Court has said after all amounts to this, that in the case of Laing as presented to them (and we shall see afterwards that it was wrongly presented) the premises are enhanced in value by the presence of the machinery." But, it is observed, the Court will not decide facts. The Lord Chief Justice, in his remarks, said, "We will not take upon ourselves to decide a question of fact"; and the author goes on to show that in this case, notwithstanding the affirmation, the Court has actually decided as to facts, and has decided wrongly, that the judgment does not bear the interpretation put upon it, and that even if it did bear such construction it is valueless, being formed on an assumption. In Part III. Mr. Potts discusses the principles to be applied in making assessments, founded on the Halstead case, which is carefully analysed by the author, and which presents not only a complete contrast to the Laing decision, but is also unanswerable in its conclusion. In the judgment on this case, the machinery a tenant brings with him is regarded as furniture carried from one manufactory to another. Mr. Potts shows clearly enough, in answer to the question, What is to be rated?—that whatever a landlord would provide for a tenant and let to him from year to year is the subject to be assessed; and secondly, whatever a landlord would not provide for a tenant, but which the tenant brings with him, and at the end of his tenancy takes away again, is *not* a subject to be assessed. There is a third supposition: namely, where there is no actual landlord and tenant; the occupier being owner as well. In this case the rateable value is to be determined as it would be were both landlord and tenant in existence. In answer to the question, How assessments are to be made? some useful remarks are given, the simple principle being that the owner of a factory or a coal-mine should be rated on such a sum as it would let for, and *no more*. Mr. Potts observes, that many ingenious theories have been set up which have obscured the above principle, but he thinks "the gross estimated rent from which the rateable value is to be calculated must be taken to be that sum which a tenant would pay in the ordinary and regular course of business for the hereditament; or, in other words, for what a *landlord would provide for his use*, clear of rates, &c." The author considers the practice of ascertaining by calculation the cost price or capital value of the freehold to be erroneous, and says that everyday experience proves that *cost price* has nothing to do with rent. It will be readily acknowledged that Mr. Potts' views are practical and sound, for, as he observes, there are costly buildings producing very little rent, and cheap buildings producing comparatively enormous rents.

The only practical test, as he shows, of fair assessment of rateable value on premises, is to consider what rent a tenant will be found to pay for this from year to year. But while we acknowledge the principle we cannot altogether dispute, as he appears to do, the value of rules such as that resorted to by many valuers of the square yard and cube foot, for it is not always possible to determine the rent some properties would command in the open market. Sometimes the knowledge of cost price and the amount expended as capital may rectify an opinion even when formed by valuers of experience, and we may instance the very conflicting valuations made by professional men to show that approximate rules are better than guesses. We must, therefore, partly dissent from the view taken in the last part of his chapter, that assessments made by such methods should be resisted by all means. The remarks on making of assessments, with particular reference to the treatment of machinery, are of value, and we can cordially recommend Mr. Potts' little book as a safe guide on the subject.

* Remarks on the Assessment of the Rateable Value on Hereditaments containing Machinery, &c. By JOSEPH POTTS, Architect, Surveyor, and Valuer. London: E. and F. N. Spon.

SCHOOLS OF ART.

BRISTOL.—The annual prize and certificate distribution took place on Monday week. The report congratulated the subscribers on the continued and increasing success of the school, both in numbers and general efficiency. There were 359 pupils on the books. Forty-three prizes had been awarded in the second grade, and 2 third-grade prizes had also been granted for extraordinary success in the second grade. Besides these 104 certificates had been awarded, including 13 full certificates in the second grade. In the third grade the works of 28 students in the elementary section were acknowledged by the Department as highly satisfactory, as were those of 9 in the advanced section, and 26 prizes were awarded to 18 students in this section. Three students obtained local free studentships, two obtained the first certificate of the third grade, qualifying them to become art teachers; and one national scholarship was also obtained. The local committee have commissioned Messrs. Wyon, the medallists, to produce a bronze medal, which will in future be given to the head student of each year. The report of the head master, Mr. Nichol Smith, stated that to the examinations two "time" ones in design and architecture were added this year and were well taken up. The study of architecture of both the Classic and Mediæval periods had been taken up, and also that of botany. Some excellent work in pottery painting had been done by the pupils, and the results had been sold.

NEWCASTLE-ON-TYNE.—Last week the Mayor of Newcastle presented the prizes gained by the successful students at the Newcastle School of Art. The number of students who attended the school during the year has been 241, showing a decrease of 72 since last year. The falling-off has been 34 in the morning and afternoon classes, and 38 in the evening class. 88 students were examined in second-grade freehand, model drawing, practical geometry and perspective, in May last, 44 of whom were successful in passing one or more subjects, 7 obtaining the mark excellent. One silver medal was awarded at the national competition, and 12 third or higher-grade prizes were awarded by the examiners at South Kensington. 223 students (being 28 less than the previous year) sent 2,112 works to South Kensington, 378 of which were in the advanced sections. The advanced art examination was attended by three pupils, two of whom were successful, one in figure drawing from the antique and one in architecture. One student in the advanced second-grade examination obtained the mark excellent in outline drawing from the cast, and pass in shading from the cast. One student completed the first certificate of the third grade. Out of seven pupils who sat for examination in science subjects five passed in machine construction and building construction. Fifteen pupils obtained local prizes of books and money amounting in all to £23 12s. 6d.

NORWICH.—The distribution of prizes and certificates to the students in the Norwich School of Art was made by the Mayor at the Free Library on Monday week. The report showed that the school was in a more flourishing condition than it had been for some time past. The increased attendances had resulted in augmented fees, and the higher standard of merit attained had led to the raising of the capitation grant. Nine prizes and twenty certificates had been gained in art, and three Queen's prizes and three certificates in science.

CHIPS.

ADMISSIONS TO ROYAL ACADEMY—ARCHITECTURAL SCHOOL, DEC. 31st, 1879.—Upper School: E. W. Coldwell, F. Miller. Lower School: F. C. Booty, W. Bucknall, J. H. Curry, B. Dicksee, G. Firsch, J. C. Hambling, E. G. Hardy, D. S. Haynes, W. Lane, C. J. Marshall, J. W. Simpson, E. A. Woodrow. Probationers: A. M. Calderon, C. A. Fagg, J. B. Gass, A. Keen, W. F. Keen, W. R. Lethaby, E. A. Ram, B. A. Raves, F. W. Richardson, E. W. Smith, J. D. Wheeler, C. C. Wilson.

A newly-created Congregational chapel has been opened at Haylands, near Ryde, Isle of Wight.

A tender amounting to £3,050 has been accepted for the erection of a new Wesleyan chapel, vestries, and schools, in Warren-street, Tenby.

The contract for the ironwork to be used in the erection of new municipal offices at Leeds has been secured by a local firm, after keen competition with English and Belgian manufacturers.

Building Intelligence.

ATHERTON.—The new church of St. John the Baptist was consecrated by the Bishop of Manchester on Saturday last. The building is Late Decorated in style, from designs by Messrs. Paley and Austin. The present portion has been built at a cost of £10,000, and an additional £10,000 will be required to complete the nave and tower. When finished, the former will be 137ft. long and the latter 26ft. square. The church is constructed of Runcorn stone outside, with an inside facing of Stourton stone. The font is made wholly of polished alabaster, executed by Mr. John Roddis, of Birmingham. Mr. W. Winnard, of Wigan, was the contractor, and Mr. E. Potts acted as clerk of works.

BADINGHAM.—The parish-church at Badingham, Suffolk, an edifice chiefly in the Perpendicular style, and consisting of chancel, nave, and square west tower, was reopened on Tuesday week, after partial restoration effected at a cost of £700. The south wall of the chancel has been rebuilt, and a new door inserted. A new roof of pitch-pine has been placed upon this portion of the building, and the old high-backed pews—amongst the largest and ugliest of their kind—have been cleared from the church and replaced by substantial benches, with carved heads next the passages. A portion of some old screenwork found at the west end has been utilised for the separation of nave from chancel. The chancel floor, slightly levelled, has been paved with encaustic tiles, hot-water apparatus has been put down, the Jacobean sounding-board over the pulpit lowered, and the south porch restored. The architect was Mr. Blackburn, of London; and the contractor, Mr. Grimwood, of Weybread. The next stage in the work of restoration will include the removal of the west gallery and opening-out of the west window, and the renovation of the Perpendicular font, the carvings on which, of the Seven Sacraments, were defaced and mutilated by the Puritans.

BISHOP'S FONTHILL.—The parish-church of All Saints', Bishop's Fonthill, near Salisbury, was reopened on Wednesday week, after complete restoration. The alterations include the raising of the tower, roofing anew the whole church, casing the north and west walls, rebuilding the east and west walls of the north transept, the insertion of a two-light window in the west wall, the provision of a complete system of drainage and new heating apparatus, new open seating to replace pews, new tile paving, pulpit, desk, harmonium, bells, &c. The architect was Mr. T. H. Wyatt, of London, and the work has been executed under the superintendence of Mr. Walter L. Spiers, by Mr. W. Crook, builder, of West Dean.

BOSSALL, NEAR YORK.—Two new lodges are being erected at the separate entrances on the estate of Bossall Hall in the Elizabethan style of architecture. Armorial bearings of the family will be placed in the walls executed in terra-cotta; the same material is used for coping to gables, cornices, window-sills, window and door-jambs, &c. The roofs are covered with red tiles. The terra-cotta work is supplied by Messrs. Wilcock, of Leeds, and the contractor for the whole is Mr. Robert Weatherley, of York. Plans are being prepared for the reconstruction of the old hall, which is of much historical interest. The whole is under the superintendence of, and all the drawings have been prepared with great care by, the architects, Messrs. William Lewis and Son, 46½, Stonegate, York.

CARDIFF.—A new graving-dock is in course of construction for the Bute Trustees as a connecting-link between the East Basin and the West Dock at Cardiff. It will be about 430ft. long between caissons, 77ft. wide between the top copings, and will have 50ft. entrances. In order to carry out the work without interfering with the dock traffic, a very long coffer dam is being made on the east side of the West Dock, consisting of two rows of piles filled in with clay puddling. The dock walls will be of masonry, diminishing from 12ft. thickness at the bottom, and resting on a foundation of cement concrete 5ft. 6in. thick, on piles 4ft. 9in. apart. All the pile-driving machinery is worked by steam. The stonework, with the exception of the granite copings, is from Pwllypant Quarry. The caissons for the entrances are in course of construction by Messrs. Parfitt and Jenkins, who also supply the pumps. The East Dock entrance will be crossed by a line of railway. Mr. James Mackonochie is the engineer, and Mr. D. A. Jones the resident engineer. The contractors are Messrs. Kirk and Randall, of Woolwich, and about 150 men are engaged on the work, under the personal supervision of Mr. Chas. Randall and Mr. R. W. Bennett.

COWFOLD.—The recent severe weather has caused an entire suspension of building operations in connection with the Monastery of the Carthusian Brothers at Cowfold, near Horsham, an establishment which has been in course of erection since 1875, and is not expected to be completed before 1882. By this decision no fewer than 600 workmen, principally masons, will be deprived of employment for the remainder of the winter, as it is only remotely probable that work will be resumed before the advent of spring. The monastery is being built principally of stone quarried in the neighbourhood, and the expense is defrayed by a party of French ecclesiastics, while the supervision of the building operations is entrusted to M. Norman, a French architect.

HAWORTH.—The foundation-stone of the new church of St. Michael, which replaces that wherein Patrick Brontë officiated for many years as incumbent, was laid on Christmas-morning. The new building will be in the Perpendicular style, and will comprise nave, side-aisles, chancel, north and south chapels, and a vestry. The internal dimensions will be:—nave, 77ft. by 22ft., with a height of 42ft. from floor to ridge; chancel, 30ft. by 21ft., and 37ft. in height; side-aisles, each 63ft. by 13ft.; north and south chapels, each 21ft. by 14ft. The east window will have six and the west window five lights; with elaborate traceried heads, and filled with stained glass. The total cost is estimated at between £8,000 and £10,000, of which Mr. M. Merrall, who laid the foundation-stone, has promised £6,000. Messrs. T. H. and F. Healey are the architects, and the contractors are Messrs. Crabtree and Sons, of Oxenhope. The only vestige of the old church now remaining is the square western tower.

HAVERSTOCK HILL.—A spacious new Roman Catholic Church, built by the Dominicans or "Black Friars," is now rapidly approaching to completion in the north-western suburbs. It stands at the foot of Haverstock-hill, is about 200ft. in length, and in breadth about 80ft., and the ridge of the roof externally is above 100ft. from the ground. It consists of a long nave and chancel, not divided, however, by any internal arch, two aisles, a large Lady-chapel, and two porches at the lower end of the nave. The chancel is apsidal. It stands east and west, but the high altar will be at the western instead of at the eastern extremity. The roof is of high elevation, and will be decorated in polychrome. The building will be the largest Gothic church in Cardinal Manning's archdiocese, and nearly of the same size as St. George's Cathedral, Southwark. The style is transitional between the Early English and the Decorated. The architect is Mr. Charles Buckler, and the builders are Messrs. Kelly, of Windsor. The total cost of the erection of the building, exclusive of internal fittings, &c., will be about £21,000.

RUBERY HILL LUNATIC-ASYLUM.—The borough authorities of Birmingham are about to erect a new lunatic-asylum at Rubery Hill, near to the Bromsgrove Lickey Hills, about eight miles from Birmingham. The new asylum is intended to accommodate 616 patients, and is arranged in groups or blocks of buildings, in such a manner that other blocks may be added from time to time, as occasion may require. It has a total present frontage of about 600ft., and the central part of the buildings, in which the administrative block is placed, extends about 450ft. from back to front. The chapel is placed in the centre of the main front and the centre of the whole group of buildings. It is 80ft. long and 40ft. wide, and will seat 400 persons at one time. The buildings are being built of bricks. No stone will be used in any part of the buildings except for steps, landings, and window-sills. The contractor for the works is Mr. Thomas White, of Swansea; and the architects are Messsrs. Martin and Chamberlain; Mr. H. Lovatt is clerk of the works. The amount of Mr. White's contract was £82,861.

STEPNEY.—Last week the Bishop of London consecrated the new church of St. Augustine, Stepney. The new building is situated in Settle-street, Commercial-road — a densely-populated district; and its cost alone is estimated at about £7,500. It is 96ft. long by 53ft. wide, and is substantially constructed of stock-brick and Bath stone, varied with red brick in the arches of the nave and windows. The church is seated for 600 persons; but a gallery can easily be added, when necessary, and accommodation for other 75 worshippers may thus be secured. The site for the church, which is sufficient also for a parsonage, has been already purchased at a cost of between £5,000 and £6,000. The architects of the new building are Messrs. Newman and Billing; and the work has been carried out under the superintendence of Mr. Arthur Newman.

THE THREE COUNTIES ASYLUM, STOTFOLD, HERTS.—For some considerable time the above asylum has been undergoing a series of additions and alterations, plans and reports up to April last having appeared in these columns of April 12th. Since then the undertaking has so far progressed that nearly the whole of the works have been completed, while they are already partly occupied. On Monday, December 22nd, the new chapel in connection with the building was publicly opened for Divine service in the usual manner. This chapel is built for the accommodation of over 600 persons; the nave is 92ft. long by 52ft. wide; the chancel was 26ft. by 22ft., and the end is an apsed one. The whole of the roof of the nave is in one span, so as to have no pillars to obstruct the congregation. The general appearance of the whole has been much admired. The contractors were Messrs. Bellerby and Biscomb, of York, and very much credit is due to them for the highly satisfactory manner in which they have carried out the job. The total cost of the whole of the works, inclusive of new east and west wings, converting the old chapel into new apartments for the medical officer, special dormitories (male and female), additions to the laundry, &c., being only £65,000, shows that economy was combined with good work. Messrs. G. Fowler Jones and Son, of York, F.I.B.A., were the architects, and Mr. Rashleigh Banfield acted efficiently as clerk of all the works.

WEDNESBURY.—The town-hall, after being closed for about three months for repairs and decoration, was reopened on Monday week. The plan of the building, it may be mentioned, is a parallelogram, measuring 75ft. in length, 46ft. in width, and 37ft. in height. A semicircular gallery runs round three sides, and the fourth side is occupied by an orchestra. The predominating tint of the decorations is green of various shades, both on the walls and ceiling; but the pilasters are painted a dark chocolate, and all the other more salient parts of the building are brought into prominence by the use of primary colours, whilst the centre flowers have their leaves painted fawn and buff, relieved with Indian red and other colours, and richly etched with gold. The large panels between the pilasters are diapered over with an intricate stencil pattern, bordered with pink honeysuckle and a darkish-brown fret; and the frieze is painted a warm slate-colour, on which a handsome Roman scroll is stencilled in white; whilst gilt and colour-stencilled designs are introduced throughout the hall. The work has been carried out by Mr. F. Stevenson, Wednesday, from the designs of Messrs. Loxton and Newman, architects, of the same town. The cost, including some external repairs, will amount to nearly £500.

CHIPS.

The annual exhibition of students' works at the Gloucester School of Art has been on view for four days, and is spoken of in the local newspapers as showing a general advance upon those of previous years. The school has this year taken 12 third-grade prizes against six in the previous year, and in the second grade has held its own.

The Youghall sanitary authorities have adopted plans prepared by Mr. Greaves, C.E., for supplying water to the Strand district from wells at Seafield, at an initial cost of £400.

A new National school is being built at Tredol, near Corwen, Merionethshire. Mr. Richard Lloyd, of Corwen, is the contractor.

The Cromford canal has burst, near the mouth of Gregory tunnel, in consequence of the recent severe weather.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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X. Y. Z. (Write Shillito and Shorland, Stretford-road, Manchester.)—C. E. (We should be very glad to illustrate such works, but they seldom reach us, and are unfortunately in almost every case not good enough for publication.)—M. INST. C. E. (Many thanks for your kind expressions. We can only say it is by the hearty co-operation of readers like yourself we have been enabled to do as we have done in the past, and that we have no intention of standing still.)—J. BACKHURST. (In measuring labour in brickwork, the usual plan is to take the face of the work per foot superficial, and describe whether of selected bricks, &c. The reveals of course are measured, if not stuccoed, and the fireplaces and openings deducted except in difficult work. All cuttings and gauged arches are measured by the foot superficial.)

"BUILDING NEWS" DESIGNING CLUB.

LIST OF SUBJECTS.—1. A small church for a village, to seat 200 worshippers. No spire but a tower, may be included. Materials to be brick and flint. Cost not to exceed £1,500. Plan, south and east elevation, with view from south-west and section. Scale, 6ft. to the inch. 2. A pulpit and font for the above church—sketch and plan. The latter to be drawn to inch scale.

DRAWINGS RECEIVED.—Attempt, A. U. C., Motto J. L., Fleur-de-lis, Plansman, No. 90, Quod, Resurgam, Null Bien san Peine, Timeo, Our Praises are Our Wages, Figaro, Edwin, Quiz, Ogmore, Binny, Burswell.

Correspondence.

TERRA-COTTA.

To the Editor of the BUILDING NEWS.

SIR,—I have read with much interest the instructive articles upon terra-cotta that appeared in your Christmas number.

Your condemnation of the absurd practice of washing over the terra-cotta with a thin coating of clay, with the object of acquiring a uniform tint in imitation of stone, that has done so much to bring terra-cotta into disrepute, and your advocacy of the principle of using the more perfect, more effective, "highly-fired" material, appear to me especially well-timed.

Had your condemnation taken a wider range, and embraced the detestable practice now so rife amongst manufacturers (and, I am sorry to say, encouraged by the profession) of staining, and thus obtaining, by artificial means, an undurable deep red colour, you would have deserved the thanks of all admirers of this most perfect building material, so long neglected and forgotten, and which now, thanks to the persistent efforts of a few, promises to regain its proper position in the building materials of the country.

I must take exception, however, to that portion of your article in which you say that no red clay or mixture of clays, necessary to produce a deep red colour in the finished material, can be subjected to the same temperature in the kilns or can be burnt so hard as the buff variety, thereby implying that a red terra-cotta, really good in all its qualities, does not exist.

I can only say that I can vouch for the existence of at least one bed of red clay that, by its peculiar properties, is capable of enduring even greater heat than many fireclays, without becoming either twisted or discoloured—terra-cotta that the chisel will not penetrate, and which only obtain their deep red tints by being subjected to the same kind of firing generally given to fireclays.

I believe that many of my professional brethren in the North who are acquainted with the terra-cotta manufactured at the works at Pen-y-bont, Ruabon, can add their testimony to this.—I am, &c., ARCHITECT.

SIR,—We have read with pleasure your excellent notice on the new Natural History Museum, and can endorse all you say as to the general effect—which is very good—of this, one of, if not, the most important example extant of the introduction of that noble material, terra-cotta, which reflects great credit on both the architect and the manufacturers.

There are one or two points, however, in your general remarks to which we beg leave to take exception. We are all aware that the redder terra-cottas are growing into favour, and that "architects are particular in specifying a deep red tint," which, we admit, is more difficult to produce than a good warm buff, especially to fire it sufficiently hard to be perfectly durable, and yet retain a good colour; but it is done by some firms. This we can claim to be able to do, and have done: not only to produce a good hard durable dark red, but one that will stand the same temperature, or fire, as the buff; in fact, we have fired the two in the same kiln for some time past; and, not only this, we have produced terra-cotta in the two colours red and buff, made and fired together, such as cornice or frieze ornament, the background or moulding being red and the ornament buff, or *vice versâ*, both in the natural manipulations and colours, which, we need not say, has a very good effect; of course, it requires additional care, and therefore expense. It is fired so that the durability is certain; this we cannot but think opens up a wider field for the introduction of terra-cotta than that already in the power of the architect.

We quite agree with the remarks as to the uniformity of colour, and that architects have been too particular on this point; but if burned in close muffled kilns there is not much risk of variation of colour. Better far to have a little of this than have to apply a wash on the surface, to which you allude; but this variation does not often reveal itself until the terra-cotta has been fired. Still, what we maintain is that with ordinary care there is no necessity for so much variation of colour as displayed in the new Science Schools. It is not always the darkest-looking pieces that are the hardest and most durable. This greatly depends upon the manipulation, and the proportion of siliceous or vitrifying material introduced to produce the proper fuse in firing; hence, some terra-cotta as light as Portland stone is as durable, or more so, than some of the richer buff or pale-red, as can be shown.

We beg to differ from you in saying that terra-cotta composed of more than one clay is not so good as the natural fire-clay. With all due deference to that material, it can be, and is, made quite as durable; but there is comparatively little terra-cotta produced that is composed of more than one sort of clay as its chief

ingredient, and this only in the finer kind, and for some of the fine-art specimens.

We fear there is too much of the fallacy abroad, that terra-cotta is simply a superior kind of brick, and, in consequence of this, is somewhat degenerated as a material, in being broken up too much, and we think great credit is due to Mr. Waterhouse, as one of our leading architects, for having taken terra-cotta in hand so largely, thus bringing what has been an ill-used material into much more general use, the introduction of which is rapidly on the increase, now its advantages are becoming more apparent as the most durable material extant. But we think, with all due deference to Mr. Waterhouse, that he breaks it up more than necessary. No one admits more than the manufacturer its liability to distortion: hence the much-vaunted desirability of small pieces; but we contend that it can be, and is, made in much larger blocks and longer pieces, and yet be true and straight enough for all ordinary architectural works, as, for instance, that excellent example, Dulwich College, or, for a much smaller work, the Mulready monument in Kensal Green Cemetery; but the grand desideratum is *care and time* in drying and firing.

If architects prefer to have larger blocks, as as we believe many do, and truer lines, they must allow adequate time for its production, so that the terra-cotta may be under sufficiently careful supervision in the process of drying, or rather from the time it leaves the mould, till packed and closed in the kiln; for if hurried in the process it is very liable to distortion, it being then, as much or more than in the firing, that these deflexions take place. But the great drawback to these larger blocks being produced, and the additional care necessary for good work, is the great desire for cheapness; and the keen spirit of competition which tends to keep down the quality, and is the bane of all good work in this as everything else, especially in the matter of manipulation, line, and truth. The necessary cost of these extra precautions, which must be taken into consideration, is omitted, and the material lowered in consequence.

We may add that the Dorset and Devon clays, hitherto used almost exclusively for the manufacture of buff and light-coloured terra-cotta, and still used at the extensive works at Lambeth and elsewhere, is quite equal, or superior, to the natural fireclays so highly spoken of.

We could write much more on this subject, but fear we have already trespassed too much on your valuable space; but we hope you may think these few remarks worthy of insertion from one who has had nearly forty years' practice.—I am, &c., J. PULHAM.

ARCHITECTURAL EXAMINATIONS AND TRAINING.

SIR,—Referring to your article on this subject, I venture to trouble you with a few remarks.

I quite approve of compulsory examinations, as a means of raising the art standard of the profession higher than it is at present; but under the existing system of employment, I do not see how this is to be accomplished, unless by giving up office-work entirely, which very few can afford to do.

Would it not be worth the consideration of the "Institute," and other architectural institutes throughout the country, to adopt some such system as the Parisian one, under which a draughtsman can be employed so many hours per day, in the office, at a rate per hour, filling up his spare time by attending the "Ecole des Beaux Arts."

At present the draughtsman in this country is confined to the office all day, and if he works hard and conscientiously, by the end of the day his physical energies are pretty well exhausted; and if he attends a school of art, or one for technical instruction in the evening, the constant strain begins to tell upon his health, and, as is the case with too many, he has ultimately to discontinue his studies for a time.

If the members of the various institutes are in earnest in their desire to raise the art-standard, they must be willing to give some facilities for study, which we have not at present.

By the mode proposed they could do this without loss to themselves, while on the other hand the draughtsman would be sacrificing part of his daily earnings in his desire to qualify himself to pass the necessary examinations; at the same time earning a little, sufficient, perhaps, to maintain him, if he is entirely dependent upon his own exertions for a living.

I am quite aware that objection will be taken to this proposition on the ground that in a commercial country like this it would interfere too much with the business of the day; but I am convinced if some such arrangement were adopted, it would have most beneficial results.—I am, &c., A DRAUGHTSMAN.

Glasgow, Dec. 29, 1879.

HOUSE-DRAINAGE.

SIR,—While the letters of many of your correspondents have proved the correctness of the principle of house-drainage introduced by Mr. Norman Shaw on the Bedford Park estate, the remarks of Mr. Maurice B. Adams show that there is one inconvenience that may be caused by the plan if not perfectly applied. It appears to me, from Mr. Adams's letter, that the cause of the complaint he makes is entirely due to the proximity of the outlet-pipe to the supply-pipe, and to the imperfect insertion of the former outlet through the wall. The cold air finds its way above the hopper head and through the outlet discharge, and there is not the check to the inrush of cold air there should be. As I claim to be the first who introduced the system, many years ago, in the columns of this journal, and to having subsequently described the principle of immediate disconnection at the closet outlet in the sanitary section of my first edition of "Wightwick's Hints to Young Architects" (pp. 166-170), published in 1875, I may be allowed to point out that the weakness in the plan of Mr. Norman Shaw is the open-air space that intervenes between the outlet from apparatus and the hopper head of soil-pipe. In my method the disconnection is made below a grating in the open head of soil-pipe, thus avoiding a direct current of cold air below the trap.—I am, &c.,

G. HUSKISSON GUILLAUME.

CLEAN DRAWINGS.

SIR,—Years ago I noticed that however carefully I wiped T-squares and set-squares with dusters, the drawing-paper would catch dirt from them. I therefore concluded that if clean paper so soon caught dirt clean paper must be the right thing to clean the squares with. And this proved true; I never trust to dusters now. I find also that paper, especially if it is slightly absorbent, removes Indian ink or dry colour from saucers and palettes much quicker and easier than any other washing process. The paper for this process should be moistened a little. Possibly these little hints may prove useful.—I am, &c.

J. S. W. D.

PETERBOROUGH SUNDAY-SCHOOL COMPETITION.

SIR,—In reply to an advertisement in your journal, I wrote for particulars of the above, asking for "fullest information, plan of site, and as to how competition would be decided." I beg to inclose a copy of answer received, with no plan of site, and no information as to how a decision would be arrived at.

Your readers will be able to appreciate the successful plans (they ought to be published and fully described), which provide accommodation for 400 children for £1,000, the total amount, inclusive of everything, advertised to be spent. Altogether, I think this competition deserves a place among the already too large number that suggest the query "Who can be the competitors?"—I am, &c., S. W. G.

[COPY.]

"Pboro.,

"Dec. 22, '79.

"DEAR SIR,—In reply to your favour, the site of proposed Sunday-school has 55ft. frontage and 50ft. in depth, '*clear all round*,' quite flat, and drains to the front.

"We wish class-rooms on the sides, centre clear, accommodation for, say, 400 children.

"I am, Dear Sir,

"Yrs. truly,

"WM. CLIFFE."

THE TAY BRIDGE ACCIDENT.

SIR,—It does not seem very clear at present whether the bridge gave way before the train reached the fatal spot, or whether the train was passing over it at the time of the accident. In order, however, to prevent the possibility of a train falling through a chasm in a bridge in future, would it not be better to have some automatic arrangement to inform the men in the signal-cabins whether a bridge is perfect or not? I would suggest the following arrangement. The bridge itself might be made to form a part of an electric circuit. So long as the electric circuit was complete, an electro-magnet could be made to attract an armature. If the circuit were to be broken by a portion of the bridge giving way, as in the late lamentable accident, the armature would be released, and might be made to set in motion an electric bell, and thus give timely notice to the men in the signal-cabins or elsewhere to stop any trains from passing over the bridge.—I am, &c.,

CHARLES STEWART, M.A.

50, Colebrooke-row, N., Dec. 31, 1879.

Intercommunication.

QUESTIONS.

[5999.]—**Palladio.**—Can anyone inform me what is the date of publication of Andrea Palladio's "First Book of Architecture"?—F. T. B.

[6000.]—**Aspen Trees.**—I should feel much obliged to any correspondent who would inform me to what purposes I can apply a couple of aspen trees, which a neighbour wishes me to take down. One of them would turn out a 20in. plank at 10ft. from the ground. Is such wood readily saleable, and what would be about its value per foot cube?—I. L. H. S.

[6001.]—**Measuring Extras.**—What is a fair percentage to charge a builder for measuring up extras and deductions on a building, bringing into bill, and going through same with architect? Amount of extras about £350, deductions about £40. Also, is it right to charge on the deductions as well as the extras? Is there a regular scale of charges? As the answers received will settle the matter without a law-court, they will be anxiously looked for.—SURVEYOR.

[6002.]—**Extras.**—Will some of your readers give me their experience in these matters? A builder threatens legal proceedings unless his claim for extras is paid, and I offer a certain sum in discharge, and he will not accept this amount. His agreement is said by my solicitor to be a legal document, and in this he binds himself to accept my decision in all disputes as final and binding. Now it appears my client must fight this question in court, or pay the money demanded. Personally I wish the builder to take proceedings so that he may be held up as an example and avoided by all who don't wish to be served in a similar manner.—PERPLEXED.

[6003.]—**Coloured Cement.**—I have been requested to restore a concrete floor laid about a year ago in a large new store in the West Indies, the upper surface of which is composed of pure cement, about 1in. thick, and coloured black, red, and white, in geometrical patterns. The cement coloured red has stood the wear very well. The white is not in as good condition as the red, but the black is fast wearing off. Will any kind reader suggest what sort of ingredients should be used to render the two last colours hard enough to resist the wear of an ordinary stone business?—C. C., British Guiana.

[6004.]—**Black Varnish for Grates.**—I should feel greatly obliged if any reader could inform me what black varnish is best for use on register grates where they can be stoved.—INDEX.

[6005.]—**Testing the Weathering Properties of Stone.**—Would any of your readers kindly give me the following information, how the composition of granites affect their durability, and how you would test the weathering properties of different specimens of stone when time would not admit of a practical trial?—ROBERT VINCENT SUTTON.

[6006.]—**Old Irish Cemetery Crosses.**—I would feel thankful to Mr. H. Hems, or any other reader of the BUILDING NEWS, for replies to the following queries—viz., What sort of stone is in the above crosses? How are they connected with the base stones, and if lead is used in connection? What is the date of those crosses?—QUERIST.

REPLIES.

[5977.]—**Clay-Grinding and Brick-Making Machinery.**—Having erected brick-making machinery for the Great Western Pottery and Brick Company at Chudleigh-road, Devon, suitable for making stiff pipe-clay or blue clay, and which I think will just suit "Newport," I beg to call his attention to it. Costs about £80, makes from 15 to 20,000 per day, according to feed. One boy to attend, producing bricks—apart from digging clay and feeding—at 2½d. per 1,000. Can be seen at work and clay tried.—THOS. CARDER, Coburg Cottage, Chudleigh, Devon.

[5982.]—**Extras.**—The answer to your query will much depend on the terms of contract, if there is one. If an architect delays giving a certificate for no apparent cause, you can, no doubt, sue him for damages. Interest, of course, could be claimed legally. I cannot give you a case in point; but as in the case of Ludbrooke v. Barrett, where an architect fraudulently and in collusion with employer withholds a certificate that the builder has executed work in a satisfactory manner, such builder can sue the architect for damages if a contract is made. In another case of Pawley v. Turnbull, where the architect had not been fair in giving certificates, the builder was justified in bringing an action against employer for damages.—G. H. G.

[5983.]—**Colouring Bricks.**—If "V." will read the 6th paragraph of your article on "Terra-Cotta Architecture," in your paper of Saturday last, he will there see "blocks of a bluish-grey colour have been," &c.

"We believe this grey colour is produced by an intimate mixture of the unbaked clay with cobalt or some blue mineral pigment." We use, and we know a great number of makers in different parts of the country use, a powder prepared by the Alumina Paint Company, of Buckley, and with fairly satisfactory results. If "V." were to apply to them they would probably give him full particulars which he asks for.—BUCKLEY.

[5985.] — **Mathematical Instruments.** — In answer to "J. G.," in your issue of the 19th Dec., I find the most correct way of drawing parallel lines is by means of two set-squares, generally at 45° and 60°.—STUDENT.

[5988.]—**Plate Girder.**—I have copied the foregoing from Spon's "Architect's Pocket Book," hoping it may be of some use to "Learner." Example of a plate girder for a span of 30ft. Girder, 31ft. 6in. long; plates, 22in. deep × 5/16in. thick; angle iron, 3in. × 3in. × ½in. at the bottom; angle iron, 4in. × 4in. × ½in at the top. The B. Wm. taking the constant at 75 is—

$$\frac{\text{A in inches} \times \text{D in inches} \times \text{C}}{\text{L in inches}} = \text{B Wm.}$$

or

$$\frac{6 \times 22 \times 75}{360\text{in.}} = 27{\cdot}5 \text{ tons.}$$

The B. Wm., or 55 tons, distributed equally over the length. Safe load for wrought iron girder ¼. A = area of bottom flange in inches, D = depth of girder in inches, B. Wm. = breaking weight in middle, L = length of bearing in inches.—STUDENT.

[5989.]—**Colouring Portland Cement.**—I should be glad if "Concrete" would say what he used for colouring Portland cement black, so that in trying experiments I may avoid what he found to fail. I tried founder's sand for mixing with cement for the floor of a tennis-court, but the sand was not sharp, and it did not answer. I am inclined to think there was soot mixed with the sand. It was very black, much more so than I should imagine founder's sand to be. I intend getting some more and washing it. I also tried coal-dust, but with no better result. I shall try crushed cinders, and also black marble and flint broken up.—C. F. M.

[5995.]—**Damp Walls.**—I have known tin-foil fail by reason of its being put on with ordinary paste. When white-lead is used the tin-foil is a complete success. The white-lead should be mixed with a little oil, so as to make a thick paste, which, for good work, should be passed through a painter's sieve, so as to get rid of all lumps, &c.—C. F. M.

[5996.]—**Gas Regulators.**—The most convenient gas regulator is a simple contrivance made by Carnaby and Co., of Liverpool, which can be adjusted by hand from any part of the house.—A. H. B.

[5997.]—**Symbolism.**—"H." should procure Parker's "Calendar of the Prayer Book," illustrated with upwards of 200 engravings. It is a six-shilling book, and it will tell him all he wants to know, I expect, about the Apostles and a good many other Saints, and much other useful matter into the bargain. In fact, it is as handy a little book as any man can have.—HARRY HEMS.

CHIPS.

At the foundry of Messrs. Edward Finch and Co., in Chepstow, Mon., a large lattice-girder bridge is in course of completion for the Indian State Railway. It is for a single line, and will be erected on the Northern Punjaub Line leading to Afghanistan; there are ten principal spans of 120ft. each, and several smaller ones, and the total weight of iron will exceed 1,000 tons.

The Llandaff Diocesan Church Extension Society decided last week to revert to the system of granting pecuniary aid for church-building.

The Mansfield rural sanitary authority have just effected loans for sewerage works at South Normanton, estimated to cost £2,490, and at Tibshelf, £1,960.

The Atbridge rural sanitary authority on Tuesday week determined, in a fit of economy, to reduce the salary of Mr. Nicholson, inspector of nuisances, from £191 to £150, and that of Messrs. Bayliff and Smith, medical officers of health, from £100 to £50 each, and sitting as the board of guardians the salaries of all Poor-law officials were correspondingly lowered.

The men and boys employed in the erection of the Centenary Congregational Church, at Lancaster, numbering about 110, were entertained at supper on Tuesday week by the building committee.

The Rural Sanitary authority of Lancaster have instructed Mr. Jowett, their surveyor, to prepare plans for the disposal of the sewage of Galgate by discharge of the effluent into the Conder, near Thornham Mill. A scheme has been approved for sewering Glasson Dock district, also prepared by Mr. Jowett.

At the meeting of the Hove Town Commissioners held on Thursday, the 18th inst., a step was taken towards the establishment of a public abattoir, a recommendation of the sanitary committee being adopted, by which it was decided not to grant any fresh licenses for the erection or occupation of slaughterhouses in the town.

Two fronts for an arcade in Albemarle-street and Marlborough-street, in polished red and blue granites, are being executed in material supplied by Messrs. James Wright and Son, of Aberdeen, the red from their own quarries at Stirlinghill, near Peterhead, and the blue from their quarry at Alford, N.B.

STAINED GLASS.

COLESHILL CHURCH, WARWICKSHIRE.—A window has been placed at the east end of the south aisle by Dr. Barker, representing the parable of the Good Samaritan. It commemorates his ancestors having for five generations, from father to son, practised the science of medicine in Coleshill, and his having also practised there for fifty years. The work is by Messrs. John Hardman and Co., of London and Birmingham.

STIRLING.—A memorial window is about to be erected in the High Church, Stirling, to the memory of the late town clerk, William Galbraith, who occupied the position for nearly forty years. The design, the work of Mr. Stephen Adam, of the firm of Adam and Small, has been approved of, and the carrying out of the design placed in the hands of that firm. The centre portion of the window is divided into eight vertical compartments, of which the upper four represent the birth of Christ and the lower tier His death. The extreme left compartment of the upper division shows the infant Jesus in His lowly birthplace; the extreme right of the lower section, Christ bearing His own cross; and the intermediate compartments represent shepherds bringing their flocks, kings of the earth offering rich gifts, camels laden with treasure, Roman soldiers, mocking Jews, the common people—much indeed that was implied in the initials upon the Roman banners, S.P.Q.R.

ST. SIDWELL'S CHURCH, EXETER.—Three aisle windows have just been put up to the memory of the late rector, the Rev. J. Lincoln Galton, by his family and friends. One represents the Disciples walking to Emmaus, our Lord appearing to them on the road, and breaking bread with them; another (the font window) the baptism of our Lord; and the third the Woman of Samaria, the water of life, the Good Shepherd going into the fold with his lambs following, angels keeping the fold, and our Lord multiplying loaves and fishes, the bread of life. The work is by Messrs. John Hardman and Co., of London and Birmingham.

ST. NEOT'S, HANTS.—The Rix memorial window has just been unveiled in the parish-church. The subject is the Transfiguration. The central light shows our Saviour surrounded by the Presence of God, from which faces of angels appear in every direction. On the right of our Lord Moses is represented bearing the tables of the law, and on the left is Elijah the Prophet. The Apostles Peter, James, and John are represented in the lower lights, and above these lights are texts in Latin. The dedicatory inscription runs along the base of the window, and is in English. The work has been executed by Messrs. Clayton and Bell, of London.

STATUES, MEMORIALS, &c.

A STATUE OF MR. GLADSTONE.—Mr. Theodore H. Bryant, of the firm of Bryant and May, has just munificently offered to the Tower Hamlets a statue of Mr. Gladstone as a birthday tribute. The statue will cost at least a thousand guineas. The sculptor who has been commissioned to execute the work is Mr. Albert Bruce Joy, of Pembridge-gardens, a pupil of the late Mr. Foley.

ELY CATHEDRAL.—The memorial to the late Professor Selwyn was formally unveiled on Monday week. It is placed in the south aisle of the choir under an archway, which originally formed the private entrance into the Cathedral Church for the nursing sisters of the great Norman Hospital adjoining. The exterior doorway on the south of the choir has been walled up for centuries, but the interior of the archway remains intact, and now forms a baldachino for a life-sized effigy in white statuary marble of the late Canon, vested in cassock, surplice, and stole, with the hands joined as in prayer. The figure rests on a moulded base of Purbeck marble, from a design by the late Sir Gilbert Scott. The sculptor was Mr. Nicholls, of London.

WATER SUPPLY AND SANITARY MATTERS.

BRIGHTON WATER SUPPLY.—An important report on the water supply of Brighton was presented to the Town Council, on Wednesday, by Mr. Edward Easton, C.E., under whose supervision and advice the water service of the town has been gradually brought to what is believed to be the highest possible point of efficiency. The water supply of Brighton was originally in the hands of a company, but circumstances arose which rendered it expedient that such an important element towarde the prosperity of the town as an adequate supply of good water should pass into the direct control of the Corporation, and since that event, a few years since, continuous efforts have been made to develope the sources of the supply as well as the service. By an expenditure of about £35,000 a new well has been sunk at Goldstone bottom, a hollow on the Downs westward of the town, the water tunnels have been extended, and a new pumping-engine erected, thus making this station equal in its resources to the Lewes-road station. By other works just completed, at a cost of about £12,000, it has been ascertained that the whole of the town, with the exception of the low-service district, can now be supplied from either of the two stations, so that Brighton has now two independent services of excellent water. Its position, as regards its water supply, may, therefore, be looked upon as unsurpassed in the kingdom. The daily consumption of water is between two and three million gallons; the average consumption per head of the population being 24 gallons. This supply, before reaching the consumer, passes to reservoirs at different levels; the seven reservoirs have a storage capacity of 6½ million gallons. It may be added that the purchase of the waterworks by the Corporation has been the means of securing a considerable yearly profit, which has been applied to the borough fund.

SITTINGBOURNE AND MILTON.—Another inquiry as to the water supply of Sittingbourne and Milton, a subject as to which there has been considerable agitation of late in the two districts, owing to the incompatible views and schemes of the local authorities, was held on Saturday before Major Hector Tulloch, R.E., one of the inspectors of the Local Government Board. Major Tulloch now made a final proposition: he recommended that Milton should pay Sittingbourne a lump sum of £2,000 for the privilege of attaching a 6in. pipe to their main; also that Milton should, in addition, pay one-third of the working expenses and cost of maintaining the works. He estimated that Sittingbourne would save £2,000 and Milton £1,500 by this arrangement. The principle of the proposition was agreed to by the Sittingbourne Local Board, and after considerable discussion it was also accepted by the Milton Town Commissioners, subject to arrangement of details.

WESTGATE-ON-SEA.—An inquiry was held at Westgate-on-Sea, Isle of Thanet, on Wednesday, by Mr. Arnold Taylor, one of the inspectors to the Local Government Board, in consequence of an application from the Thanet Rural Sanitary Authority for authority to constitute portions of the parishes of Acol, Birchington, Minster, and St. John the Baptist into a special drainage district. It was explained by the clerk and medical officer of health to the authority that the district, which comprised 340 acres, with a present population of 1,400, was at present under no control as to building line, street cleansing, &c., except for the removal of simple nuisances, and the authority sought these powers and also that of providing drainage, in place of the present system of making cesspools in the chalk. After some discussion the inquiry was adjourned *sine die*, the application being opposed by the principal landowners, and by the town council of Margate.

LEGAL INTELLIGENCE.

AN ALDERMAN FINED FOR NOT DEPOSITING PLANS.—At Huddersfield police-court, Alderman Thomas Denham, draper, has been summoned for having erected at the rear of his premises in John William-street a building, without having deposited plans of the same, in accordance with the terms of the Huddersfield Improvement Act. It was proved that defendant had removed a shed from the back of his shop, that he had placed an iron girder on two walls running at right angles with the building, that he had covered the whole in with a roof, and had caused a floor to be laid much above the ground level. It was further stated that at a meeting of the Committee of the Town Council to consider the matter, defendant was required to apologise for having erected the building, and to send in plans. Mr. Denham declined to do either, on the ground that he had not contravened the Act; the Committee viewed the building and expressed their satisfaction with it, but still pressed for an apology and the deposit of plans, but unsuccessfully. The magistrates, after hearing this in evidence, and also the contention of defendant's solicitor that the alteration only constituted an addition to existing premises, fined Mr. Denham 20s. and costs, but expressed the opinion that they did not think he intended to contravene the Act.

DANGEROUS BUILDINGS.—Mr. C. Fry, from the solicitor's office of the Metropolitan Board of Works, appeared at Bow-street on Friday last to support a summons against the owner of No. 2, Harvey's-buildings, Strand, for allowing the premises to be in a dangerous condition. Mr. Robert Walker, district surveyor, stated that he surveyed the house by order of the Board on December 17th, and found the chimney-breast and party-wall so dangerous that he directed the Board's contractor to shore it up at once, which was done. On Tuesday last, when the builder commenced to pull down the breast the greater part fell with a crash, nearly

burying the workmen, and the party-wall and remainder of breast were imminently dangerous, and it had been necessary to warn the inmates not to stop in the house, and also to report the party walls to the two next houses as dangerous. Mr. Flowers at once made the order, and cautioned the tenant, who was a lodging-house keeper, not to allow any of the inmates to stop in the house.

DEDUCTIONS FROM WAGES.—Dr. Abdy, the Judge of the Essex County Courts, has given a written decision in a test case of some importance. Messrs. Eddington and Co., a firm of engineers at Chelmsford, were sued by one of their apprentices for wages which they had deducted on account of their establishment working short time through the depression in trade. It was argued that under the indentures the apprentices were entitled to full pay when the loss of time was not caused by their own default, and that it would be unreasonable to expect them to submit to a deduction when they were not free to enter other service if the chance offered. The judge, after taking time to consider the question, and after reading the indentures, decided that the defendants had no right to deduct wages when the apprentices were put on short time, and he therefore directed the verdict to be entered for the plaintiff, with his costs of attendance.

METROPOLITAN BUILDING ACT.—At Lambeth, last week, Henry George, builder, Cranham-street, was summoned by Mr. Jarvis, district surveyor, under the Metropolitan Buildings Act, for not complying with the 15th section of the statute in two houses in Rye-lane, Peckham. Mr. J. Thompson, barrister, appeared in support of the summons, and stated that the iron breastsummer must have a brick or stone pier, or be placed upon a wooden or iron story-post, in addition to the bearing on the party wall. The defendant declared that he had put all that was required. The object of the Act was to prevent the use of timber, and he had put in an iron girder. Mr. Jarvis insisted that as the 15th section had not been complied with, he was bound to summon the defendant. The absence of what he (Mr. Jarvis) required had caused the accident in Tottenham-court-road. Mr. Chance said the words of the Act had certainly not been complied with, and he must make an order that the work be done within 14 days. Mr. Thompson asked for costs, and the magistrate ordered a sum of £3 3s. as costs to be paid by the defendant.

CHIPS.

In the drawing of prizes by the Brighton Art Union, last week, the largest award, one of £20 value, and three other prizes, were won by tickets belonging to Mr. A. R. Farr, architect and surveyor.

A new Carver Memorial Congregational Church is being erected at Oldfield, near Windermere, and will be opened in the spring. The stencil decorations in the interior are being executed from the designs, and under the superintendence of, Mr. E. Sherwood, of London.

The tender of Messrs. Cowen and Lansdown, of Lincoln, at £925, has been accepted for the erection of the new Wesleyan schools in Derby-street, St. Catherine's, Lincoln, from the plans, &c., of Mr. Chas. Bell, of London, whose designs were selected in the recent competition.

At a general assembly of the Royal Academy held on the 18th inst., Mr. John E. Hodgson and Mr. Henry H. Armistead were elected Royal Academicians.

A remarkable invention called "captive daylight" is announced. A chemist has succeeded in forming a luminous paint, which absorbs light, and during darkness will suffice to light an apartment. Size of apartment and sufficiency of light not stated.

At a meeting at Bridgnorth, of the committee for erecting a memorial of the late Henry Whitmore, M.P. for the borough from 1852 to 1870, was held on Tuesday week, when it was decided that it shall take the form of an ornamental drinking-fountain, surmounted by a statue of Sabrina, with a medallion likeness of deceased in relief on the pedestal; and that this shall be erected on the small ornamental garden recently formed in West Castle-street, Bridgnorth.

A new Masonic hall was consecrated at Southampton, on Monday. It is siuated in Albion-place, and comprises a fine lodge-room, banqueting-hall, chapter-room, and usual offices.

A new organ was opened at the Congregational chapel, at Braintree, last week. It was built by Mr. Kirkland, of Wakefield.

The board of Holland Fen, Lincolnshire, have elected Mr. West, of Timberland, as their surveyor. There were 62 applicants.

The restoration of Bangor Cathedral is being actively proceeded with, and the edifice will probably be opened in its entirety about May.

Our Office Table.

SIGNOR PARNETTI has, it is said, been engaged in analysing the dust and *débris* of the streets of Florence and Paris. His investigation of the *débris* of the horse-paths proves that the dust contains 35 per cent. of iron, given by the shoes of the horses to the stones. In the dust from the causeways this eminent chemist finds from 30 to 40 per cent. of good glue. Signor Parnetti selected and treated separately the dust from the causeways of the Boulevard des Italiens over a period of two months, which uniformly gave 30 per cent. of good transparent glue, it is said, quite equal to Belfast. This chemist is now engaged in the analysis of the dust and *débris* deposited by the shoe abrasions in the thoroughfares of London, and has it in contemplation to place his discoveries at the disposal of a limited company, with a view of establishing blast-furnaces on the banks of the Thames to recover the iron thus lost, and a large glue works, which, it is thought, will produce more glue from the wasted material than will supply all London for every purpose.

WE understand that, at a meeting held last week, the trustees who superintended the erection of St. Mary's Cathedral, in Edinburgh, which is now completed, having considered the duties which Mr. Morgan had performed during the whole progress of the works, and the assiduous care and constant supervision he had ungrudgingly given, resolved to present him with a hundred sovereigns and a silver salver, bearing the following inscription:—"Presented by the Walker trustees to Mr. Edwin Charles Morgan, along with a purse of 100 sovereigns, as an acknowledgment of the valuable services rendered by him, as clerk of works, during the erection of the Cathedral Church of St. Mary, in Edinburgh, 10th December, 1879."

THE following instance of wide tendering, for which some Ipswich builders seem to have a fondness, deserves record here, instead of in the usual column. At the meeting of the School Board on Thursday week, one open minute had reference to the proposed addition to the boys' school, Argyle-street. The chairman read the following tenders:—Mr. George Kenny, Burrell-street, £764 15s.; Messrs. John Pells and Sons, Carr-street, £483; Mr. William Grayston, Argyle-street, £365; Mr. Henry Gladwell, Foundation-street, £284; and Mr. O. T. Gibbons, Wolsey-street, £385. On the motion of Mr. Wollaston, seconded by Mr. Bugg, Mr. Gladwell's tender was accepted.

IN the Victoria Hall, Exeter, 300 poor old people were entertained on Christmas-day. The chair was occupied, for the eleventh Christmas-day running, by Mr. Harry Hems. A great number of the poor people brought together were worn-out artisans, formerly connected with the building trades. The mayor, high sheriff, and chief constable, together with several Exeter architects and other gentlemen, were present, and, after dinner, Mr. Hems read a letter he had received from the Queen that morning, expressing her interest in, and sympathy with, the gathering. The hall was beautifully decorated with exotics, lent by Lord Poltimore and others, for the occasion, and 2 cwt. of beef, a score or two of geese, 5 cwt. of plum pudding, and 4 barrels of beer, were consumed. After dinner, all present were served out with an ounce of tobacco and a long pipe, and 50 bottles of whisky (subscribed by the publicans) were brewed into punch. Whilst these good things were being discussed, members of the cathedral choir and others sang Christmas carols. Another substantial meal, in the shape of tea, followed, and then the hall was cleared for dancing. The ancient ones footed good old country dances, until 9 or 10 o'clock, when each was presented with half a pound of tea, a pound of plum pudding, and a shilling, and everybody, entertainers and entertained, went home very happy.

THE sixth annual convention of the Potters' Association of the United States began in Cincinnati, Ohio, December 2. About a hundred manufacturers were present, representing all the prominent centres of the industry. The secretary reported that the past year had been an eventful one in the history of the ceramic art in the country. Never before had more rapid advances been made in any department of industry. Especially in the decorative departmen has the improvement been marked. The demand for this class of goods has rapidly increased, and American artists have succeeded in producing results never before accomplished in the country. Some of the lady artists of Cincinnati are fast gaining a national reputation for their beautiful work. The Americans recognise their need of more art schools, and are evidently determined to have them.

ACCORDING to the *English Mechanic*, the largest organ in the world is now being built in the cathedral at Garden City, Long Island, by Mr. Hilborne L. Roosevelt. The main body of the instrument will stand in the chancel, where the organist will sit. At the west end of the building, in a tower directly behind a large stained-glass window, is a room in which a part of the the organ will be placed and connected with the chancel by electricity. Over the ceiling in the centre of the building will be placed another part of the instrument called the echo organ, which is to be played from the chancel by electricity. Underneath the chancel, in the chapel situated there, is a part of the organ, which is arranged so that it can be played in the chapel as well as from the chancel. Lastly, the large chimes which hang in the tower will be connected with the chancel by electricity, so that the organist can play them from the keys of the organ. The bellows will be operated by hydraulic engines, and the organist can, by simply turning on the water, have the whole instrument, including the chimes, at his command. There will be 120 speaking stops in all, that in the Albert Hall, which is next largest, having 111. Five hydraulic engines will be employed, and a small Gramme machine for generating the electricity.

THE fourth annual exhibition of pictures in connection with the Art Institute of Paisley was opened on Monday evening. The total number of works is 183, being an increase of 15 over last year. These are the works of 62 artists, 58 of whom are members of the Institute, and 22 former pupils of Mr. Stewart, headmaster of the School of Design. Among the works on loan are the "Scene from the Tempest," by Sir Noel Paton; "The Moorish Minstrel," by C. H. Miller, and "On the Road to the Kirk," by Erskine Nicholl. Mr. Steward Clark announced, in the course of the evening, that the Brothers Clark had arranged with Mr. W. H. Lynn, their architect, to fit up one of the rooms in the new George A. Clark Town Hall, now in course of erection, as an art-gallery, where he hoped the exhibition would be of a permanent character.

DR. DONALD FRASER lectured at Birmingham on Tuesday night on "Worship of the Fine Arts." With regard to architecture, he said that Norman severity and Gothic grandeur fitted well with the emotion of reverence; but if they really held the purity of worship to be paramount, they could not regret that the Reformation had required some change in religious buildings. He would encourage artists to work out a good Protestant style—strictly ecclesiastical. He would not have a church cheap and shabby, and while he would not have it gay or luxurious, he would not have it gloomy. He would in every way have it congruous for its divine purpose, and adapted to a service in which simplicity was studied. As to the use of pictures in churches, they did not want so much to bring them into churches as to bring Christ into their pictures, and their books out into the world of men to comfort and ennoble their every-day life. It was with religion and art as with civil politics. They were not to bring politics into their religion, but to bring religion into their politics, and let it govern their civic action. So they were not to take art into religion, but religion into art, saving it from superstition and misuse, and from godless frivolity and licentious degradation. In the remaining part of the lecture he strongly condemned the use of superfluous ornaments in churches.

THE work on the new lighthouse at the Eddystone has been suspended and the *Hercules*, the steamship used as a tender by the engineer, is laid up in dock. The circular area on the south reef is inclosed by a massive dam, as the site of the new tower is now almost covered by stone work in position, and within six mouths it is hoped that the basement of the building will be above high-water level. It will form a compact

mass of granite masonry, formed of stones 3 tons each in weight. The stones are very curiously interlaced. It is considered that in preparing the foundation, most of which is some feet under water, and bringing the stonework to its present height, the engineers have completed the most difficult portion of the undertaking, and, all being well, the whole will be finished within two years. No accident to life or limb has occurred during the progress of the work.

AT Hurstpierpoint, on Tuesday, the lightning struck the beautiful chapel of St. John's College, and has done considerable damage. The picturesque church of East Blatchington, near Seaford, was also struck about the same time. The edifice consists of a chancel and nave, with a tiled roof. At the west end is the tower, a square, stone structure about 40ft. in height, and surmounted by a spire made of shingles. The lightning first struck this spire towards the west side, and then passing down in a north-easterly direction came in contact with the ridge of the roof of the church. The spire is an entire wreck, being completely stripped on three sides, while much of what remains sways with the gale, and presents a most ruined and dangerous appearance. A large portion of the roof next the spire is carried away, and a very large hole left. The south side of the church does not seem to have been struck by the lightning, and has suffered most from the falling timber and stones. On the west side of the tower the current came in contact with one of the windows, and carried away a portion of the stone sill. The tower is also cracked both on the west and north sides by the fury of the elements. The walls inside do not appear injured. Most of the plastering has fallen from the west end of the roof, through much of which daylight is visible. Strange to say, there is not a single pane of glass broken throughout the building.

CHIPS.

Mr. S. Cousins, the engraver, has resigned his Royal Academicianship and entered the class of Retired Royal Academicians. A new associate will be elected in January. The president, Sir Fredk. Leighton, is preparing for the summer exhibition six or seven idyllic and poetic pictures and studies of the class which he illustrated last summer in the same galleries.

A coffee-tavern in Harpur-street, Bedford, was opened yesterday. The large room on the ground-floor is 32ft. by 20ft. 6in., and a staircase runs across to a billiard-room, 22ft. by 20ft. 6in., a reading-room, &c. The kitchens and store-rooms are at the rear of the main building. Mr. John Usher, of Bedford, was the architect, Mr. B. Litchfield the contractor for bricklaying, and Mr. Lilley the contractor for carpentry.

The Canadian Government has let contracts, amounting in the aggregate to 9,167,040 dols., for four sections of the British Columbia division of the Canadian Pacific Railway—an undertaking which will probably increase the demand for English railway iron.

At a special meeting of the town council of Margate, held on Tuesday, the final arrangements were made for the purchase of the waterworks and plant from the local company for the town. The price to be paid is £59,000, raised by means of debentures, and the town council took possession yesterday, the 1st inst.

The Teddington Local Board have memorialised the Local Government Board to be allowed to withdraw from the combination known as the Lower Thames Valley Main Drainage Board, on the ground that the proceedings of the latter board are an injury to their district, and that the joint board have ignored the advice of the central authorities, and have determined to keep to Colonel Haywood's scheme without any modification.

The Water Committee of the Exeter Town Council, who during the past twelve months have managed the works purchased from the old company, have paid for many important improvements out of the income of the past year, and they now recommend a rate which will effect a saving of £1,000 a year to the citizens, and at the same time they have initiated a constant supply.

A new station, to be known as Mildmay Park, was opened yesterday upon the North London Railway, situated midway between Canonbury and Dalston Stations. The Company's own land being utilised, the total cost has been that of construction, between £6,000 and £7,000. The engineer and architect is Mr. Matthews, and the work has been carried out under the supervision of Mr. Birton, chief-assistant engineer. The contractor is Mr. Cortus, of Acton, and Mr. T. Robinson acted as foreman throughout the job.

Amongst the minor casualties occasioned by the hurricane which swept over Scotland on Sunday evening, and occasioned the destruction of the Tay Bridge with its moving load, were the blowing down of lofty chimney-stacks at Milton Dyeworks, Ruchterarder, Panbride Bleachworks, Arbroath, the sugar-refinery at Dee Park, Greenock, and of the wooden spire of the New Free Church, at Sandback, Holy Lock, and the twisting of that of the East Free Church at Rothsay; the fine bridge over the Linn of Dee, opened by the Queen in 1857, has been smashed by the falling of trees upon it, and the destruction of exposed gables, scaffolding and fences, as well as of trees, has been very general.

The marble bust of Mr. Spottiswoode, F.R.S., which has been executed by Mr. Belt, was unveiled at the Royal Institution on Saturday.

At the next meeting of the London and Middlesex Archæological Society, to be held on Monday day week, the 12th inst., Mr. J. G. Walker will read a paper descriptive of "The Course of the Tyburn."

We are pleased to see that the Lord Chancellor has just added the name of Mr. James Fowler, F.R.I.B.A., of Louth, to the roll of commission of the peace for the borough. Mr. Fowler was, a few years since, mayor of Louth.

At St. Peter's Church, Lancaster, on Sunday week, the Roman Catholic Bishop of Liverpool blessed a peal of bells preparatory to their being placed in the tower. The bells are eight in number, the tenor bell weighing 2 cwt.; they have been cast by Messrs. Warner and Sons, of London, and have cost £1,000.

An inquest was held at Hull Infirmary last week, on the body of a bricklayer names John Robinson, who was killed by a fall from a chimeny 90ft. high, now in course of erection at the Albert Dock Extension Works, Hull. Deceased and a stonemason were in the act of fitting a stone cap, which had just been set upon the brickwork by means of a derrick, when the brickwork cracked, and deceased fell to the ground, the mason falling within the chimney, and saving himself on scaffolding 4ft. lower down. At the inquest, Mr. Graham Lyne, assistant-engineer to the Dock Co., and Alfred Jones, the foreman, attributed the accident to frost, and admitted that he had not been to the upper part of the chimney for three week; that the men were skilled in their work and needed no supervision. The jury returned a verdict of accidental death, but appended to this an expression of opinion that the work had not been under sufficient surveillance.

At a meeting, last week, of the newly-constituted Board of River Commissioners for North-east Yorkshire, it was decided to take early action with a view to the liability to floods in that district. Mr. William Munzen, of South Holme, was appointed water bailiff, and will have charge of the Rye and Derwent and their tributaries.

A new public hall has just been opened at Walton, Surrey. It is of red brick, pointed with black mortar, with a tile roof, and the elevation is described by a Guildford paper as "neat and pleasing." The lecture-room is 55ft. by 30ft., with open deal roof, 24ft. high from floor to apex, the roof trusses, as well as the other woodwork, being wrought and stained. At one end is a movable raised platform. Seats are provided for 400 people. The frontage of the building is taken up with a reading-room, 22ft. by 20ft., and 14ft. high. The building has been erected at a cost of about £1,000 by Mr. Henry Faulkner, builder, of Walton, under the supervision of Mr. Heary Peak, architect, of Guildford.

At a special meeting of the Bingley Improvement Commissioners, held last week, it was decided to apply to Parliament next Session, for power to purchase Sunnydale estate for waterworks purpose. The plans and propositions have been prepared by Mr. Filliter, C.E., and show alternative schemes of supply, one estimated to cost £40,000, the other £20,000.

A memorial stained-glass window is about to be placed in the south aisle of St. Nicholas' parish-church, Great Yarmouth, to the late E. R. Aldred, and C. S. D. Steward, churchwardens; the work has been placed by the subscribers in the hands of Messrs. Buckley and Co., of London. The singular oaken pulpit that has long been in course of erection in this church has received important additions this Christmastide. Four columns with carved capitals and four figures have been added, the latter representing Melchisedek bringing bread and wine, Enoch with palm-branch and staff, John the Baptist in his raiment of camels' hair, and holding a banner inscribed *Ecce Agnus Dei*, and St. Matthew, with an angel. Eight figures, all special gifts, have now been placed in position, ten more being required to complete the work, in addition to four panels, each having a Scriptural subject carved in high relief.

A new organ, constructed by Messrs. Forster and Andrews, was opened in the parish-church of Elloughton, near Hull. The pipes are decorated in gold and colours.

Mr. Henry Warren, K.L., Honorary President of the Institute of Painters in Water Colours, died on the 18th ult. at his residence, 8, Cromwell-terrace, Wimbledon, aged 85.

The annual exhibition of works executed by the students in the Halifax School of Art is on view during the present week. It includes works which have gained for the school this year the National silver medal and three other National awards, and a large number of prizes and certificates, and a new feature is the drawings made by the members of the recently-organised sketching-club.

A new church of St. James was opened at Clamfield, Sussex, on Sunday week. It occupies the site of the old church, and is built of flint and Bath stone, and internally is lined with brickwork in various colours. Mr. R. J. Jones, of Ryde, Isle of Wight, is the architect, and Mr. Walder, of East Harting, is the builder.

M. Alexandre Denuelle died suddenly at Florence recently. He was largely employed in planning the interior mural decorations of public buildings in France.

Messrs. Macnaught, Robertson, and Co., of Bankend, Southwark, have issued, in conjunction with a pocket almanac for 1880, a useful series of tables and memoranda having reference to all kinds of constructional ironwork.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Institution of Surveyors. E. R. Robson on "The Non-Educational Work of the School Board for London," 8 p.m.

THURSDAY.—Royal Academy. Professor E. M. Barry's lectures on Architecture. No. 1, "Architecture in Theory, a Matter of Public Interest."

Civil and Mechanical Engineers' Society. A. T. Walmsley, A.I.C.E., on "The Bridges over the Thames at London," 7 p.m.

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Trade News.

WAGES MOVEMENTS.

WAGES OF ITALIAN WORKMEN.—A Milanese paper, *La Ragione*, gives the following as the average weekly earnings of the different trades in Italy at the present time:—Carpenters and joiners, 19 lire 60c.; gasfitters, 19l.; masons, 19l.; painters, 19l.; plasterers, 21l. 50c.; plumbers, 17l.; blacksmiths, 17l. 90c.; brass-workers, 27l. 50c.; cabinet-makers, 25l.; coopers, 16l. 65c.; coppersmiths, 17l. 40c.; cutlers, 17l. 40c.; engravers, 20l.; shoeing smiths, 17l. 50c.; paperhanging painters,, 19l. 26c.; tin workers, 17l. 90c.; labourers, &c. 12l. 70c.

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THE BUILDING NEWS.

LONDON, FRIDAY, JANUARY 9, 1880.

CONCRETE BUILDING.

FOR some reason or other, concrete, as a material for the construction of buildings, does not appear to advance so rapidly in public estimation as was predicted by those who were interested in its introduction, and who were always ready to assert, when this mode of building first came into operation, that in a few years it would supersede brickwork for London houses. There are probably more causes than are at once apparent for this obvious failure on the part of concrete to take the prominent rank among our building materials originally claimed for it, and at this time, when we hear so much of bad bricks and worse mortar; of houses condemned and jerry builders fined; and of faulty and insecure modes of construction of all kinds, it may not be amiss to glance at some of the chief obstacles and difficulties in the use of concrete, and to endeavour, at the same time, to ascertain why it is that concrete building has made so little progress.

Two conditions for success in the use of concrete of the utmost importance are encountered at the very outset of our examination of this question — first, the imperative necessity for a good and reliable cementing material; and, second, the existence of an ample supply of suitable "aggregates," as they have been termed, or substances capable of being incorporated together into a concrete. Looking at the subject with reference solely to the metropolis, we may assume that both these requirements can be satisfied. For in Portland cement and Selenitic cement we have safe and excellent binding materials to form the matrix, while Thames and gravel ballast and calcined brick earth furnish suitable and abundant aggregates for the concrete. Moreover, the small coke, or coke breeze, almost a refuse product in gasworks, seems peculiarly fitted for some descriptions of concrete, and this is invariably to be found in the neighbourhood of large towns.

We cannot, therefore, attribute our want of progress in concrete building to the absence of either of its chief components; but we have still to find whether — firstly, the mode of mixing these substances so as to insure the best results has been attained; and, secondly, whether we possess suitable machinery and appliances for moulding and fashioning the concrete as blocks to be built into walls, or apparatus capable of being employed for the erection of the walls themselves. In dealing with these two subdivisions of the subject, we ought to consider, under the first head, the proportions to be employed of cement and aggregates, so as to insure the strongest result, combined with economy in what we may regard as the raw material. We must also examine the means usually adopted for bringing about the intimate mixture of the materials we employ, in order that the utmost extent of homogeneity may be insured in the resulting compound. Under the second head we may broadly subdivide the use of concrete for constructive purposes into two main classes —(1) the block or slab system of construction; (2) the monolithic system of building. The machinery for each of these classes is entirely distinct, and must be judged from wholly different standpoints.

To the former part of our subject—the choice of materials, and the adjustment of their proportions—we propose to devote only a small share of the space at our disposal. Portland cement seems almost irresistibly to appeal to us as the fittest and most proper constituent of a concrete. When of good quality, it attains a tensile strength equal, if not superior, to that of most of our common building materials, and it is capable of uniting gravel, burnt ballast, and stone rubble into a compound of considerably greater strength (as manifested by its resistance to crushing strains) than common brickwork. Concerning the substances employed as aggregate, it is only necessary to remember that the surfaces exposed to the binding power of the cement must be clean, *i.e.*, they must be the actual surfaces of the materials to be so united, not films of dust, or coatings of clay or mud. As the strength of a chain is no greater than that of its weakest link, we must bear in mind that concrete exposed to the influence of wear, or of heavy crushing strains, must consist of hard and compact aggregates. Concrete destined to withstand a heavy tensile strain may only be composed of such materials as afford the best hold for the cement. A *hard* concrete is a very different substance to a *tough* concrete, and the composition of each must be carefully studied and adapted for the special purpose for which it is intended. To give illustrations: a concrete made of cement and chips of granite is a material admirably suited for paving purposes, owing to the great hardness and durability conferred upon it by the fragments of granite; while a concrete made of coke-breeze will stand a very high tensile strain, owing to the toughness gained by the porosity of the coke, and hence the very perfect degree of adhesion between the matrix and the aggregates. A correspondent, in commenting upon our remarks on Portland cement, has pointed out, in reference to the fine grinding of the cement, the greater extensibility of a given quantity of it, *i.e.*, the gain in extent of area covered by the cement; and he even anticipates the possibility of making one volume of cement bind together twenty volumes of sand. Theoretically, there is no doubt that this might be accomplished; but in practice the limit at present attained appears to be, even with a finely-sifted cement and the utmost care in the mixing, not more than twelve volumes of sand to one of cement. Cheapness is a matter of great moment in considering the practical use of concrete, and of two substances costing about the same price per ton, the lighter and most bulky would ostensibly be the better adapted for concrete-making. Thus, assuming Thames ballast to cost, when delivered on the work, about 6s. per ton or per cubic yard, coke breeze could in most parts of London be obtained for 5s., or even less. We should, therefore, weight for weight, regard small coke as a more advantageous ingredient to use than gravel ballast.

When once the composition of the concrete has been decided upon, the next question to be settled is the plan of the construction to be adopted, and to make choice either of the method of employing blocks or slabs on the one hand, or of a so-called frame-system on the other. The latter plan is by far the most general, and its prevalence is mainly due, we believe, to the efforts made by the patentees of one or the other of the appliances for concrete construction to introduce their inventions. The more we endeavour to trace the causes of the stir made about concrete building the more certain does it appear that the prime movers therein have all along been the patentees of apparatus to be used under royalty for this purpose. The increased expenditure entailed by the framework of the moulds, that is the sum payable for its use or hire, has amounted, in cases, to no inconsiderable item on the entire cost of the concrete work, and the extravagant ideas concerning remuneration of some of the patentees have often been a barrier to a more extended use of concrete.

The great argument in favour of concrete has generally been the fact that no skilled labour is required for its use, but this point in its favour is too often counterbalanced by the fact that a good deal of skill is needed in putting together and altering the framework used to contain it, and that what with the sum claimed by way of royalty by patentees, the cost of special moulds for particular openings, and the wilful obstinacy of the workpeople, concrete building has very frequently been found to give more trouble than it is worth.

Another great drawback to the use of concrete, apart from its deficiency in colour, is the necessity it involves of providing a finishing coat of stucco or rough cast. The surface of the wall after removal of the moulds is too rough and uneven to remain as it is, and hence the need of some further skilled labour to render its appearance neat and sightly. The addition of a coating of stucco, so often resorted to, in order to cover up the defective work of the bricklayer, is an expedient which can scarcely be avoided by the concrete builder, except by the introduction of still more costly methods of putting a finished face on the walls. Among the plans which have been proposed are the employment of thin slabs of earthenware, the introduction of tiles, the insertion of various kinds of colouring materials, and other like artificial surfaces.

The employment of blocks of suitable size, which can rapidly be cast upon the spot by unskilled labourers, in inexpensive moulds, removes some of the difficulties inherent in the monolithic system of construction, but it brings others in its wake; while the slab-system has the disadvantage of needing a wooden framework, to which to attach the concrete either in single or double thickness. For simplicity and convenience few plans of employing concrete slabs can vie with that advocated by Mr. Lascelles, and his system has also the merit of considerable economy. We incline, however, to modes of using concrete where the materials can be brought to the site of the works, and compounded on the spot where they have to be used. In this respect we fear Mr. Lascelles' plan would scarcely come up to our requirements. There can be no doubt that structures of concrete possess many advantages in point of increased equality of temperature throughout the year and freedom from damp. Many of the supposed defects of concrete houses are due, not to the use of concrete, but to that of *bad concrete*. Half the objections to the material arise from errors in its preparation, and manifest imperfections in some of its ingredients. In fact, with all the difficulties and drawbacks in the way of the employment of concrete, our only wonder is that so much, and not that so little, has been accomplished in what will, in spite of all that may be said to the contrary, one day come to be the chief mode of building in London.

THE OLD MASTERS AT THE ROYAL ACADEMY.

THERE are only 254 pictures exhibited at Burlington House this winter, but many are of a very high order of excellence. Among them are some first-rate portraits by Sir Joshua Reynolds and Gainsborough, and a few of great merit by English artists of ability, whose work is less known than that of their great contemporaries and predecessors. The great feature of the collection is Gallery No. 4, in which are collected a fine and most instructive series of the works of Holbein and his school. Gallery No. 5 also contains genuine works of the early schools, especially of Italy and Spain. The latter are chiefly contributed by Mr. J. C. Robinson, and are all the more welcome

on account of their rarity in this country. Even of Spanish illuminated manuscripts of any consequence there is a considerable dearth in England. Gallery No. 2 is filled chiefly with pictures of the Dutch and Flemish schools of the 17th century. The great central room, No. 3, as usual, contains most of the larger paintings; the Reynolds, Gainsboroughs, and Italian paintings in this gallery are most conspicuous. The list of contributors contains the names of many of the highest connoisseurs and best-known collectors. Her Majesty contributes 10, all of great value; the Duke of Norfolk 11; Mr. A. C. Fountaine, Mr. E. W. Harcourt, Mr. C. Butler, Sir Richard Wallace, Lord Northbrook, Earl Sydney, and Viscount Middleton are also extensive exhibitors.

No. 7, "Roman Peasants in the Campagna," is by Joseph Severn, a scholarly artist, who painted at Rome in the first half of this century. In colouring, manner, and grouping this picture follows the Venetian style. In the foreground are some peasants resting, classically grouped—almost as Titian might have done it. In the back are the Alban Hills, standing out in dark blue outline; from them, across the plain, runs the long line of the Claudian Aqueduct. There is something of hardness about the drawing of the two outside figures; otherwise it is an excellent work. There are two other paintings by this highly-gifted but little known artist. Shakespeare's lightest fancy has seldom been so successfully interpreted as in No. 26, belonging to the University of Oxford, where Ariel, a dainty, naked figure, is floating on a bat's back, holding a peacock's feather over her head. The best of the three is No. 4, the subject being the passage from the "Ancient Mariner," when the Skeleton Ship passes—

> "The naked hulk alongside came,
> And the twain were playing dice.
> 'The game is done! I've won! I've won!'
> Quoth she, and whistled thrice."

The weird terror of the whole scene reminds one of Blake, with double his power of execution. The dreadful fear of the mariner, and the majestic jubilance of the conqueror, are told with amazing force. Mr. Ralph Brocklebank shows two very representative pictures, of the two extremes of J. M. W. Turner's best work. The soft, quiet green — the glossy transparent water, and the sun-flaked sky of No. 11, "Summer Hill, near Tunbridge, Kent," transport one to as fair a scene as the beautiful English county can show, transferred to canvas, as Turner alone has done. "The Grand Canal, Venice," looking up the river towards the Rialto, is flooded with sunlight and bright colours—hundreds of figures and gaily-dressed gondolas crowding together to witness the blessing of the Adriatic. The picture is in excellent condition, and seems certain to preserve its splendid colouring. It is not a little curious to compare such a realisation as this with the hard, though architecturally correct, view of "Venice" (No. 40), by R. P. Bonington. "Sands at Sunset" (No. 32), by this artist, is a good specimen of his more uncommon style. No. 34, scene from "Peveril of the Peak," is well told, and very rich in colouring. Sir Augustus W. Callcott is represented by a very large river scene, "The Mouth of the Tyne," showing the town of Shields to the right. The shipping and boats are all astir with the fresh breeze. There is much life in the carefully-painted figures. The details of the cordage and rigging are admirably finished, but the colour is too grey, and generally there is a certain stiffness, not altogether pleasing. Sir H. H. Hoare's landscape, by Richard Wilson, is a little gem — rather mannered in its composition, but charming in its beautiful colour and clear atmospheric effect. There is a much more important work of his in the Central Gallery (No. 134), which belongs to Sir R. P. Beauchamp. It would be hard to surpass, in all sorts of excellence, the two landscapes by Thos. Gainsborough, of which Sir Dudley Majoribanks is the fortunate owner. The lovely calm quiet of the "Evening" landscape (No. 137) is quite refreshing. The figures, too, are so capitally introduced, the tired drover talking to the village girl who has come to fetch water, the cows feeding, rocks and trees on either side, with the hills in the distance, make up as beautiful a picture as one would wish to see. No. 140, "The Harvest Waggon," is still better; and is all the more interesting because two of the country-girls, one in the waggon and another just going to be lifted up into it, are portraits of Gainsborough's daughters. There is only one painting by John Crome, powerful and faithful, but not equal to several that have appeared in previous exhibitions. Mr. J. C. Harford's wooded landscape, by M. Hobbema, is of an unusually large size, 49½in. by 72in. The handling is proportionately vigorous. The figures are said to be by P. Wouvermans. Mr. Addington exhibits a fair example of the same master. The best landscape by Jan Both is No. 63, with figures by Poelemburg. Aart Van de Neer's "Moonlight Scene," the moon shining on the water, and showing in its silver light the vessels on the river, and the houses and cattle on the banks, could not well be better. There is just one high-finished and pleasant view, by J. Van der Heyde, No. 76. It represents a canal and houses, with trees along the wharf, and very cleverly-painted figures giving life to the scene. As an exhibition of what can be done in a few bold strokes, if you are perfect master of your art, the grand, luminous landscape by Salvator Rosa, No. 120, "Tobit and the Angel," produced apparently without effort, stands out among all the landscapes in the room. The facility and truth with which the waterfall on the right is painted are really surprising. We turn with a feeling of relief from this gigantesque style, to the calm, sunny pictures of Low-Country scenery, by Albert Cuyp. Of the seven specimens of this painter's work, the most important are in the third gallery, Nos. 114, 117. Very similar in handling and subject, No. 88 shows how he could paint a portrait. It belongs to the Duke of Norfolk, and is especially interesting, among other things, for the quaint costume of a noble child of the period. The little fellow holds a hobby-horse with his right hand. No. 60 is also well worth looking at, as showing how finely Cuyp could paint birds. The two cocks and two hens on a bank to the right are capital. High finish in its most valuable form is shown in the "Mercury and Argus," by Adrian van de Velde (No. 72). The whole is also a marvel of colour. Frank Hall is always right; his portrait of a lady (No 64) is painfully true. His subject was not a beauty; but as she was, in every particular of dress and feature, so he put her upon his life-like canvas. We have to thank the owner of this picture, Mr. W. Stratford Dugdale, for one of the most interesting portraits in the gallery, that of Sir Wm. Dugdale, by Peter Borsseler (No. 59). It was taken when the learned author of the "Monasticon," "The Antiquities of Warwickshire," and "The History of Old St. Paul's" was Norroy King of Arms, and aged 60. Near him is placed the companion-picture of his wife. Fine portraits abound in this year's Exhibition. Those by Gainsborough are scarcely equal to the landscapes we have mentioned, or to other portraits in the National Collection, but Sir Joshua Reynolds was never better represented. "Lady Elizabeth Compton" (No. 135) is simply delightful. We can well imagine with what pleasure Sir Joshua would have thrown all his powers into the perpetuation of so charming a beauty. Better still is the portrait of Miss Sarah Campbell (No. 142), sister of John Campbell (No. 144), afterwards 1st Baron Cawdor, whose successor owns both of the pictures. They are both as fresh and perfect in colour as when they were painted. Not so, unfortunately, has it happened with the portrait of Mrs. Riddell (No. 131); the carnations here have almost faded quite away, the whole having a uniform green tone, the result, in all probability, of mere carelessness in not properly cleaning the brushes. This is much to be regretted, as there is so much fine painting, otherwise, in the picture. No. 14, a half-length portrait of Maria Walpole, Countess Waldegrave, her head resting on her left hand, while she is looking upwards, is enchanting. As usual, some of the best paintings by Sir Joshua Reynolds are the children. No. 44 represents the children of his friend and fellow-artist, Van der Gucht. They are half life-size, seated in a wood, the one on the left holding out its hand, full of fruit. The palm is due to that perfect inspiration called "Simplicity." Even the famous "Strawberry Girl" can only compete with it for the first place. It is one of those original conceptions that the greatest artists seldom carry out in more than a very few instances. Those who care for old London must not pass by Samuel Scott's bright little view on the Thames (No. 6), giving old Montagu House, and the quaint water-tower, which used to stand at the bottom of Buckingham-street, Strand. "Old Covent Garden" (No. 45), by J. F. Nollekins, is also full of interest. The best pictures of this kind in the Exhibition are two magnificent Italian views, by Canaletto. They belong to H. M. the Queen. No. 111 is the "Arch of Septimius Severus," in an unusually large style. It is taken as seen from the Forum. No. 95 is a view at Venice, looking down the Grand Canal.

BUILDING CONTRACTS.

THERE are a few questions which now and again crop up in our correspondence columns, which perplex the young architect, and yet are of such common occurrence that it is surprising at first sight that such should be the case. They are those which have reference more especially to the duties of the architect in his relation to the builder or contractor, and to these we propose to devote a few words. The liability of clients for work done, the authority of the architect to order goods, allowance for old materials, extras, the granting of certificates, the liability of architects and builders, the acceptance of tenders, &c. — these are some of the matters which occasionally come for the first time under the consideration of the young practitioner just set up in business. We cannot avoid the reflection that the young architect is, of all business men, the least cautious in his preliminary relations. Whether, as is sometimes urged, the artistic temperament of the young aspirant unfits him for the sterner necessities of practice, or whatever more practicable reason may be assigned, the fact remains that inexperienced architects are often sufferers from the consequences of their own faults, and these are more frequently those of omission than actual wrongdoing. Young men are entrusted with work from some wealthy client; but in many instances, if we are to judge from the questions that so frequently reach us, they come to no definite understanding with their patron, as to the terms of their employment, which is often contingent upon some condition of cost. In other instances it is clear that tenders are accepted without any properly-prepared contract being executed, the only written document being a short agreement, which, from some unaccountable supineness, sometimes remains unstamped, and when that necessary

precaution has been taken, turns out as often as not to be informal. It is not surprising that the architect's peace of mind under such circumstances is of short duration; he is brought into connection with a tricky builder, who is ready to sign anything—which he sees he can wriggle out of when it suits him. The first thing that usually happens, is that the specification is ignored; bad materials are brought on the ground, over the acceptance or rejection of which the architect has no control, and these are introduced into the building, either in open defiance of the architect, or whenever his back is turned. There is no clause in the contract giving power to the architect to require removal. The next unpleasantness may arise from a want of clearness in the contract respecting payments or certificates. The contractor refuses to proceed, and the architect and client discover that the contract is not binding on the builder, or a much worse thing happens. The building is "finished"—at least the contractor says so—but the architect and his employer altogether fail to agree with the builder, whose notions of finality are of a peculiar character. The specification and contract are appealed to, and found so loosely worded that the contractor, in spite of all remonstrances, can claim his certificate of completion, and extras into the bargain. Defects in material and bad workmanship become apparent: the grates are badly set, the chimney-pieces clumsily fixed, doors and windows are twisted or do not fit; the furniture is of the commonest description, and yet the architect feels himself powerless, while the employer pays with reluctance, feeling that his interests have suffered owing to the neglect and want of precaution of his architect. The last named-individual fares worst of all, for a disagreement generally ends the transaction, and often at the same time severs the connection. The difficulties we have briefly sketched are by no means uncommon. Our object here is to point to the necessity in the first place of an agreement with the employer respecting the percentage to be paid, so that in case of the work not being executed, or the contingency arising of the employer getting the work carried out without the architect's assistance, he can claim his fee for preparation of the necessary drawings. We are not quite sure whether a verbal order to prepare designs is good in law, or whether in such a case an architect can claim his percentage if the employer alters his mind and denies that he instructed the architect to prepare a complete set of drawings. Such instances are not rare, and yet nine-tenths of the commissions received by architects are nothing but verbal instructions, their binding quality arising from other circumstances that take place afterwards. When a specific sum is named as the limit of cost, and the architect's design far exceeds it, he has obviously no claim; and yet the questions that have been so often put in our pages would appear to show a recklessness on the part of some architects as if whatever the amount of estimate was, the employer should be bound to pay the percentage claimed. Again, it does not seem to be generally known that an architect is not entitled to charge for probationary drawings unless they are approved. It sometimes happens that an architect agrees to prepare certain plans, as for laying out land for building purposes or for some building, and to make no charge for such work if the land is otherwise disposed of or the building is not carried out, on the condition that he may be appointed architect in case of the work proceeding. In the case of Moffat v. Lawrie it was ruled that the architect, though he prepared plans on such an understanding, namely, that he should be appointed architect if the land was disposed of for building, or receive remuneration for what he had done if his services were dispensed with, was not entitled to charge for the contingent services, the event contemplated after the services were rendered not having taken place. This ruling shows the importance of an architect not engaging to render services upon contingencies of this kind. Then there may be a fault of omission in some technical form, as in the case of corporate bodies and committees, fraught with even greater consequences; and we lately referred to an instance where an architect lost his claim because the agreement he made with a Local Board was not under seal (Hunt v. Wimbledon Local Board). But a far greater cause of difficulty to the architect, as we said at first, is an imperfect form of contract. Some architects use their own form, others adopt the clauses approved by the Institute of British Architects and the Association of Master Builders of London, but in a large number of instances no conditions are signed. We will just mention a few of the points upon which difficulties arise. One of the most important to the architect is that referring to the drawings supplied. It is far too common to omit the clause altogether. The form that should be adopted should have the following sense or purport, namely,—that the drawings and specifications should be construed according to their reasonable intent and meaning, and that if any discrepancy appear between the drawings and specification, the architect is to decide which shall be followed. The importance of this clause can only be appreciated by those who have gone through the ordeal of getting their design executed by a troublesome builder, from drawings imperfectly figured or roughly drawn. One fruitful cause of disagreement is that respecting extra work, and few more troublesome points occur to the architect than this. It is necessary to stipulate, of course, on the contract, that no extra work is to be executed without the architect's order in writing, and it has been held in law that, when such a clause is stipulated, extras done without such order, even when made at the request of the employer, cannot be claimed. We cannot too pointedly draw the attention of our less-experienced readers to this legal decision, and to the fact that no valid claim can be made for "extras," without a written order, if such order is made a term of the contract. It may be useful to know, in relation to this question, that sketches of extra work are not sufficient authority under the circumstances. We will here cite the form of the clause approved by the Institute of British Architects and Builders' Society in 1870. It runs thus:—

"No extra work is to be executed, except upon the express order of the architect, to be shown by any instruction, or subsequent approval in writing, or by any drawing, plan, or account signed or initialed by him. Provided always, that if the architect shall require the contractors to execute any works as a variation which he may decline to order as an extra, the contractors may reserve the question of their right to be paid for the same until the final settlement of account."

It is common also to introduce a clause to the effect that the value of all variations and additions is to be made by measurement, or by a schedule of prices agreed; but it frequently happens that the schedule is imperfect, and recourse is had to measurement and valuation, not always attended with satisfactory consequences, though the only equitable mode of adjustment. As regards deductions, it appears to us that the fairest method is to value them at the price upon which the estimate of the contractor is based.

(*To be continued.*)

A new footbridge across the Severn at Shrewsbury, connecting Coleham and Belle Vue with the centre of the town, was opened on New Year's Day by the Mayor and members of the corporation, and christened "Whitefriars." It is a lattice-girder iron bridge of 150ft. span, and has been erected at a cost of £2,500, by Messrs. Cochrane and Co., of Woodside Ironworks, Dudley.

WORK OF THE SCHOOL BOARD FOR LONDON.*

THE work of the School Board for London can excite professional interest among members of the Institution of Surveyors chiefly in so far as it relates to the acquisition of sites. I propose, therefore, to lay before you a short outline of that professional labour which must precede the educational work proper of the London Board, together with such records and tabulations as may hereafter prove useful for reference. The Board owes its origin and existence to a general Act of Parliament (33 and 34 Vict.), applicable to England and Wales, known as the Elementary Education Act of 1870, in which its formation is peremptorily ordered, and any christening rendered unnecessary by its name being precisely fixed. The district within which the Board has jurisdiction is, by an Order of the Education Department of the Privy Council (contemplated by the Act) co-extensive with that of the Metropolitan Board of Works. It includes Holloway and Hackney on the north, Hammersmith, Starch Green, and the whole districts of Fulham, Wansdworth, and Tooting, on the west, reaches down to the Crystal Palace on the south, and embracing Eltham and Plumstead, finds its eastern boundary on the northern side of the Thames at the river Lea. This district may be approximately described as having an extreme length from east to west of fourteen miles, and from north to south of ten miles. The Education Act of 1870, incorporates the Lands Clauses Consolidation Act of 1845, and thus the purchase of property for school sites takes place under precisely the same conditions as in any other case where land is scheduled by a public body under the latter Act. But the preliminary procedure—the method of obtaining compulsory Parliamentary powers—is somewhat different, inasmuch as the Bill is promoted, not through the usual preliminary investigation of a Committee of either House, but under the authority of the Education Department of the Privy Council, and, in fact, as part of a Government Bill. The plans of the various properties scheduled, as well as the book of reference, are made to conform to Standing Orders, but, when ready are deposited with the Education Department. The notices to owners and occupiers must be published during three consecutive weeks in the months of October and November, or either of them. The objections (if any) to the proposed compulsory taking of property are heard by the Education Department who, for this purpose, take the place of a Parliamentary Committee, receive complaints, obtain answers from the School Board, and give decisions after having obtained reports from their own inspectors. They can also, if they think fit, hold a formal inquiry. Objection can, of course, be taken by any member of either House at any of the proper stages during the passage of the Bill, but, failing any successful exercise of this privilege, the Bill becomes law in due course. This process, although much less costly, is sometimes quite as troublesome as the more familiar one before a committee, and after all, either House may order an investigation before a committee. One instance of this has already occurred—viz., that by the House of Lords in the Session of 1872, when the whole policy of the Board was called in question, and was successfully vindicated. The actual powers seen to be possessed by the School Board may be really great; but they are not granted without the most searching investigation on the part of the Government. The Board cannot buy any site or property out of its capital account (*i.e.*, out of money borrowed on the security of the rates, the repayment of the capital and interest of which is spread over fifty years, or a shorter term) without having first proved to the satisfaction of the Education Department the existence of an absolute deficiency of school accommodation in the neighbourhood, and, in consequence, a necessity for a school-house. On being so satisfied, authority is given to build for a given number of "school places." Plans of each of the proposed sites are deposited, and the Department, through their inspectors, closely scrutinise the position and surroundings of each, whether its compulsory taking be opposed or not. The Department, further, regulate the amount of land to be taken, never permitting a less

*By E. R. ROBSON, F.S.A., F.R.I.B.A.; read at the Ordinary General Meeting of the Institution of Surveyors, January 5th, 1880. (For subsequent discussion see p. 40.)

quantity to form a site than a quarter of an acre, without very strong reasons as to cost, &c., being shown. They also exercise, at a later stage, a vigorous control over the plans for buildings. The preliminary stages being all successfully passed, and the Bill having received the Royal assent, the various interests are acquired in the manner laid down by the Land Clauses Act. With the acquisition of compulsory powers the real work of buying the sites and building the schools is begun. Yet many sites have already been purchased without compulsory powers, for it is the invariable experience of all public corporations and railway companies that property so obtained is acquired on more favourable terms. Proceeding now to give some definite idea of the work performed by the School Board of London, it is necessary, first, to show the source and nature of the funds with which the board are supplied. The school rates are collected for the board by the vestries and District Board of Works, and the penny in the pound, which in 1869 represented, in round figures, £80,000, now, in 1879, produces, in round figuges, £100,000. The population with which the board has to deal is estimated upon the censuses of 1861 and 1871, and will be more correctly known next year. The total area of the 252 sites acquired is 5,685,768 sq. ft. The cost has been for property, including trade interests, £1,231,502 19s. 1d., and for legal and surveyors' charges, £180,869 7s. 7d., making a total of £1,412,372 6s. 8d. Of these purchased sites, 26 are not those originally scheduled, but have been adopted as alternatives; while 57 others, not included in the list, have been entirely withdrawn because of objections. As to relative cost, the cheapest site has been that in Bolingbroke-road, Battersea, where 54,426 sq. ft. of land were obtained for £660, or 2¾d. per square foot; and the dearest, that in Barrett-street, Oxford-street, which cost the Board £16,204 16s. 1d., including all expenses, except legal and surveying fees. The area being only 5,200 square feet, it follows that the price per foot was £3 2s. 2¾d. in fee simple. The average cost per foot, taking all London together, has only been 4s. 2¾d. The burden on the rates has been ·57 of a penny in the £. In addition to these sites, nineteen more are scheduled for the coming Session of 1879-80, besides portions of land for enlargement. The total cost of the 220 school-houses erected, with their sites and furniture, has been over three millions, varying in "cost per head" from £5 7s. to £16. Increase in cost of buildings has arisen from the combined effect of a large number of causes, which may be classified under three main heads—viz., (*a*) The great rise in prices; (*b*) the greater size of sites and consequent formation and inclosure; and (*c*) the developed ideas concerning education and its necessities. It is true that there is another increase in cost so far as the ratepayer is concerned, which is not an increase so far as value of artificer's work is meant. I allude to the increased area and cubical content now given to the boys' and girls' schools at the instance of the Education Department. The Board had, before commencing any building operations, decided not to allow a less superficial area per child in these two kinds of schools than 9 feet. In practice, this minimum had been treated as a maximum, and school accommodation came to be computed on this 9 feet basis. Within the last two years the Education Department have required that the computation shall be made on seat accommodation, limited the number of desks to five rows deep, and have required the rooms to be 22ft. wide. The net result is that the area per child, which formerly was 9ft., is now between 10 and 11ft. It is an improvement on sanitary grounds; but it is an increase of "cost per head." It is a common ground of complaint against the School Board that they proceed recklessly, buy too much property, and build too many schools. The fact is, that the first twenty sites scheduled under a resolution by Lord Sandon, when a member of the Board, were the only cases to which such a charge, even in theory, could have applied. They were decided upon, comparatively at random, so far as general locality was concerned. The want appeared so great and the need of action so urgent that it was felt impossible to wait for the completion of elaborate statistics, and accordingly a commencement was made without this preliminary. The work has now, however, reached a much higher state of organisation. The ten divisions of London are sub-divided by the School Board into many blocks, each having a distinctive letter, and in each block the School Board officer does his best to know the home of every child. Conflicting opinions as to whether land is, or is not, to be bought for a site, are thus brought in each case to the test of facts and statistics; and objections, whether raised by property owners, persons interested in existing public elementary schools, or by the Education Department itself, can be met on solid ground. The work of the Board has grown much larger than the framers of the Act ever contemplated. This, not from any desire to extend, but from the simple necessities of the case. Until the Board began its work, the number of poor children growing up neglected in London alone was merely guessed at. It was thought to be perhaps 100,000, but the numbers now actually in the Board Schools are—In premises transferred permanently to the Board, 19,315; in 220 new school-houses built by the Board, 174,709; in temporary premises, to be shortly replaced by new school-houses, 16,204; a total number of children of 210,228. It is further calculated that, when the whole existing educational deficiency is supplied, the increase of population alone will probably require some eight or ten additional schools per annum. On the subject of illustrating the working of the Lands Clauses Act, I may say a few words. Generally speaking, the contested cases have proved more favourable to the Board when fought before juries than when argued before professional umpires. That is to say, the results have appeared to approximate more nearly to actual values, especially when the commonsense of jurymen has been left undisturbed. This may appear remarkable when the well-known bias of juries against public bodies is considered; but it is the fact. I do not hold it to be conclusive as to the respective merits of the two tribunals. It points rather to the special value of the professional gentlemen, surveyors and counsel, who have aided the Board in the work, when united before a non-professional tribunal. One skilled professional umpire must, in my opinion, always form at least a safer judge than twelve men ignorant of values and liable to be biassed by a persuasive advocate or a mistaken summing-up. Yet, whether before juries or umpires, those cases in which the element of "severance" has found a place have usually been decided with a heavy preponderance towards the claimants. Severance is clearly an element more misunderstood than almost any other of common occurrence. Whenever a case of any importance must be contested, it has been found the best, and even the most economical course to appear by counsel. This whether before a jury or an umpire. One kind of case—viz., that in which an injunction in Chancery is obtained to restrain from damage to adjoining lights—has been before the public in connection with the Board. As is well known to railway surveyors, an injunction will not lie against persons proceeding under an Act of Parliament, the aggrieved party having his remedy in money compensation for damage proved. Yet an *ex parte* injunction was obtained from Vice-Chancellor Malins to stop the building of the Winchester-street school because of alleged damage to the lights of an adjoining property. The injunction was of course dissolved during the next few days. It has been usual to complain of damage to property by reason of bringing a Board School into its midst, just as in old days all property was said to be ruined if a railway came near, but the presence of a school has been actually found to increase the demand, among tenants of the more respectable sort, for the smaller kind of houses, just as the railway did. The cases in which persons have been compensated for damage to, or destruction of, profits from business have formed a comparatively small proportion, for the obvious reason that the Board are careful to avoid the neighbourhood of trade claims as much as possible. The Board Schools, with their adjuncts, playgrounds, &c., being municipal, and not imperial, in their character, are liable to pay rates, and the contest over the valuation of the assessment to the poor formed an important episode to the Board, to the ratepayers of the metropolis, and to surveyors. The point in dispute involved not merely the amount of assessment, but the principle of valuation to be followed. The Board held that the proper basis of value was the rack rental obtainable in the market. The Middlesex magistrates finally decided that the assessment must be based on an amount derivable from the interest on actual cost of land and buildings, applying 4 per cent. to the former and 5 per cent. to the latter. The amount of rate paid is therefore much more than had been expected; and a principle has been adopted which will, in all probability, have an indirect and imperfectly recognised application in the future to private buildings likewise. In reference to those portions of the surveyor's profession which relate to buildings, the experience in London during the carrying out of the Education Act has been varied and extensive. The Metropolitan Building Act is found to be interpreted and administered in different ways by the respective surveyors having jurisdiction in differents parts of London. The school-houses rank as public buildings under the Building Act, and are not exempt from its operation as are buildings belonging to railway companies. The district surveyor has, therefore, a discretionary power beyond the mere enforcement of the regulations framed for observance in the case of ordinary buildings, and his requirements have sometimes proved not merely a test of his knowledge of the Act, but of his acquaintance with practical and scientific building construction. Differences under this head have always been settled by arrangement. It is sometimes asked "What constitutes a public building within the meaning of the Act?" In reply I may confine myself to what now concerns us, by admitting that the new school-houses of the board, at least, should properly be treated as such. In the case of the Upton House Truant School, however, the question was broadly raised by the district surveyor whether the mere fact of an occupation by a public body like the School Board had the effect of converting an old house, originally built for a private residence, into the class of public buildings, and thereby rendering conformity with the Act, in its provisions as to new buildings, imperative. The magistrate decided in the board's favour, and the plaintiff has not seen fit to carry the case into the Court of Queen's Bench. Had the decision been otherwise, the use by the board of temporary premises, pending the erection of new school-houses, would have been impossible. Except that of ancient lights, perhaps no building question is more troublesome in London than that of frontage lines. A board armed with an Act of Parliament can get over the former by paying money for damage proved. Not so with the latter. They then have no power beyond that of private persons. The School Board has always been so desirous to avoid any hindrance to a public improvement, and even to further such schemes, so far as its duty would allow, that few real difficulties have arisen in respect of frontage lines. One of the provisions of the Building Act (sections 22 and 30) relates to the use of non-combustible materials in the staircases, landings, and corridors of public buildings, and is manifestly directed towards securing, as far as possible, safety from fire. In the board schools, therefore, the principal staircases, &c., are always constructed of non-combustible material. But it usually happens that a few steps are required to give access to the private rooms of the teachers, and, not being intended for use by the children of the school, have generally been made of wood. Recently, this practice was challenged in the case of the Haggerstone-road school by the district surveyor, who required the removal of the wooden staircase. The surveyor was doubtless right, *technically*, and it was thought that a sufficient protection would be afforded by giving an undertaking to reconstruct should it at any time be desired to devote the staircase to the use of children. The matter was thereupon heard by the Metropolitan Board of Works, who decided against the School Board. Leaving the Building Act, I now turn to the subject of the new school-houses. It is, perhaps, a necessity to the School Board to regard the expenditure on its buildings according to the outlay on each child, and thus to test everything by "cost per head." This form of calculation, however, can have no scientific value to the surveyor or architect, for it is manifest that all items over and above the mere school-room accommodation are almost the same in a building for 500 children as in one of twice the size. There is the same staircase, bell, caretaker's house, three teachers' rooms, inclosed walls, &c., in the one case as in the other. Thus, the "cost per head," which may seem very small, may really be large if the school-house be large, and *vice versâ* if it be

small. "Cost per head" depends therefore upon the size of the school, the method of computing the accommodation, and the relative size of one department to another. Its use is to assist in arriving at averages—never to form a standard by which to judge any single building. The true test is the cost of each cubic foot of building, provided always that the planning be compact and economical throughout. With that test, useless expense in mere adornment, whether external or internal, becomes impossible. The cost per cube foot of the new buildings proper, apart from boundary walls, &c., has varied from 5½d. to 7¾d., and at the present moment, when prices are low, stands at 6¼d. The cost of sites and buildings is defrayed out of capital account, and is spread over so long a term of years that it forms, comparatively, a small element in the rate. The expense of repairs, of maintenance in all forms, of management, of teachers' salaries, &c., all, on the contrary, fall upon the rate of the year, or, as it is called, "current account." The school rate is now 5½d. in the £, and must soon be higher. Yet the total amount spent in everything connected with the buildings and furniture, boundary-walls and adjuncts (excluding only the cost of sites), amounts but to ·9 of a penny in the £. The sites (as already stated) have cost ·57 of a penny. Thus, the real pressure on the taxpayer arises not so much from the cost of building a school as from the necessary expense of carrying on and maintaining it. Most of the schools are now built, and it is chiefly in the direction of careful organisation and simplification of all matters chargeable to current account that economy can be observed. In conclusion, I may, perhaps, be pardoned for venturing one step beyond the limits which I had laid down for this paper by remarking that architectural display has never formed an object in the school buildings. The only reason I had for traversing, at my own cost, Europe, the United States, and Canada, was to observe the best known arrangements for internal convenience in school buildings, with the result of saving many thousand pounds in compactness and suitability of plans. The style of architecture arose naturally from an endeavour to provide something adapted to the indigenous brick building of London, something which should avoid the dreary aspect of the workhouse, should look cheerful and school-like, should possess three points always present in good architecture—viz., good form, good proportion, and good colour, and which, while having its roots in the past, should in reality form a new style, marking alike the schools and the School Board epoch. That ignorance should have nicknamed it the "Queen Anne style" (which it in no way resembles), and that it should have become the passing fashion for other buildings are both causes for regret. In order not to incumber a subject, I have omitted any reference to the sanitary science applicable to schools —*i.e.*, to the playgrounds, the buildings, and the children—as that would have led me far afield, would have doubled the length of this paper, and confused its purpose.

ARCHITECTURAL ASSOCIATION.

THE fortnightly sessional meeting of the association was held on Friday, the President, Mr. S. F. Clarkson in the chair. The following gentlemen were elected as members:—D. F. M. Cheveley, H. Budd, W. Williams, W. F. Croot, R. Bentley, Llewellyn S. Harmack, T. de Courcy Meade, C. B. Blackshell, W. R. Low, P. Dellar, W. H. Oakley, Godfrey Pinkerton, J. W. Simpson, L. Vincent Hunt, François Louis Borgeaud, C. R. Bayley, S. J. Wolfe, C. T. Anderson, Howard-Chatfeild-Clarke, A. Sykes, E. J. Reid, R. F. Hodges, A.R.I.B.A., A. E. Gannaway, J. Howard Pentland, B.A., A.I.B. (of Dublin), J. B. Pinchbeck, J. Higgins, R. C. Murray, F. O. Stephens, H. Sawyer Hicks, W. Thorold Lowdell, R. Elsey Smith, J. C. P. Higgs, A. P. Durlacher, F. A. Gerrish, and C. F. Clifton. The President appealed to the members to exert their influence in recruiting for the classes of the Association. The majority of those newly entering the Association would derive benefit and profit by joining the elementary classes, and also the science class, and he would invite co-operation in inducing young members to enter upon such work.

Mr. R. C. PAGE read a requisition, signed by the President and eleven other members, asking the hon. secretaries to call a special business meeting at the earliest opportunity, to consider the following addition to rule 1—To add, after the words, "The Architectural Association," the words, "And the Society is intended to be established under the authority, and for the purposes (so far as applicable) of the Literary and Scientific Institutions Act, 1854." Mr. Page explained that there was some difficulty in obtaining a lease of the upper portion of the premises in which they assembled, the lawyers having been good enough to say that the Association had no legal standing, and the suggested addition to the title would remove the difficulty.

The PRESIDENT announced that the special meeting should be held half-an-hour before the next sessional meeting (at 7 p.m., on the 16th inst).

ARCHITECTURAL ILLUSTRATIONS AND THEIR CLASSIFICATION.

Mr. R. L. Cox read a paper on this subject, which will be found on p. 53.—At the close of the lecture the PRESIDENT said discussion of the subject of indexing might usefully be divided into several inquiries: first, had the author established the desirability of a classification of architectural publications? and, then, if anyone was prepared to reply in the affirmative, could any such scheme as that suggested be put into practical working, and would be likely to answer if carried out? Mr. Cox appeared to have almost a Moslem reverence for everything that was printed or written that seemed at first sight almost fanciful; but, certainly, the example given—the preservation of old Bradshaws—would furnish a romance as interesting as any to be found on the shelves of the British Museum, and something might be said in favour of the preservation of the most essentially ephemeral publications. The author might well have suggested that a complete classification of architectural matters ought to be made in the current professional journals. To his numerous quotations the author might have added the dictum of Lord Malmesbury, that an acquaintance with references was knowledge itself. It was doubtless highly advantageous to be able to grasp the outline of a matter, and to know where to fill in the details, without burdening the mind with a load of particulars. For the practical working of such a scheme it would be absolutely necessary that a master mind should direct affairs; such a person would be like the whipping-boy beaten for French princes' edification, a vicarious sufferer for the reading public, entitled to very much gratitude from them.

Mr. POWNALL proposed a vote of thanks to Mr. Cox for so amusing, practical, and really literary paper he had read. He had been forced to much the same conclusions as to the need of architectural indexes as the author had come to, for when the BUILDING NEWS began to publish six plates of illustrations every week, he saw it would be impossible to make good use of them professionally if he waited for the publication of the indexes to the half-yearly volumes. He accordingly indexed it, at first by getting a certain number of paper bags, labelled for churches, houses, &c., into which he stuffed the separate plates as they appeared. The bundles soon exceeded all practical limits, and so he was compelled to copy, sort, and keep references, and not the plates themselves. He was of George the Fourth's opinion, who considered that lawyers did not know so much more law than ordinary folks, but what made them so awfully clever was that they knew where to find it. He trusted Mr. Cox's scheme of a general index would be put into effect, and he should be happy to take part in the work. It would need to be carried out with great care and exactness; the committee of the Architectural Publication Society were in their Dictionary taking pains to verify every reference, and had found a great many of those given in other works erroneous.

Mr. GILBERT REDGRAVE asked if, in speaking of 380 writers on architectural matters, the lecturer meant so many were now living in England; to which Mr. Cox replied that this included all who had ever written on the subject. Mr. Redgrave remarked that the smallness of the number was most startling, and certainly made the proposed classification of works less formidable in appearance. That the architectural journals should have indexes in duplicate was most vital, and the second one should be printed on one side only, to allow of cutting up for a general index, and he hoped this suggestion would be adopted by the professional papers, to whom they all owed a very deep debt of gratitude. (Applause.) More had been done in this direction by these journals, more especially by the BUILDING NEWS, than in any other way. The suggestions made in the paper were admirable, and he hoped steps would be taken to give them practical effect.

Mr. JOHN JOHNSON considered that a general index of architectural matters would be of very great value to every member of the profession, and trusted it would be attempted. He seconded the vote of thanks to Mr. Cox.

Mr. H. W. PRATT, while giving all credit to the labour undertaken by the Index Society, which proposed to classify literature generally, believed it would be of great advantage to the architectural profession if a committee of their own body undertook this section of the work. It could only be done as an honorary duty, but if a large number aided in the work, the proportionate labour would be reduced, although even then it would take a considerable time. The question arose whether existing places and works of reference could not in the mean time be better classified. At the South Kensington Museum, perhaps the most accessible library for the profession, the attendants appeared to have a class index which was not available to the general public, and he could not understand why this should not be made generally useful. Coming to the professional journals, all knew that they published indexes to each half-yearly volume. These indexes, especially in one case, were exceedingly copious. In that particular journal one might refer to a subject, and there would be so many cross-references given, that it involved much time and trouble to find the object of their search. He did not think such a number of cross-references were an advantage, and if the index were done more clearly they would not be needed. He had himself been in the habit of indexing in a manuscript book, lettered with the alphabet, all the professional papers, both for letterpress and illustrations, and he could find a given subject sooner by this means than by the published indices. He took exception to the way in which the journals were paged,—and he was referring especially to the BUILDING NEWS in these remarks. This paper skipped a dozen pages in the numeration of the centre of the paper every week, there being represented by the illustrations. He believed if the printed matter were paged consecutively the volume would be more handy of reference.

The PRESIDENT, in closing the discussion, read extracts from a letter received from Mr. Blashill, who was unable to be present, describing his mode of classifying the illustrations in the professional journals. This consisted in providing a series of boxes the width and length of the papers, divided into four classes: domestic, ecclesiastical, castellated, and general; and two great groups, works ancient and contemporary, with numerous subdivisions to meet special requirements. The President added that all seemed agreed that a general architectural index ought to be in existence. Its compilation was, perhaps, one of those duties which should be undertaken by a general body of the profession. He then put to the meeting the vote of thanks, and this having been cordially adopted, Mr. Cox briefly replied, expressing a hope that the suggested scheme would not be allowed to drop.

CHIPS.

The Great Western Railway Company have made a contract with Mr. Walker, who constructed the Swansea Docks, to complete the Severn tunnel at Portskewith, which was recently flooded, for the sum of £1,500,000 sterling. Operations will be commenced forthwith.

The foundation-stone of a new Wesleyan chapel, at Pendleton, was laid last week. The chapel is being built by Messrs. Robert Neill and Son, at a cost of £11,000, from designs by Mr. R. K. Freeman, of Bolton. It will seat 1,170 persons, and will be of stone.

A new Board School was opened at Heeley Bank, Sheffield, on Tuesday. The style is Queen Anne, and the architect, Mr. E. R. Robson, of London. The builder was Mr. John H. Thorpe, of Leeds, and Mr. J. Laidler acted as clerk of the works.

A new Wesleyan school-chapel was opened at Boscombe, Bournemouth, on Thursday week. The style is Early English, the exterior being of red brick with white-stone facings. The estimated cost is £480. The architect is Mr. Curwen, of Liverpool, and the builder, Mr. Collins, of Winton, near Bournemouth.

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ILLUSTRATIONS.

NATIONAL HOSPITAL FOR THE EPILEPTIC AND PARALYSED. — VILLA AT STOKE BISHOP. — OLD HOUSES, RÖMER STRASSE, BERECASTEL. — DESIGN FOR PROPOSED TOWN HALL AT BOOTLE. — ROYAL ACADEMY EXTRA SILVER MEDAL DESIGN FOR A BAPTISTERY.

OUR LITHOGRAPHIC ILLUSTRATIONS.

NATIONAL HOSPITAL FOR THE EPILEPTIC AND PARALYSED.

WE present a sketch of the building to be erected in connection with the National Hospital for the Paralysed and Epileptic, Queen-square, Bloomsbury. This, it is intended, shall form the initial portion of the new hospital, which the Board of Management hope to be enabled to provide hereafter. The hospital now contains 100 beds for adults, and 10 cots for children, and when it is remembered that it deals with patients from all parts of the country, it is readily understood how insufficient this accommodation must be. The erection of the new wing will provide an urgently needed and valuable extension, and we trust the board will soon be enabled to proceed with the other parts of the proposed new hospital, and so to bring to a satisfactory issue the great work upon which they have entered. Building operations will be commenced in the course of a few weeks. The architect is Mr. M. P. Manning, of 6, Mitre-street Chambers, Temple, whose design, of which the wing now illustrated forms but a small section, was selected in a limited competition—a circumstance to which reference has already been made in these columns.

VILLA RESIDENCE, STOKE BISHOP.

THIS house is proposed to be erected at Stoke Bishop, near Clifton, at a cost of about £2,800. Mr. Henry Shaw, of 25, New Broad-street, E.C., is the architect.

OLD HOUSES, RÖMER STRASSE, BERECASTEL.

IN the midst of the celebrated vineyards of the Moselle, is the interesting mediæval town of Berncastel. A fire, in 1856, destroyed nearly all this town, and our lithograph represents a few of the remaining groups, some of which are now being destroyed for public improvements. These drawings were made from sketches by Mr. F. Atkinson Powell, during the summer of this year.

PROPOSED TOWN HALL, BOOTLE.

THE accompanying plans show the general arrangement of the building, in designing which it was desired to obtain a compact and economical plan, and, while separating the Town Council department from the public offices, to afford easy communication between all portions. The large assembly room is approached by the main stairs from the principal entrance, and also by a second staircase at the end of the building, and has a gallery over the lobby, reached by stairs in octagonal turret. It is covered with an open-timbered roof, and the platform is in communication with suitable retiring rooms. The materials proposed to be used were Tegnose stone for the walling, and Runcorn stone for dressings, the roofs being eaved with brown tiles. The author of this design is Mr. John Douglas, Chester.

ROYAL ACADEMY OF ARTS EXTRA SILVER MEDAL DESIGN FOR A BAPTISTERY.

LAST week we published the Gold Medal Design for a baptistery which was awarded to Mr. Frank Baggallay. To-day we are enabled to give the design for the same building, for which the Royal Academy presented an extra silver medal to Mr. J. Howard Ince, its author. Our illustration includes the perspective view, transverse sections, and general plans. We shall publish next week the prize design for a town residence for a Royal Prince, by Mr. R. W. Gibson, to whom the Royal Academy Travelling Studentship was in consequence awarded. The general detail of Mr. Baggalay's Gold Medal design, above referred to, has also yet to be published.

SECOND PREMIATED DESIGN FOR CITY OF LONDON SCHOOLS.

WITH our description of this illustration last week, we were unable to append the references to the plan. We now give them.

A Class rooms
B Lobby for hats and coats
C Corridor
D Large hall
E Head master's room
F Lavatories and w.c.'s
G Library
H Committee room
I Secretary and secretary's clerk
K Entrance lobby
L Porter's room
M Book store
N Master's visitors' room
O Assistant master's room
P Retiring room for ladies
Q Hall
R Stairs to lecture-room
S Stairs to covered play-ground
T Stairs to porter's room and culinary department
U Porter's entrance
V Stairs to class-rooms on first floor, and covered play-grounds under large hall
W Lecture room for natural science
X Laboratory
Y Best apparatus room
Z Practical chemistry class-room
1 Refreshment counter
2 Dining-hall

INSTITUTION OF SURVEYORS.

THE fortnightly meeting of this institution took place on Monday evening, Mr. Edward Ryde, V.P., in the chair. The decease was announced of Mr. Alfred Sedgwick, member of council, and Mr. Alfred Fowler, of Birmingham, was nominated to fill the vacancy.

THE WORK OF THE LONDON SCHOOL BOARD IN RELATION TO SITES AND BUILDINGS.

Mr. EDWARD R. ROBSON, F.S.A., architect to the London School Board, read a paper having this title, of which we give a summarised report on p. 37.

Mr. T. CHATFEILD CLARKE, in proposing a vote of thanks to the lecturer, remarked that it was not generally known under what high pressure much of the early architectural work of the London School Board was devised and carried into effect by Mr. Robson. The public were impatiently anxious to see in the metropolis some results of the Education Act; twenty sites were therefore chosen at random, hastily scheduled, and if any mistake was made in the board's policy it was on these first schools, although he would not admit they were entire failures. An error was made in acquiring limited sites and planning thereon small schools, for adjacent property had subsequently to be taken at great expense, and the schools were found ill fitted for enlargement. This was a false economy, and if the Education Department permitted it, he thought the board would be justified in acquiring sites and providing schools in districts which were obviously likely to be covered with houses. It ought to be more generally known that the Department exercised a complete and detailed control over the School Board in the selection, arrangement, and size of schools; especially to guard against interference with voluntary schools. There was a power granted to district surveyors, by the Building Act passed last year, against which architects had earnestly protested, and he should be glad to hear Mr. Robson's experience with regard to it: he referred to the provision by which district surveyors could demand the permanent deposit of plans of all public buildings. This was a needless expense, either to the architect or his clients, and the arbitrary enforcement of the Act should be strongly resisted.

Mr. E. VIGORS challenged the statement that juries had been found to give more favourable awards than arbitrators. As an old railway surveyor, he had had some experience in compensation cases, and he had not been impressed with the common-sense of juries. Their verdicts were most uncertain, but they had a distinct bias against railway companies. Perhaps one reason for Mr. Robson's better fortune was that juries looked upon a railway company as a trading firm, but upon the School Board as supported by rates to which their own pockets contributed. He was convinced that arbitration was more fair to all parties than jury cases.

Professor KERR intimated, with reference to the deposit of plans, that Metropolitan district surveyors would concur in not requiring any public body to give them up permanently. The power possessed by the School Board under several Acts, by which no injunctions to restrain injury to lights would lie against it, was admirable and equitable. He wished the English law of right to light and air would be assimilated to this, the practice of all other countries, so that a man should be able to build what he chose on his own land, on condition that he compensated his neighbours for any injuries thereby inflicted on them. Such a reform of the law would remove the most common difficulty to building parties. Then, as to the frontage line. That the School Board, or any private individual, should be compelled to set back their property without receiving any compensation was radically unsound. Equity demanded that a man should be recompensed by the public for all additional ground given up for their benefit.

Mr. YOUNG, assistant surveyor to the London School Board, thought perhaps that body had given way too much to local authorities as to the frontage lines. For many valuable street improvements the Board had cheerfully set back their premises; thus, while the expense came, of course, out of the same pockets, the District Board or Vestry got the credit with the ratepayers, while the School Board charged the outlay in their rate. He thought more than the 8 or 10 new schools spoken of by Mr. Robson would be required for some years to come, for voluntary schools would continue to be taken over by the Board, and then the views of the department as to accommodation invariably rose, so that great additions or new schools were needed.

Mr. T. SMITH-WOOLLEY, of South Cottingham, Newark, spoke as chairman of a rural school board, and as a surveyor, in high terms of Mr. Robson's work, but expressed his surprise at the favourable results of jury-compensation cases in London. His own experience was otherwise.

Mr. ROBSON, in replying upon the discussion, said it would doubtless be better to acquire sites before they were built over, but the department declined to allow the Board to schedule a site till there was a proved deficiency of school accommodation, so that they had to wait and see the houses built and filled with children, and then to step in, pull them down, and place a school on the site. He looked forward to the diminution of cost by decrease of building, increase of fees, &c., but the process would be slow, and they had not yet reached the limit of rate. He had had to deposit his plans with district surveyors, but they had been, or would be, he trusted, all returned. Architects felt very strongly on this point, and thought that district surveyors who were chosen from among architects in practice, should not have the permanent use of all plans. He had simply stated the fact of the more favourable verdicts of juries than arbitrators' decisions, as a matter of surprise to him, and he believed Mr. Vigors had suggested the true solution of the problem—that jurymen were ratepayers. As to frontage lines, in one case only the Board had resisted a demand—in Johanna-street, Lambeth; but, as a rule, the Board were glad to co-operate in public improvements.

The CHAIRMAN summed up the discussion, and in doing so corrected a popular mistake as to the increase in the value of property in the metropolis, founded on the rapid rise in the ratal basis of late years. The property was not so much more value, but was assessed at a sum more nearly approximating to the present rack rental. The rating of Board Schools was most unfair; a school in Battersea, where there was an increasing population, would be of more value, if let to a private schoolmaster, than one situated in the heart of the City, and yet the latter would be rated ten times as high as the former. The verdicts of juries were the greatest of games of chance. No one, after hearing the evidence, would venture to predict what a jury would decide, and he would go further to say that no one going into the jury-room, as one of the twelve, could tell what would be awarded. Arbitration was more fair to all parties. The school ought to be able to secure land before it was covered with houses, and especially with shops. As a general question, he thought all cases of light and air ought to be referred to a court composed of two surveyors and a lawyer.

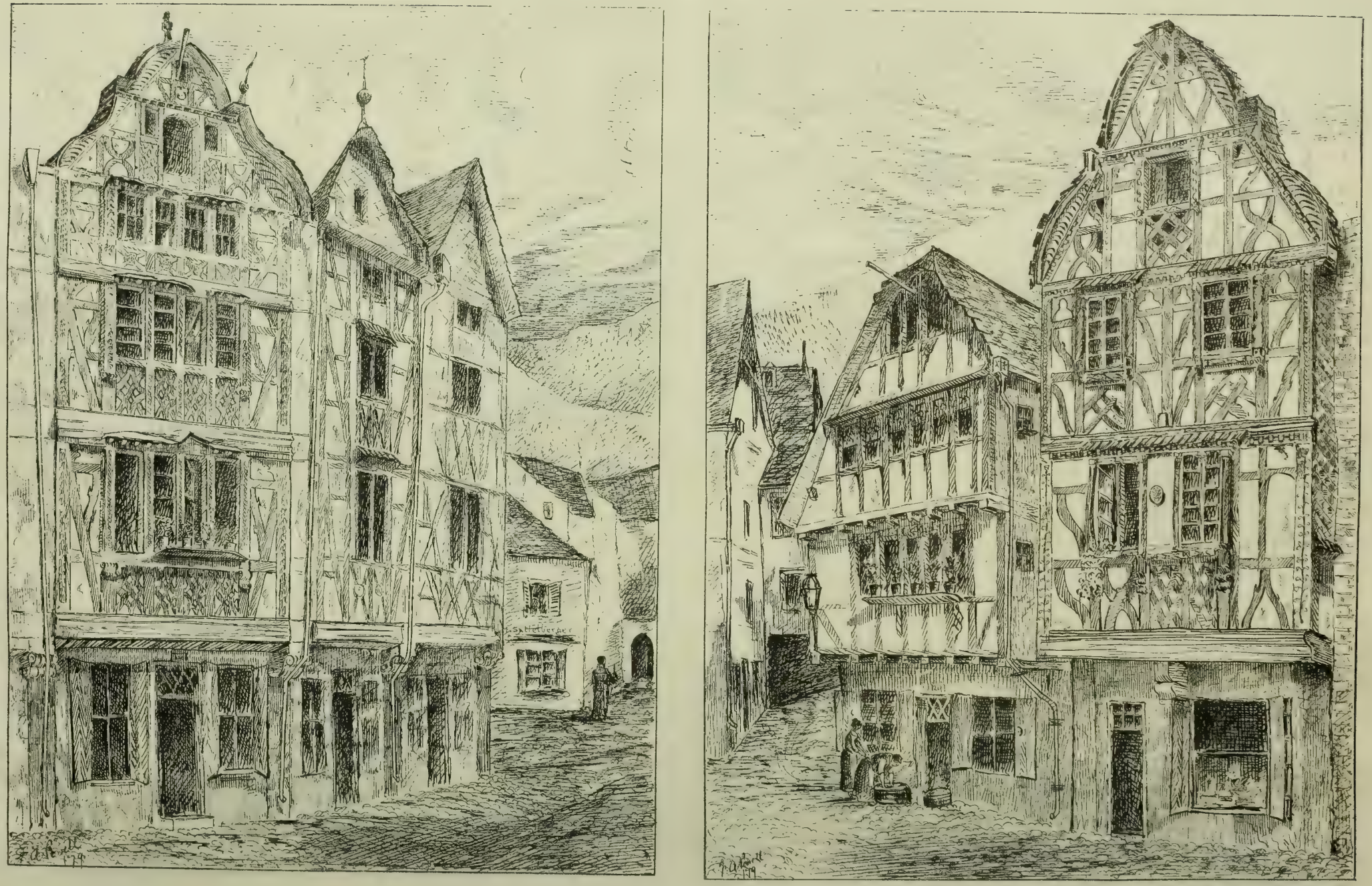
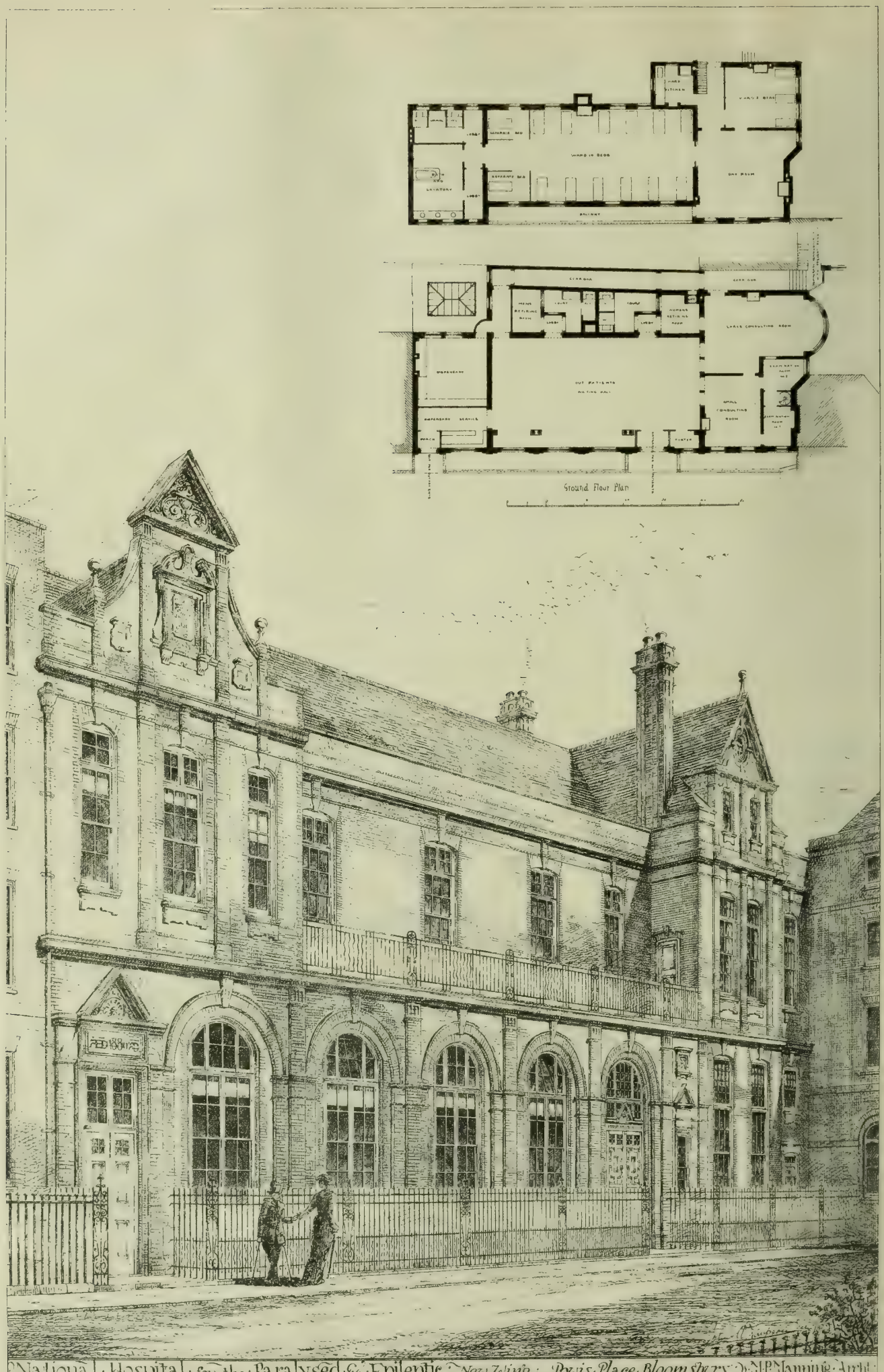


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OLD HOUSES RÖMER STRASSE BERECASTEL.



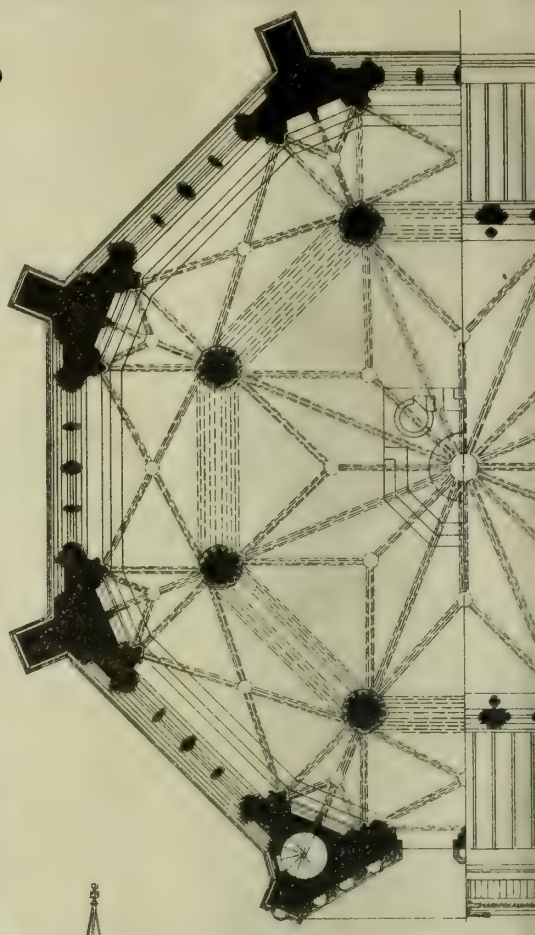
National Hospital for the Paralysed & Epileptic: New Wing in Powis Place Bloomsbury. J. N. P. Manning, Archt.

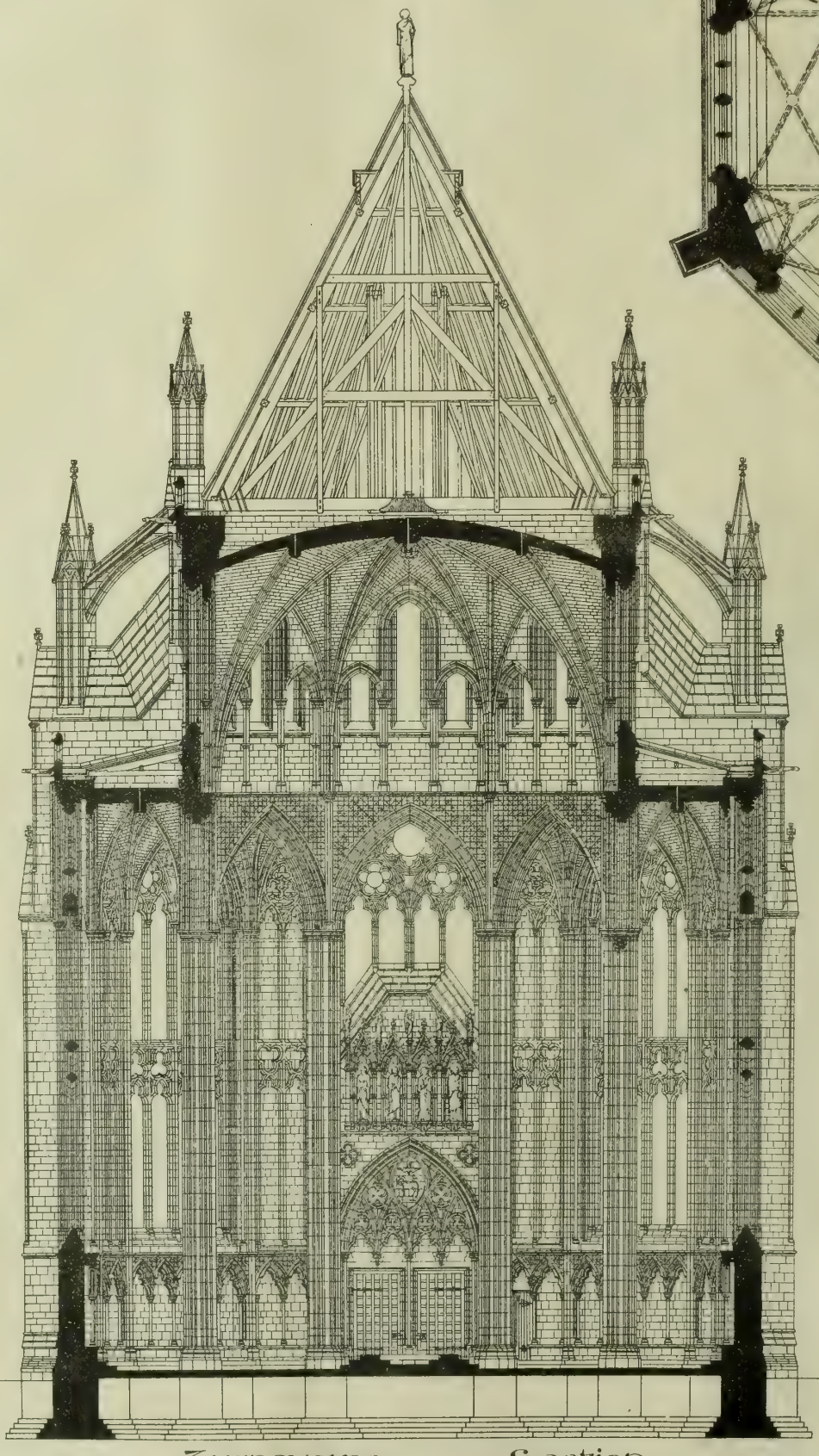
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Royal Academy of Arts
Design for a Baptistry

EXTRA SILVER MEDAL AWARDED

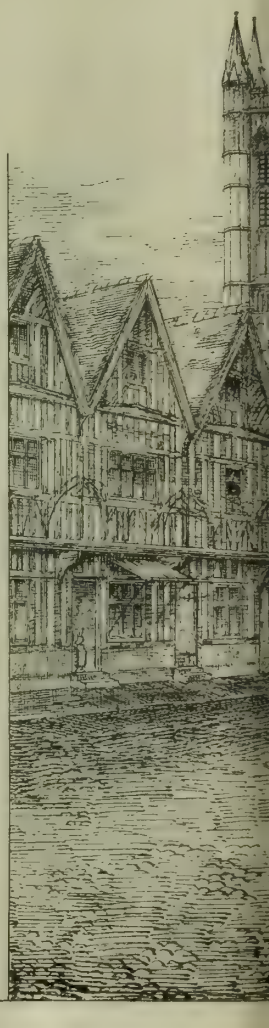
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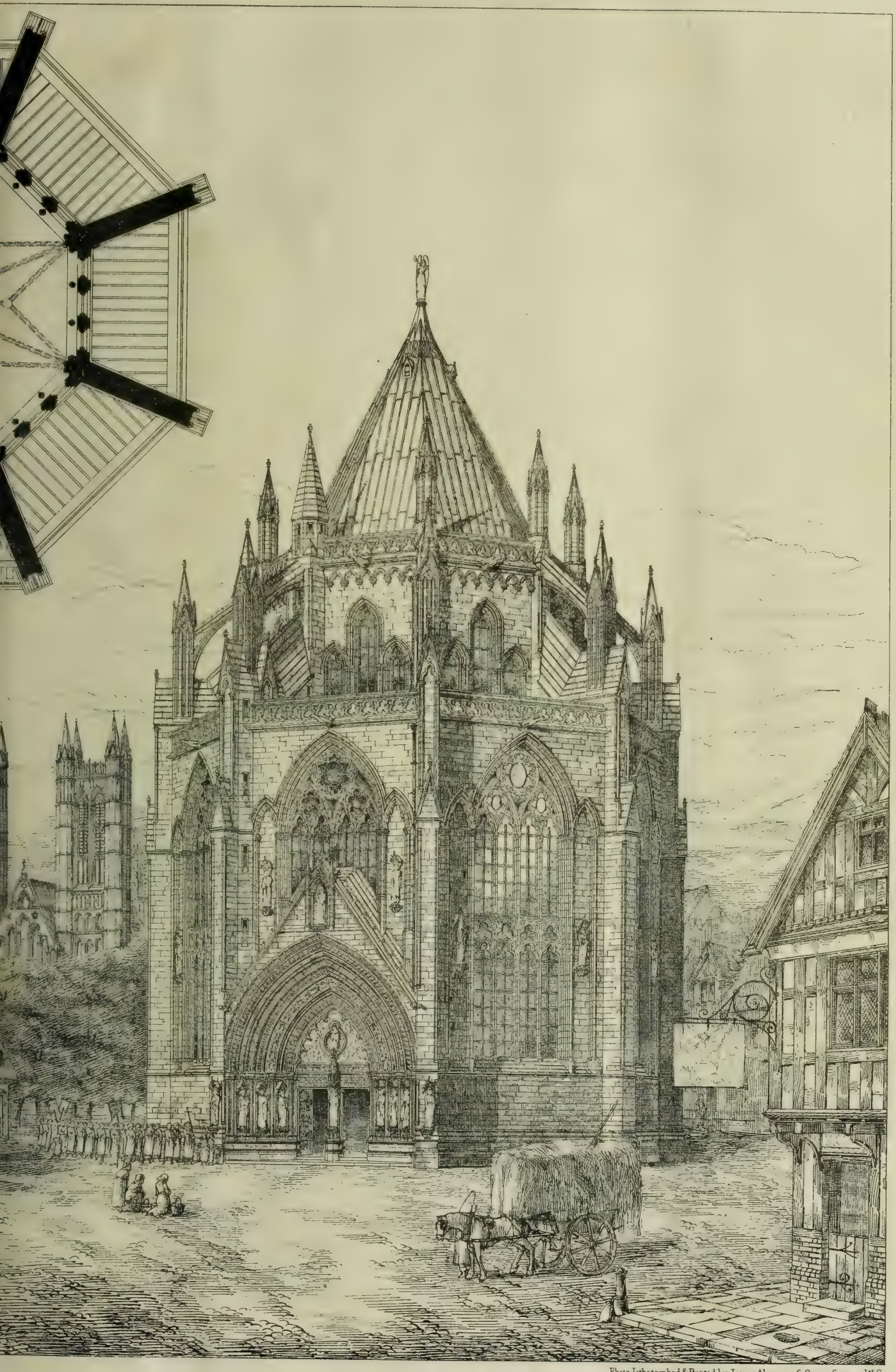
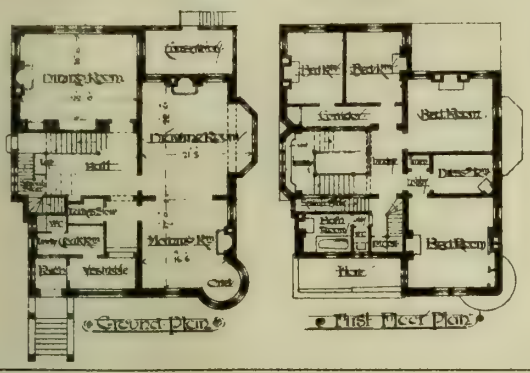


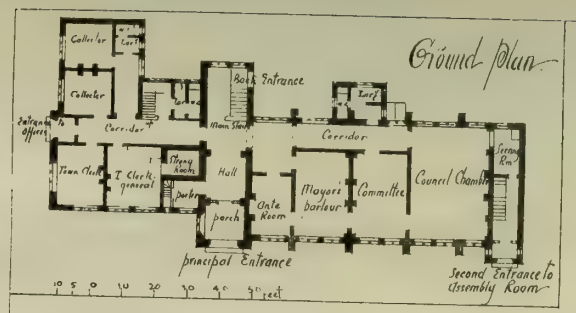
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Villa · Residence
STOKE·BISHOP
near CLIFTON ·

Henry · Shaw ·
ARCHITECT

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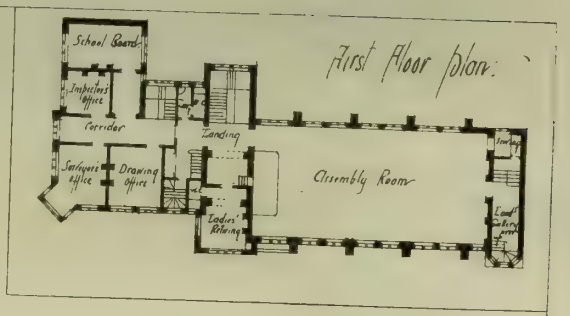




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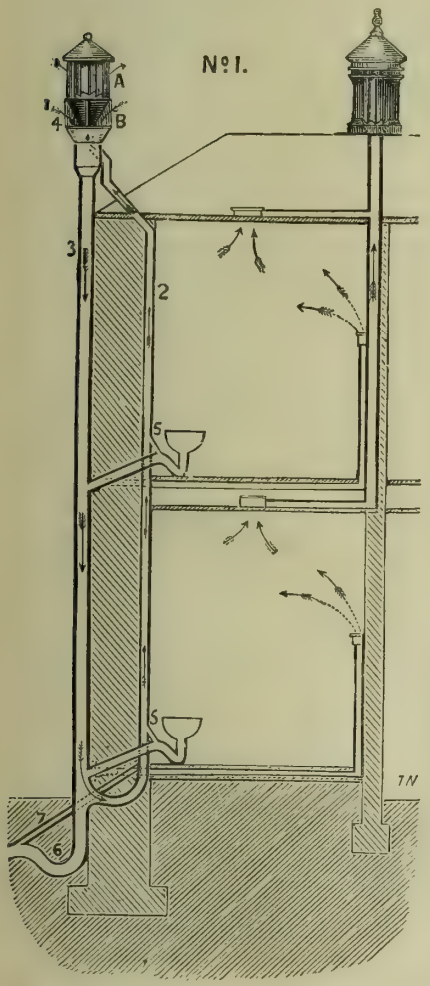
DESIGN FOR PROPOSED TOWN HALL BOOTLE

John Douglas Archt

A NEW DOUBLE-ACTION SOIL-PIPE VENTILATOR.

IN connection with the discussion just revived in our Correspondence Column respecting soil-pipes and sanitary fittings, we may, perhaps, appropriately direct attention to a new double-action soil-pipe ventilator, just introduced by Messrs. Robert Boyle and Son, of Glasgow, which is simple and efficient.

As shown in diagram 1, Fig. 1, the upper portion of it, marked A, consists of the air-pump or extracting ventilator, connected with the up-cast ventilating pipe 2. The down-cast ventilator, B, forming the lower portions, communicates with the soil-pipe, 3. From the arrangement of the plates or division 4, it presents an open mouth (on the principle of the wind-sail) to the wind, from whatever quarter it may blow, forcing it down the soil-pipe and up the ventilating-pipe, as indicated by the arrows. By this means a double power is obtained, the force of the wind driven down, and the suction of the extracting ventilator keeping the soil-pipe thoroughly aërated, and perfectly free from poisonous gases, which are not allowed for a



single instant to lodge or accumulate in the pipe.

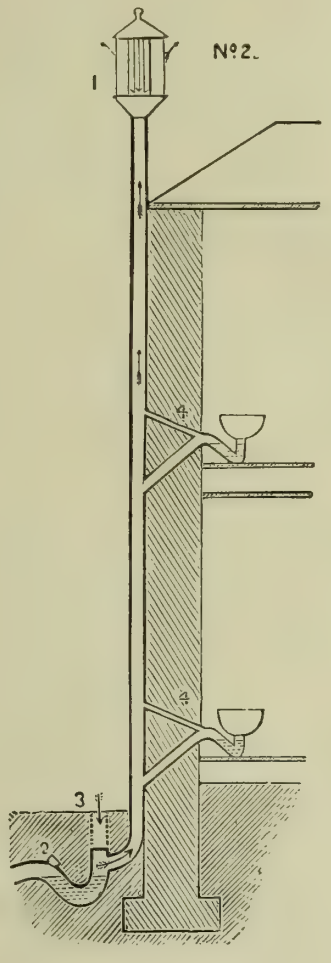
This ventilator has also the great merit of being a fixture, with nothing movable to get out of order or make a noise. The fact of the air inlet being at such an elevation insures a supply of air, and a force not attainable at a lower level.

Both pipes may be placed inside the house, or outside, as preferred, or the soil-pipe may be placed inside to protect it from frost in the winter time. There would not be the slightest danger, however, in having it in the house with the double-action ventilator applied. It is shown by Messrs. Boyle placed outside, so that the up-cast pipe may have the benefit of the heat in the house, which tends to rarefy the column of air, and which also derives a greater velocity from the colder and heavier air in the outside pipe rushing towards it and forcing it out at the top. These conditions alone assist greatly to maintain a continuous through current, independent of the force of the wind.

Figs. 5. 5. 5. are ½in. pipes to ventilate the discharge pipes connected with the w.c.'s, and prevent the traps being unsiphoned by the passage of matter down the soil-pipe. Fig. 6, the drain-trap; Fig. 7, 2in. ventilating-pipe, connecting drain with cast-up pipe, where no provision is made for ventilating the drains separately. This arrangement is so simple and easily understood, that its utility must be at once apparent.

It is also shown in the diagram how Messrs. Boyle and Son ventilate the w.c. by means of one of their air-pump ventilators placed on the roof, with a main-pipe led down the wall and connected by means of a branch pipe with the centre of the ceiling, the fresh air being admitted through a vertical tube placed against the wall close to the door, so that the current of air will always have a direction from the door to the ventilator, which, from obvious reasons, is the proper direction. The vertical tube is connected underneath the floor with an opening, through the wall, communicating with the external air.

Diagram 2 shows the system of soil-pipe



ventilation, which is at present most extensively used by the leading sanitary engineers. Fig. 1 is a Boyle's patent air-pump ventilator, 10in. diameter, for creating an up-draught, and preventing down-draught, which it has been found to do most effectively, the highest testimony being given in its favour. It is now too well known to all in any way interested in these matters to require a further description. Fig. 2, the drain-trap; 3, fresh-air inlet to soil-pipe, by which means a through current is established.

In the diagrams the ventilators are shown larger in proportion than they would be in reality, for the purpose of making their construction plain.

ARCHITECTURAL ILLUSTRATIONS AND THEIR CLASSIFICATION.*

THE subject that I have to bring before you this evening is one that I think I am right in saying has never yet been introduced for the consideration of the architectural profession, and I hope to be able to show that it is in reality a highly interesting as well as a very important one. In its wider and broader sense, that is, the general classification and arrangement of all sorts of knowledge, it is one that will thrust itself year by year more prominently before the notice of students of all classes, till at length, I am convinced, it will force itself into that place in their estimation that its importance has long demanded.

In order to point out clearly the use and value of compiling what I am going to argue in favour of, viz., complete indexes of all the knowledge we possess, I will quote the remarks of Professor Robinson, an American librarian, who says that while a student in the present day is required to know exactly as much of languages and mathematics as one in the last century, he must, in addition, be well acquainted with chemistry, geology, physics, botany, and a host of other sciences, of which the latter never dreamed at all, while—and here lies the gist of the whole thing—the period allotted to student life remains the same. The field of learning is constantly widening. Year by year we have books, papers, essays, and pamphlets written upon all branches of science and art in constant and ever-increasing succession, so that it has now become impossible for a man to do even what little the architect, as the disciple of a profession that embraces perhaps the widest range of all, has been advised to do—that is, to aim not so much at an attempt to know all, as to find all that is required of him at a moment's notice. This in the present state of things is a result that is only to be obtained by the compilation of accurate references, by which one can learn at a glance where to go to find any given subject, and a moment's thought bestowed upon the matter will show how really imperative the necessity of boldly undertaking the task is becoming.

We have, without reckoning books whose name is legion, six professional journals published weekly, two monthly, and one quarterly, besides a dozen, or thereabouts, of weeklies so closely allied as to be almost ranked with the special ones; most having continued uninterruptedly for many years, some for more than forty years, and altogether containing an enormous mass of history, archæology, science, literature, art, precedents, illustrations, and records of results of practical experience, which would be of inestimable value to the professional man if they were at all within reach. They are, however, all but useless, like so many pearls that cannot be obtained without an amount of grubbing in the depths of the ocean of letters that would exhaust the life and patience of the most expert of literary divers. This huge accumulation has, for the most part, never been touched by the exploring indexer, although the formation of accurate and copious indexes for books has long been held a work of the utmost importance. The Roxburghe Club, founded in the beginning of the century to commemorate the enormous price given for an edition of Boccaccio's "Decameron"—viz., £2,260 (a volume that, by the way, was sold at a second sale afterwards for just £1,000 less)—declared that the omission of an index ought to be made an indictable offence, and Lord Campbell is said to have actually had the intention of bringing a bill into Parliament to punish authors who omitted to provide complete ones.

From the time of the foundation at Oxford of the first public library in England, by Sir Thomas Bodley, until the present day, the cataloguing and arrangement of books has been the cause of endless discussion and controversy, and as many as the librarians, so many were the different systems proposed. I believe that there are some sixty-four different ways of arranging books for easy reference, many good, but more useless or even puerile. The chief grounds of contention have been the respective merits of the simple catalogue of authors' names, the classed, or catalogue of subjects, and whether the catalogues when made should be printed for public circulation or merely kept in MS. for the use of

* A paper read by R. L. Cox before the members of the Architectural Association, on January 2nd. (See p. 39.)

librarians alone. Now, the system adopted at the British Museum is to arrange all books under the names of the authors, which system has perhaps had the greatest amount of care, attention, and criticism bestowed upon it, of any of them; and I believe it has been found upon the whole to be so efficacious, that it has been recently preferred to others in the United States. Just twenty years ago the New General Catalogue of the British Museum had reached the remarkable size of 977 folio volumes, and it was then fully expected to extend to 2,000. There are more than a million entries in these even yet unfinished volumes, which are only of authors' names and cross references. A catalogue of subjects in addition to this would probably make an equally formidable array of books, but in spite of the fact that many consider such a work a proper adjunct to an educational library alone, and quite beyond the scope of a reference library like that of the British Museum, yet as it is not possible for anyone to be acquainted with all the literature of any large subject, the classed catalogue must of necessity put the wisest man in possession of fresh books. There are in all some 650,000 English books, of which 50,000 would repay reading; and, as Dr. Allibone says, if a man read 180 pages a day, or ten volumes a year, he would have to be 500 years old before he could finish such a library. Therefore how important it is for a man to know what to read.

Without giving attention to the subject one cannot conceive the difficulties that attend a cataloguer, though an examination of the controversy of about 1849, when Sir Anthony Panizzi was commencing the present catalogue of the British Museum, will show one pretty clearly what they are, and at the same time unfold some of the errors and absurdities of indexing which form a very amusing though very instructive page in the history of the art. Mr. Wheatley, in his essay, gives as an example an old story, which he has traced down to its *fons et origo*, of a certain law index-maker who made a reference under the letter B to Mr. Justice Best—his great mind. Now the worthy Justice was so completely devoid of anything at approaching to that endowment of nature, that all were filled with astonishment to find it set down in writing that he had anything of the sort; till one day someone, more overcome by surprise and curiosity than the rest, turned to the place indicated, and found that Mr. Justice Best said he had a great mind to commit the prisoner. Mr. Wheatley thinks this is to be attributed to Chitty, the lawyer, who had a grudge against the Justice, a method of paying off scores that is neither noble nor commendable.

An index may in this manner be made to contain expressions of opinion of all sorts, and to be a very powerful instrument of malice and revenge, though in proportion as it expresses the author's personal feeling, it loses its value as a trustworthy guide. Of this nature was the case of the lexicographer, who, hating a certain Mr. Beesley, gratified his spite by a cross-reference in his dictionary: Obesity, see Old Beesley. Cross references have often been made the vehicles of wit and sarcasm, as those taken by Mr. Wheatley from the Pleas of the Crown—Cattle, see Clergy; Convicts, see Clergy; Election, see Bribery; Footway, see Nuisance; the latter evidently written in muddy weather by some one indignant at the filthy and neglected state of that part of our thoroughfares that is so unmistakeably under the care and supervision of our "parochial authorities."

But in indexing, as in everything else, difficulties will crop up on all sides, not the least of them often arising from the imperfect or fantastic nature of the titles selected by authors for their works.

Such a paper, for instance, as "The Triton and Minnows," quoted by one of the American librarians, is difficult to class, it being about neither one nor the other, but in reality a valuable essay on steam navigation; or a more dubious title still was that of a controversial pamphlet of the time of Queen Elizabeth, entitled, "Pap with a Hatchet, *alias* a Fig for my Godson; or, Crack me this Nut!" Titles like these would prove to the indexer of subjects what anonymous books have been for the cataloguer—a *monstrum horrendum cui nomen ademptum*—a bugbear that called forth from Sir Patrick Flood a motion in Parliament that for the future all anonymous books should have the author's name in full on the title-page.

The rule for dealing with anonymous works at the British Museum is to take the first substantive in the title, so that were the pamphlet I have referred to a separate work, it would appear in the catalogue under the letter T of Triton, although it is about steamships. This naturally gives rise to an immense amount of difficulty and confusion, and is very reasonably complained of by Mr. J. Payne Collier in his pamphlet, in which he instances the favourite title for anonymous works of "An Account of" so and so. I have found under this title the following tracts or treatises placed side by side in the Catalogue of the British Museum:—"An Account of the Several Societies for the Promotion of God's Worship." (1700.) "An Account of the Game of Hazard, exposing many of the Impositions with Dice by the Blacklegs." (1816.) "An Account of the Great Fire." (1800.) "A Particular account of Two Young Rovin' Youths, who Courted Lasses for Cakes and Puddin'." (Edinboro': 1830.) Not very cognate subjects! Who, writing a history, for instance, of two roving youths, is to know that he ought to look under the letter A of Account. Again, to quote Mr. Collier's examples, you have, after a pamphlet on the use of coal tar, a tract on epidemic madness; so that if a reader does not happen to remember or to know that the title of a work begins with account, his long search in the catalogue will be useless. Mr. Collier contends in favour of Subject Indexes, so that readers who want tracts on coal tar or epidemic madness shall find them under those heads, while all useless titles, as Account, Discourse, Dissertation, and the like, should be abolished. The application in this way of subject matter to form the titles will require that the ordinary care and attention of the indexer shall be supplemented by a complete knowledge of his subject, and experts in the various branches of science and art will be required to form a satisfactory index, if only for the sake of avoiding a repetition of such errors as the classification of Bude's work on Roman money, "De asse et partibus ejus," or Miss Edgeworth's essay on Irish bulls, and a trestise on the Great Seal, in the Natural History Division; or the placing the volume of poems called "The Viol and Lute" among works on musical instruments, as Mr. Wheatley tells us.

That mistake about the Irish Bulls is said to have caused a Scotch farmer to purchase a copy, and although he read it without much difficulty, he never discovered his error, but only said he thought Miss Edgeworth must be a silly body to write a book about Bulls, and "not one word o' horned cattle in it a'."

Burton's "Anatomy of Melancholy" has been placed among the anatomical books in the London Catalogue, being preceded there by an anatomy of the lymphatic system, and followed by an anatomy of vertebrates; and other amusing instances might be adduced to show how necessary an intimate knowledge of the books is in the preparation of a classed catalogue.

Lawyers were the first to perceive the importance of indexing. The very essence of their study, depending as it does so much upon precedent, has made it necessary to have at hand lists of all rulings and expositions of the law; so perhaps in this study alone we find adequate means of reference to precedents, as may be seen by turning to such a work as Hodgson's "Analytical Digest of Cases" in the *Law Journal Reports*, an index which deals with an immensely heterogeneous mass of material, and includes all decisions on doubtful or out-of-the-way cases, arranged according to the subject, alphabetically. The plan adopted in this work and the method of carrying it out, are worthy of careful study by all who have anything to do with indexing; yet this is but one of many such works relating to the law.

Next to lawyers, students of topography have given the earliest practical proof of their realisation of the importance of having collections of references, among which one work in particular, Upcott's "History of Topography," is a model arrangement that would serve for whatever subject it was applied to. The utility of the work lies in its placing before you lists of the contents of all books relating to the subject; so that if you want to know, for instance, what has been published about Westminster Abbey, you will find the indexes of all the works published up to its own date, which was 1818, with lists of all the engravings, and the page and volume where they are to be found. Thus you can compare one work with another, Akerman's of 1818, Dart's of 1723, with Crull's of 1711, and by turning over a page or two discover which volume gives the particular information you want.

A much more difficult undertaking was Bromley's "Catalogue of Engraved Portraits, from Egbert to the Present Time (1793)," in which the titles of all the known British portraits are collected and arranged on a very good plan, with references to the work or place where they may be found. A simple index of names shows who are included in the book, and to any person who was writing the life of a celebrity, the use of a book like this might save perhaps six months of labour at research alone. In general literature indexing has been undertaken in a desultory sort of way, and with isolated works here and there. Dr. Johnson suggested to Samuel Richardson, the author of what, in these days of the bigamy and murder style, we consider the prosy novels of "Clarissa" and "Pamela," the formation of a dictionary of the sentiments and moral quotations contained therein. This was actually done, and I can refer anyone to it, who wishes to improve his mind, if he will come to me in the little room after the lecture.

Sampson Low commenced in 1859 a quarterly "Index of Subject Matter to Current Literature," which contains every English book, as well as every article of note in a few of the best known journals published during the quarter. It states that it is a first attempt to place magazine articles on a par with books; and as Professor Robinson, the Librarian at Rochester University in the United States, points out, the ablest work of many of our best scholars takes the form of these articles, which can be read in an hour or so, while a book on the subject would never be touched. It is obvious, therefore, how important it is that such should be rescued from oblivion and placed within the student's easy reach.

Among the sciences a system of indexing and compiling lists of references has been carried out for years past with great completeness, and many of the scientific societies have all their transactions so treated. Thus the Royal Society has a catalogue of all the scientific papers in the British and foreign journals. The zoologists, the botanists, the chemists, and, in Germany, even the military men, have done the same thing, also the Parker Society of Oxford their publications, and the Antiquarian Society to the archæologia. The civil engineers have two indexes of their Transactions. Among the magazines the *Edinburgh Review* has five indexes to its 140 volumes, and *Blackwood's Magazine* has one index to fifty volumes. *Notes and Queries*, too, has an index to each of its four series of twelve volumes.

We see, then, that the work already done in this direction is so extensive that it becomes necessary to have an index of indexes, and to obtain this, as well as to further the making of others, a society called the Index Society was founded in 1878, which has already issued a number of valuable publications, including a list of such works. The clever essay by the secretary, Mr. Wheatley, to which I have already referred, would amply repay anyone for the trouble of reading it. He seems to have consulted every authority, and to have so thoroughly exhausted the subject, as to leave little for anyone else to do without repeating what he has already said.

(*To be continued.*)

A DEMONSTRATION OF THE USES OF SANITARY APPLIANCES.

THE first of a series of free lectures to working men and others on the contents of the Parkes Museum of Hygiene, University College, was delivered at that Institution, on Saturday afternoon, by Professor Corfield. The audience chiefly consisted of artisans, who followed Dr. Corfield's peripatetic commentary on the sanitary appliances shown with close attention, now and then commenting on the exhibit or asking for further details. Mr. Mark Judge, the curator, introduced the lecturer, and announced that the present series would be given on alternate Saturday afternoons, at 3, as follows: Jan. 17th, "Ventilation, and Light and Air," Professor Corfield; Jan. 31st, "Food," by Dr. G. A. Poore; and Feb. 14th, "The Hospital and Sick Room," Dr. J. C. Steele.

Dr. Corfield said he should commence with the consideration of house-sewers. These ought

not to be of brick, on account of damp from leakage, and from being bored through by rats; neither should the ordinary tile be used, for it was porous. The best material was glazed stoneware. The pipe need not for the largest house be more than 6in. diameter, and generally much less; 9in. was a needless size, except for an estate. The common clay joints were a constant source of danger, and they often leaked so much as to cause the sewer to be choked up. They were recommended by some so-called practical men, who argued that if the soil slipped the clay luting would yield, but as a fact, when a slip took place the one joint usually fell from the other, and the clay proved useless. He recommended that a layer of concrete be laid under all house-sewers, and that they be covered when near the surface with a layer of same. For joints, cement was useful, but care must be taken to make the circle complete, and to allow none of cement to spread on inside of pipe, as it might form the nucleus of an obstruction. He showed Stanford's patent joint, as made by Doulton, which consisted in finishing the end of the pipes with conical sections; these were covered with india-rubber, so that when greased and fitted together they formed a water-tight joint, with little expenditure of labour or time. In Jennings's joint the pipe was plain and the collar movable, so as to allow of the insertion of junctions. For connecting sewers of slightly different sizes, taper-pipes were useful. Siphon traps were the best for use in yards; they held considerable water, and if the traps were taken off could still be used. A good one was made by Doulton, where the opening into sewer was from side of gulley, but above the trap; the perforated tops should be made of cast iron instead of stoneware, for they could see that the sample shown had become broken by the slight usage of a museum. The lecturer showed and explained the operation of Rogers-Field's flushing-tank, in which the contents are discharged when they have reached a certain level, by the automatic action of a siphon; it was useful in slop-water drains through gardens, and by placing the siphon short leg some height from the bottom of the tanks, could at the same time be used as a fat-trap. Amongst the disconnecting traps in the museum was Weaver's, made by Stiff, and the intercepting sewer made by the same firm which had two dips with exit to air. Some drain interceptors made by Beard, Dent, and Hollyer, for receiving waste-pipes with open ends, and for surface drainage, were constructed to expose the discharging end of pipes to the air; in all sizes they had a water-seal of about 2½in. in order to shut out back-draughts. The Mansergh trap was useful for disconnecting basement sinks from sewers. It was divided into three compartments over which the liquid ran, the end ones being closed and the middle one exposed to the external air by a ventilating pipe. This trap was not suitable for use upstairs, and if adopted it would cause a smell. Potts's Edinburgh chambered trap, made by Cliffs, could only be used where there was a very large fall to the sewer; he doubted, in any case, if the double chamber served any useful purpose. As an example of what to avoid, Dr. Corfield directed attention to an enormous stoneware exhibit, made by Wilcock, and presented by Mr. Copsey Woodhead. In it there were two siphon traps, with ventilating shafts set directly one behind the other; and it was remarked by one of the audience that there was no reason, if two traps were desirable, why three, four, or an infinite number should not be made in the sewer. The most interesting feature of the afternoon's visit was the examination of a collection of specimens of defective sanitary apparatus, traced and presented to the museum by the lecturer, and all of which were connected with some case of disease or death in the house in which they were found. These included old D-traps, and sections of lead and zinc pipes perforated at the top and sides by the foul air; that this was the agent which had riddled the lead in every instance was evident from the fact that all the erosions commenced from within the vessels, and were invariably above the water-line. Broken soil-pipes, mended by tying up with string; another which had slipped from the closet, and had been thrice brought up by an additional joint; a lead D-trap, set in zinc, to which an iron waste-pipe, a lead housemaid's, and stoneware drain-pipe were connected; and other specimens of botching and scamping were shown. Leaden pipes, it was exemplified, were always first eroded at the joining, the solder not standing the action of foul air so well; they should, therefore, be of drawn lead, but all bends should be cast, to avoid thinning down of the metal. The bell-trap was condemned as a frequent source of the intrusion of sewer-gas into sculleries. In conclusion, Dr. Corfield described the several kinds of water-closets in the museum, showing the bad points of the old hopper-closet, of old form of waste-preventing cisterns, and of all closets in which there was direct communication between the house cistern and the pan. As examples of better forms, several of Jennings's patent apparatus were shown.

COMPETITIONS.

CARDIFF FREE LIBRARY.—One hundred and seven sets of plans have been received in this competition.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

SOCIETY OF BIBLICAL ARCHÆOLOGY.—On Tuesday night the anniversary meeting of the Society of Biblical Archæology was held, the President, Dr. S. Birch, in the chair. The hon. secretary, Mr. Arthur Cates, read a communication, giving an account of the "Monuments and Inscriptions on the Rocks of the Nahr-el-Kelb River in Syria," from Mr. W. St. Chad Boscawen, who is now travelling in that country for the purpose of archæological explorations. The paper was the result of two excursions, made on the 25th of September and the 1st of October last, to the rocky pass of the Nahr-el-Kelb, or Dog River, the Lycus of the classical geographers, where it falls into that part of the Mediterranean called St. George's Bay. A sufficiently minute account was given by the writer of the position, shape, size, and present state of preservation of the tablets, some notice being taken of the description given by earlier explorers. The whole are elaborately engraved in Lepsius's stupendous folio work the "Denkmaeler," after copies and casts taken by his expedition in 1845. There are nine of these historical slabs in all, three of which are in Egyptian hieroglyphics, none now more than very partially legible, but the whole trio being, nevertheless, distinctly, in the judgment of Lepsius, assignable to Rameses the Great, *i.e*, to Sesostris. The other six are in the Assyrian cuneiform script, and to these almost exclusively Mr. Boscawen directed his attention.

CHIPS.

A vestry meeting was recently held at Oswestry to consider plans and designs prepared by Mr. George E. Street, R.A., for raising the east window and placing a reredos in the parish-church. The plans were approved, and a faculty will be applied for. It is proposed that the figures on the reredos shall be that of our Lord in the centre, and of the four Evangelists, the Virgin Mary, St. John the Baptist, and St. Paul on the sides.

The *Newcastle Chronicle* publishes a summary of the annual report of the Grainger Permanent Benefit Building Society, which contains a full statement of the irregularities of the ex-treasurer, William Forrest. It now appears that the gross amount of the Society's loss through Forrest's forgeries and defalcations is £16,470 16s.

The salary of Mr. Thomas Shelmerdine, the Borough Surveyor of Liverpool, was increased on Wednesday from £850 to £1,000 per annum.

The building committee of the free library and science and art schools proposed to be erected in the centre of St. Alban's, have just obtained the sanction of, and a grant in aid of £415 10s. from, the Department, South Kensington, and the work will, therefore, be proceeded with at once. A tender has been accepted for the work, the plans and designs for which were prepared by Mr. Syme, of Watford.

The new bridge at Wapping, over the principal entrance to the London Docks, was opened for traffic on Saturday. It has been constructed for the Metropolitan Board of Works.

The new pier at Bournemouth, in course of erection from the designs of Mr. E. Birch, is being rapidly proceeded with. The whole of the iron piles have been driven, and the principal portions of the girders placed in position. The structure is decked over, and the seats and rails fixed as far as the square end. It is hoped that the work may be completed by March next.

A coffee-tavern is about to be built at Cromer, on a site till recently used as a coal-yard. Mr. Charles Dobbin is the honorary architect.

More than Fifty Thousand Replies and Letters on subjects of Universal Interest have appeared during the last ten years in the ENGLISH MECHANIC AND WORLD OF SCIENCE, most of them from the pens of the leading Scientific and Technical Authorities of the day. Thousands of original articles and scientific papers, and countless receipts and wrinkles embracing almost every subject on which it is possible to desire information have also appeared during the same period. The earliest and most accurate information respecting all new scientific discoveries and mechanical inventions is to be found in its pages, and its large circulation render its the best medium for all advertisers who wish their announcements to be brought under the notice of manufacturers, mechanics, scientific workers, and amateurs. Price Twopence, of all booksellers and newsvendors. Post free 2½d. Office: 31, Tavistock street, Covent-garden W.C.

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[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

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Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

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(Payable in Advance.)

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Cases for binding the half-yearly volumes, 2s. each.

X. Y. Z. (We can recommend a treatise on Perspective, published in Messrs. Lockwood's series. Another good work is the Perspective used in the Science and Art Department at Kensington, by Burchett. The principles of both exterior and interior perspective are also explained fully in Newland's "Carpenters and Joiners' Assistant" (Blackie and Son), and in Gwilt's "Encyclopædia.")

"BUILDING NEWS" DESIGNING CLUB.

VANO. (We do not see why you cannot adopt the scale we have stated, but if you cannot get your requirements within the limits you can use an eighth scale for the church. Your motto was a misprint.)—CON AMORE, JACK, AND OTHERS. (Stone may be used for dressings, with the flint and brick for walling.)

Correspondence.

ORIENTATION.

To the Editor of the BUILDING NEWS.

SIR,—In your number of Dec. 19, 1879, your correspondent, P. Shaw, under this head, mentions an instance of *deflection* of axis between nave and choir in the parish church of Old Eastbourne, Sussex.

There are a good many instances of deflection of axis in this country, and some on the Continent. Several were mentioned in a paper which I read at the Institute of British Architects, on January 27, 1879, of which you gave a full report. Instances of deflection are more frequently found with the axis of the choir having the more northerly direction of the two, but it is not invariably so, and in the paper referred to a case of southerly deflection in the parish church of Wisbech was mentioned.

The most remarkable instances appear to be Whitby and Bridlington Abbeys, St. Mary's Church, Oxford, and Lichfield Cathedral.—I am, &c.,

F. C. PENROSE.

The Chapter-house, St. Paul's, E.C.,
January 2.

THE CITY OF LONDON SCHOOL COMPETITION.

SIR,—How in the name of common-sense or justice could Mr. Knightley's design for the City of London School have been considered at all, much less premiated, seeing that the plan depends wholly upon the possibility of one half of the classrooms being lighted from the east side?

The adjoining hotel towers above that side to such a height that all those classrooms would be in utter darkness.

It is, indeed, disappointing to competitors who endeavour to conform to conditions to find such glaring departures from them unnoticed.

Truly, competitions are the bane of the profession, and their results vanity and vexation of spirit.—I am, &c., PUZZLED.

RESTORATION ABROAD AND AT HOME.

SIR,—Mr. Ruskin and others have been making, as it is shown, a most unnecessary noise about the contemplated works at St. Mark's, Venice. What a pity that people should have such telescopic vision that, whilst they observe so clearly objects afar off, they cannot see things near! Why, if really anxious for the conservation of old buildings, do they not manifest some interest in the gross interference with and injury to the Abbey Church of St. Alban's? Why not care for the state of that noble fragment of a grand building, the Priory Church of St. Bartholomew, London? But very few vestiges of antiquity exist in the City, yet this, the chiefest, is left in utter neglect, and seems, to the multitude of those who talk art, unknown. It is a great pity, a scandal and disgrace, that the miserable domicile which has been built there over the Holy Table should be allowed to remain. This subject is far more worthy attention than foreign affairs. St. Bartholomew's is architecturally finer than St. Mark's. It is colour that seduces Mr. Ruskin, and his magical trick of words misleads the public to see beauty in, from an architectural point of view, very inferior things. I was once told by a young architect, who had been born and bred in London, that he had never seen the inside of Westminster Abbey or St. Paul's Cathedral! And this same stolid insensibility to the claims of home antiquities and national art characterises Mr. Ruskin and many others.—I am, &c., M.

THE ORGAN IN ALL SAINTS' CHURCH, MAIDSTONE.

SIR,—Professor Macfarren has sent to me the following letter, which he has kindly authorised me to make public.—I am, &c.

G. GILBERT SCOTT.

MY DEAR SIR,—On the question proposed to me I think that if the object be to lead congregational singing, or, more properly expressed, to drown the inaccuracies of unskilled vocalists, a large coarse-toned organ may be highly desirable. If the object be to produce the effect of musical beauty, by judicious accompaniment of a trained choir, then an organ of moderate power, but of good tone, and with full pedal compass, is very greatly to be preferred to a larger and louder instrument, which no player, with a real feeling for his task, would use at the full for such a purpose.

If a sum of money be contributed for musical ends in any church, I believe that it would be far better applied in some investment that would yield an annual fund that could be spent upon choir-training, than on the increase of an organ, since this would lead to the efficient performance of admirable compositions, and the taste of hearers, as well as of executants, would thereby be exalted.

This opinion is framed upon general principles, more than on experience in Church music, and is therefore offered with diffidence; but I believe that it would have the concurrence of persons better versed in this particular branch of the subject than —Yours faithfully G. A. MACFARREN.

To G. Gilbert Scott, Esq.

A CORRECTION.

SIR,—In your impression of the 2nd inst. we notice, under the head of "Chips," that the new Carver Memorial Church, Windermere, is mentioned as being decorated from the designs of Mr. Sherwood.

We beg to inform you that this is an error, Sherwood being only the foreman of our work, and only executed our designs. Will you kindly, therefore, in your next issue insert the following correction: viz., "that the whole of the stained-glass windows and interior decorations are the work of Messrs. Shrigley and Hunt, of Lancaster, and 28, John-street, Bedford-row, London, and the architect of the building is Mr. Robert Walker, of Kendal."—We are, &c., SHRIGLEY AND HUNT.

[Mr. Robert Walker, of Kendal, the architect of the building, also writes us to the same effect, and adds:—"The work does the firm great credit, being the best lead-glazing I have yet seen in any modern building."—ED. B.N.]

LEGAL INTELLIGENCE.

THE MIDLAND BANK ACCIDENT AT SHEFFIELD.—On Monday the Sheffield Coroner concluded his inquiry on the body of Thomas Moclar, the labourer who was killed on the 20th December by the fall of the cornice of the New Midland Bank, at the junction of Norfolk-street with Commercial-street, Sheffield. Mr. J. E. Barker appeared on behalf of the architect, Mr. S. L. Swann. Mr. Harold Thomas represented the contractors, Messrs. Chambers and Sons. Among other witnesses the architect was called, who stated that he had calculated the weight of the cornice to the good of the building line, and found it was 1 ton 15 cwt. and 38lbs. If the cornice had not been disturbed in any way that weight would have been sufficient to allow the cornice to remain safely until the parapet was put on. When the parapet was put on there would have been a weight of over 50 tons to the good inside the centre of gravity. That would have been amply sufficient to keep the whole cornice perfectly secure. The Coroner in summing up said no responsibility rested upon anybody, excepting it were Mr. Swann or Mr. Chambers. It was their duty to judge whether both were responsible, and to what extent; and if not both, whether one was responsible; and if one, which? Mr. Barker had endeavoured to show that Mr. Swann had drawn his plans, specifications, and quantities in a proper and reasonable manner, and he urged that had the building been completed it would have stood and been quite substantial. Very likely it would if the parapet had been put on, but he (the Coroner) thought Mr. Swann must draw his plans and specifications in such a way that the building would stand as it progressed, and not be dangerous all the way until the top stone was put on. Witnesses had been called for Mr. Swann to bear out the contention that the work of the architect was done in a perfectly reasonable and careful way, and that it was the duty of the builder to take necessary precautions to prevent any accident occurring. If they thought Mr. Swann did his work in a reasonable way, that was quite sufficient; but if they thought he did it in such an unreasonable and careless way, with want of all proper precautions, then it would be their duty to return a verdict of manslaughter against him. Regarding Mr. Swann, they had to decide whether he had been guilty of culpable negligence or not. If he had it was a very serious charge. But if he had acted in a reasonable way, with no negligence and no want of care, or with only slight negligence and slight want of care, that was not sufficient to justify them in saying that he had been guilty of culpable negligence. The contention of Mr. Chambers appeared to be that he, as the contractor, had to work according to specifications and plans furnished by Mr. Swann. He considered himself an inferior to Mr. Swann, and that so long as he adhered to his orders he was not responsible, unless through some gross piece of negligence which a man in the exercise of ordinary care and precaution must have foreseen. Mr. Chambers on this point said he followed the plans and specifications, and foresaw nothing wrong. The worst thing he (the Coroner) saw in the evidence affecting Mr. Chambers was that one witness told him there was too little bed, and he replied, "We will order the stones according to the specifications, then we shall be right." It was for them to decide whether Mr. Chambers was guilty of an oversight in not taking proper precautions to such an extent as to make him culpably negligent. The jury returned the following verdict:—"That in the opinion of this jury, Thomas Moclar met with his death by injuries caused by the falling of a cornice of the new Midland Bank; and that in our opinion the architect, Mr. Swann, is censurable for not allowing sufficient tail weight to such cornice, and that the builder, Mr. John Chambers, seeing the deficiency, is blameable for not calling the architect's attention to such deficiency; but that the negligence is not of such a nature as to render it criminally culpable, and that therefore the said Thomas Moclar came to his death accidentally."

The Queen has just placed in Her Majesty's pew in Whippingham church, I.W., a mural monument to the memory of her daughter, Princess Alice, Grand Duchess of Hesse. The work, executed by Mr. Frank Theed in white marble, consists of a medallion of Her Royal Highness surrounded by a chaplet of flowers supported by angels, a dedicatory inscription being written beneath.

A coffee-tavern, to be known as the "Berners' Arms," was recently opened in Westgate-street, Ipswich. The premises are fitted up in Queen Anne style, and have been adapted to their present purpose from the designs of Mr. Brightwen Binyon, of Ipswich.

Our Office Table.

MR. CROSS has given a detailed reply to a request from the Metropolitan Board of Works for his approval of certain modifications in the carrying out of the Streets Improvement Acts and the Artisans and Labourers' Dwellings Act, 1875. The Board being unwilling to undertake all the responsibilities of the execution of these Acts, great delay in the projected improvements in streets and dwellings has in consequence arisen. The Home Secretary consents, in part, to the proposition that other land should, in certain cases, be substituted for that appropriated under the Act for the erection of artisans' houses, but he refers to the evil effect of delaying the carrying out of the measures, and urges the Board to energetically press forward their execution.

THE annual meeting of the London Association of Foremen Engineers and Draughtsmen was held on Saturday night at the Cannon Street Hotel, the retiring president, Mr. Joseph Newton, occupying the chair. The balance-sheet, as read by the secretary, showed a total revenue of £190 11s. 5½d., of which sum £39 had been paid to unemployed members. Of the ordinary fund, £400 was invested in Three per Cents Consols, and £96 15s. 2d. in the Savings Bank. On behalf of the superannuation fund, £2,045 3s. was invested in Consols, and the balance in the treasurer's hands was £100 5s. 11d. The president then delivered his 21st annual address from the chair, in which he congratulated the members on the fact that, despite the depression in trade, there had been no falling off in the numbers; the present strength of the Association was 100 ordinary and 160 honorary members. He complained that members had not contributed so liberally during the past few years as they ought to have done papers on mechanical questions, and suggested that the classes that would be useful would be those that combine scientific knowledge with the practical experience of the working classes. Mr. Newton was re-elected president, and other office-bearers were elected for the ensuing year.

IN our notice (on p. 3) of the works to the Porches of the North Transept of Westminster Abbey, we stated that they are being completed under the direction of Mr. Street. This is not the case. When Mr. Pearson was appointed by the Dean and Chapter to succeed the late Sir Gilbert as "Surveyor of Works," Mr. John Oldrid Scott was appointed to complete the work to the Porches, which had been designed, and in part carried out, by Sir Gilbert Scott.

MR. JOHN P. SEDDON proposes to give a series of popular lectures entitled "Caskets of Jewels," during the present session of the Architectural Museum in Tufton-street, near Dean's-yard, Westminster. The object of the course will be to make the Museum, of which Mr. Seddon has recently been appointed one of the hon. secretaries, and its contents, better known and appreciated. The lectures will be illustrated by photographic magic-lantern slides, giving views of the most interesting casts in the Museum, together with the buildings from which they have been taken. In this manner the whole history of architecture, and the characteristics of its several styles, and the subsidiary arts, will be traversed and explained. The admission to the Museum on these occasions will be free as usual. The lectures will be delivered at eight o'clock on the evenings of the last Tuesdays in each month, the first being on the 27th instant.

THE thirtieth annual report of that prosperous and well-managed Association, the National Freehold Land Society, will be submitted to the members on the 6th February. The subscriptions during the year were £547,006, the withdrawals £494,276, and the members' capital at the end of the year was £1,402,996, the largest amount yet reached, being an increase of £61,887 upon the previous year. The convertible securities have been increased from £196,182 to £259,608, and the advances on freehold and leasehold securities now amount to £1,197,318. The rate of profit on uncompleted shares was 3 per cent., and of interest on completed shares 4 per cent., throughout the year. The gross profit for the year was £63,548. Of this sum the profit and interest paid to members amounted to £50,369, and after paying expenses and writing off losses, the reserved fund has been increased to £50,271.

THE death of Mr. Edward William Cooke has caused another vacancy in the ranks of the Royal Academicians. He died on Sunday at Glen-Andred, Groombridge, near Tunbridge-wells, in the 69th year of his age. The son of an engineer, the late Mr. George Cooke, he was born in London in 1811, and was brought up with a view to the practice of the engraver's art. It was not until about the year 1832 that he began to practise as a painter in oils. From the first he painted chiefly sea-coast views, drawing his subjects from the shores at the mouth of the Thames and Medway, the sandy dunes of France, Morocco, and Holland, and the lagunes of Venice. He was elected an Associate of the Royal Academy in 1850, and R.A. in 1863. Several of his earliest and best pictures are to be seen in the Vernon and Sheepshanks collections at South Kensington. In 1863 he was elected a Fellow of the Royal Society, and he had been for many years a member of the Linnæan, Geological, Geographical, and other learned societies.

THE City and Guilds of London Institute for the advancement of Technical Education have sent to all the principal firms a circular calling attention to the fact that Profs. Armstrong and Ayrton are delivering at the Cowper-street Schools lectures on Chemistry and Physics. The fees for these lectures are very small. Practical classes for laboratory instruction have also been formed, and there can be no doubt that if the fact is made widely known there will be no lack of students. Cowper-street Schools are in a central position, and can be easily reached from all parts of London. Prof. Ayrton has commenced a series of lectures on the "Principles of Machinery," and Prof. H. E. Armstrong a series on the "Chemistry of the more important Non-metals." The lectures are delivered on Monday evenings, and the practical instruction is given on Wednesday and Friday evenings, at hours adapted to the leisure of the working classes.

THE clergy of the diocese of St. Alban's have just presented a new set of altar-vessels for the use of St. Alban's Cathedral, consisting of two patens, two chalices, and a flagon, all in silver-gilt. There has also been presented "to the first Bishop of St. Alban's" a handsome chalice in silver-gilt, an exact fac-simile of the chalice taken from St. Alban's Abbey at the time of the Reformation. The threatened opposition to the grant of a faculty to Sir Edmund Beckett for the restoration of the west front of St. Alban's Cathedral is likely to collapse. The committee, who now have unlimited power, by faculty, to restore the cathedral, have passed a vote of thanks to him unanimously for taking up the work, which is, however, only a portion of what is required to make the building safe. Sir Gilbert Scott, in 1871, estimated the cost of repairs at £28,000, independent of the roof. The design has been approved by the Bishop. The rector and churchwardens and a few parishioners, who had put in an opposition, have withdrawn it. The only remaining opponents are Earl Cowper and Mr. T. Evans, of Nash Mills, Hemel Hempstead, both of whom are objected to as non-parishioners, and the Archdeacon of St. Alban's, who has just qualified by having entered on the occupation of the old rectory.

MESSRS. LISLE AND WOOD, of Lansdowne-road, Oldham, have recently devised an improved method of making doors and windows, which adds about 30 per cent. to the strength while cheapening construction. Instead of tenons and mortises, the stiles and rails are held together by wedged dowells, which are turned out of ash, hickory, or other suitable wood, and slit at the ends. The parts for the door having been got out by machinery, are laid on a table which cramps them together; holes are then bored through the stiles into the rails, and a dowell with a wedge inserted into the slit in the end is driven in, the wedge being, of course, forced to swell the end of dowell when it reaches the solid timber at the end of the hole. The other or outer end of the dowell is swelled by driving a wedge into it, thus completely locking the parts together. In the diagram sent us, the bottom rail has three dowells on each side, the centre rail the same, and the top two dowells, and we presume that, in practice, that number is found sufficient. It is claimed that, by this method, the style is not weakened so much as it is by cutting a long mortise in it. The plan is applicable to most framed constructions usually held together by mortise and tenon.

CHIPS.

The Joint Counties Asylum at Carmarthen is in course of enlargement, at a cost of £12,510.

New Board Schools at Oswestry, built at a cost of about £2,730, were opened on Tuesday. The buildings were designed in a Domestic Gothic style, and accommodate 300 boys and girls and 117 infants. Class-rooms are provided, with inspection-windows from the main schools. There are large playgrounds, and a detached residence for the master. Mr. W. Oldham Chambers, of Lowestoft, was the architect, and Mr. R. Yates, of Shifnal, was the contractor.

At Leeds the local authority are about giving up the contracting system, and will henceforth do the scavenging work by their own workpeople.

At the meeting of the Metropolitan Board of Works, on Friday, the death was reported of Mr. C. A. Gould, the district surveyor for East Hackney and South and North Bow. The gross annual income of the office, to which Mr. Gould was appointed in 1875, is £500 a year.

Several actions are pending against the members of the Sheerness Pier Commission for acting as commissioners when, it is alleged, they had become disqualified. The plaintiff is the surveyor to the commission.

Messrs. Thwaites and Reed, who have been so many years in business in Rosoman-street, Clerkenwell, have removed to new premises in Bowling-Green-lane, close by.

Monday witnessed the opening of the new school at Kilnhurst, erected by the Swinton School Board. The building is of stone, from Hooton Quarry, and the style Domestic Gothic. The contractors were Messrs. Wortley Brothers, of Kilnhurst, and the architects Messrs. Wilson and Masters, of Sheffield.

At a meeting of the Ilkeston School Board, held on the 31st ult., Mr. J. L. Tait, of Leicester, was formally appointed architect for the new Granby-road schools, his design having been placed first in the recent competition, and Mr. Keating, of Nottingham, the author of the design marked "Plain and Substantial," was awarded the second prize of £10. Mr. Tait was directed to prepare plans and specifications for the schools, which are estimated to cost £4,000.

Mr. C. W. Richardson, architect and valuer, of Wakefield, was elected on Tuesday week as valuer to the Wakefield and West Riding Permanent Benefit Building Society, in succession to Mr. Beaumont, resigned.

The Albert Institute at Windsor, illustrated in the BUILDING NEWS on April 4th, 1879, is to be opened by the Prince of Wales to-morrow (Saturday). Messrs. H. F. Bacon and E. Ingress Bell are the architects, and Mr. Woolbridge, of Maidenhead, was the contractor.

A new pulpit was opened at St. Francis' R. C. Church, Chester, on Christmas-day. It is octagonal in form, and is of white Yorkshire stone, decorated with carved figures of the Evangelists and Fathers of the Church. It has been designed and executed by John A. Hanley, of Chester.

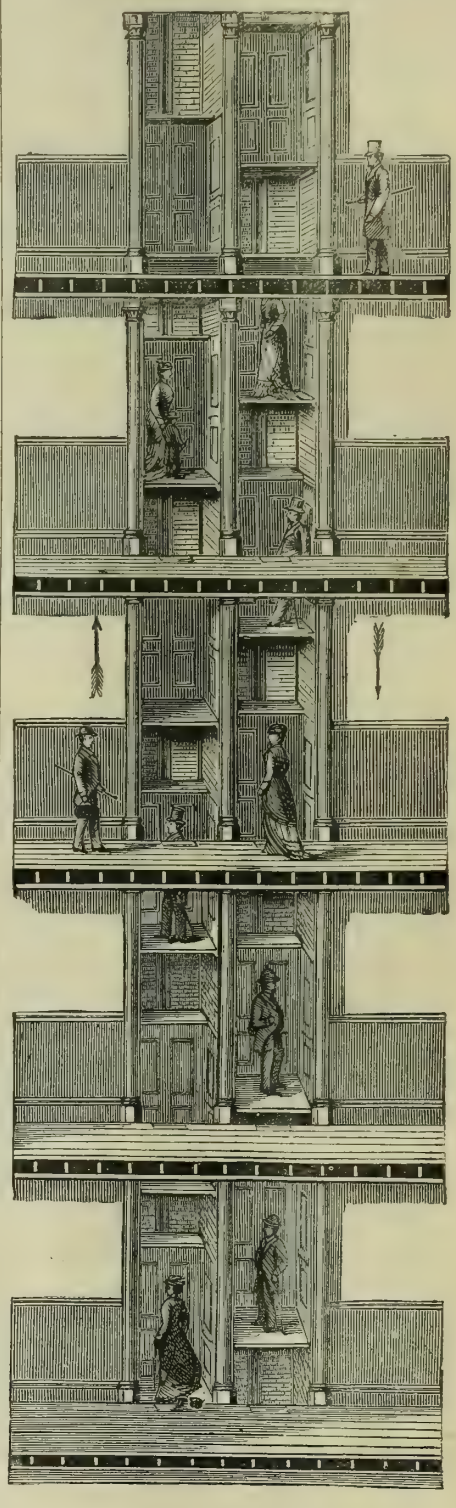
The death is announced, at the age of 68, of Mr. Thos. E. W. Barton, J.P., of Threxton Hall, near Watton, a well-known Norfolk antiquarian, and a frequent contributor of papers to the archæological journal of that county. The parish church of Threxton was completely restored at Mr. Barton's expense, and under his personal supervision.

Mr. W. Shayer, sen., has just passed away, at the advanced age of 93 years. He was the senior member of the Society of British Artists, and his paintings commanded high prices. He had, however, relinquished his profession for some years, on account of advancing age. His eldest son is favourably known as an animal painter in London, while two other sons by his second wife are also artists, and reside at Shirley.

A special meeting of the Derby Town Council was held on Tuesday week, for the purpose of electing a borough surveyor in succession to Mr. Clement Duncombe, now of Liverpool. There were 120 candidates for the appointment, although the salary has been lowered. From these a selection of four candidates had been made by a committee, viz., Mr. T. Coulthurst, in private practice in Derby, and formerly assistant surveyor of Gateshead-on-Tyne, and afterwards building surveyor to the Midland Railway Company; Mr. T. Edwards, surveyor, of Aberdare; Mr. E. Buckham, borough surveyor of Ipswich; and Mr. Oldman, in private practice at Durham. The candidates stood in this order in the voting, Mr. Coulthurst being eventually elected.

The town council of Clitheroe, on Thursday, the 1st inst., appointed Mr. Henry Wicklow, of Skelmersdale, as borough surveyor, in succession to the late Mr. Hargreaves, to whose widow they voted a gratuity of £50 for extra services rendered by her late husband in connection with the new cattle-market.

HART'S PATENT CYCLIC ELEVATOR.



APPLY TO THE

PATENTEE, 37, WALBROOK, E.C.

OR TO THE

SOLE MAKERS

J. & E. HALL,

Engineers, Millwrights, Founders, and Boiler Makers,

DARTFORD, KENT,

OR

21, ST. SWITHIN LANE, LONDON.

The bridge at Naindyke-beck has just been partially rebuilt, for the Local Boards of Normanton and Whitwood, by Mr. Vaughan, contractor.

Mr. Thomas Parry, from 1865 to 1874 Liberal member of Parliament for Boston, whose death in Algiers was announced last week, was articled, at the age of 16, to the late Mr. Charles Kirk, "builder and architect," of Sleaford, and ultimately became a partner in the business and married Mr. Kirk's eldest daughter. Mr. Parry was, till the time of his death, county surveyor for the Ports of Kesteven, in Lincolnshire.

The first piles of the proposed pier at Skegness-on-Sea, were recently screwed with public ceremony. The pier will extend from the Parade a distance of 2,000ft. over the sea, to beyond low-water mark, so as to enable steam-vessels to embark and disembark passengers at all states of the tide. The work is to be completed by June 1st. Messrs. Clarke and Pickwell, of Hull, are the engineers, and the contractors are Messrs. Head, Wrighton, and Co., of Stockton-on-Tees.

We do not know who prepared the list of awards at the recent Yorkshire Fine Art Exhibition. We took our list from those published at the time in the local papers, and have since had to amend it several times by publishing additions. Mr. W. E. Rendle, of Westminster Chambers, now informs us that he was awarded a medal by the committee, "for the general good design and utility" of his excellent system of glazing. Mr. Rendle has also just had another medal awarded for the artistic application of his system at the Exhibition of Sciences applied to Art, held in the Palais de l'Industrie, at Paris.

The Town Hall at Dunstable, recently destroyed by fire, is to be rebuilt from the designs of Mr. Henry Elliott, the architect of the former structure.

A new Masonic lodge has just been built at Stonehouse, from the designs of Mr. J. L. Hodge, architect, of Plymouth. The fittings for gas and plumbing were presented by Brother W. Lethbridge.

The death is announced, at the age of 85, of Mr. Henry Warren, K.L., the honorary president of the Institute of Painters in Water Colours. He was knighted by Leopold, the late King of the Belgians, in recognition of his talents as an artist.

The town council of Folkestone, at a special meeting, have approved plans prepared by Mr. Austin, C.E., for laying-out some 5 acres of land next the Lower-road to Sandgate as water-gardens, running irom the sea-front about half way up the cliff, and bridging over the present road with ornamental arches. It is projected to erect, subject to Earl Radnor's consent, two marine terraces at different levels, each 150ft. long by 20ft. broad, a piazza, seating 400 persons, with smoking-rooms and gallery, and a lift from the bottom to the top of the cliff.

A large service reservoir for the districts of Saltburn and Marske has just been completed by the Cleveland Water Company at Skelton. The reservoir holds 750,000 gallons of water, equal to a three days' supply for the districts served.

HELLIWELL'S Patented NEW SYSTEM
IMPERIHABLE GL AZING WITHOUT PUTTY.
As ADOPTED by H.R.H. the PRINCE of WALES at Sandringham
All Woodwork is covered, and no outside Painting is required. Old Roofs Re-glazed. Any one can repair or take in pieces.
See half-page Advt. in next Number.
T. W. HELLIWELL, Brighouse, Yorkshire; or, 19, Parliament-street, London.—[ADVT.]

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Royal Institute of British Architects. Paper by William Simpson on "Buddhist Architecture in Jellalabad Valley," 8 p.m.

WEDNESDAY.—Society of Arts. Paper by T. Bolas, F.C.S., on "Modern Autographic Printing Processes," 8 p.m.

THURSDAY.—Royal Institution. Lecture by H. Heathcote Statham on "Modern Architecture since the Renaissance."
Royal Academy of Arts.—Prof. E. M. Barry, R.A., on "Architecture a Fine Art, and also an Art of Utility."

FRIDAY.—Architectural Association.—Basil Champneys on "Soul Bay and its Churches," 7.30 p.m.

SATURDAY.—Parkes' Museum of Hygiene University College.—Prof. Corfield on "Ventilation, Lighting, and Air," 3 p.m.

Lamplough's Pyretic Saline is refreshing, most agreeable, and the preventive of FEVERS, BILIOUSNESS, SMALL POX, SKIN DISEASES, and many other spring and summer ailments. Sold by chemists throughout the world, and the Maker, 113, Holborn Hill. *Use no substitute.*—[ADVT.]

Holloway's Pills will render delicate invalids the most essential service when they suffer from bilious affections, loss of appetite, or indigestion through damp, cold, or variable weather. Lowness of spirits, sick headache, dimness of sight, faintness and vertigo, resign their perplexing sway after a few doses of this regulating medicine.—ADVT.]

Trade News.

WAGES MOVEMENTS.

SHEFFIELD.—The master-builders of this town have resolved to enforce a reduction of ½d. per hour on the wages of masons, bricklayers, and joiners. They explain that the building trade is in a most depressed condition, and that this reduction is absolutely necessary. Some time ago, the employers proposed a reduction of 1d. per hour. A long dispute was the result, and, in the end, half the reduction was conceded. It is said that the reduction now sought to be enforced will be vigorously resisted.

BATH STONE.
SUMMER DRIED
STOKE GROUND
AND
CORSHAM DOWN
supplied in any quantities on the shortest notice.
PICTOR & SONS, Box, Wilts. [ADVT.]

Doulting Freestone and Ham Hill Stone of best quality. Prices, delivered at any part of the United Kingdom, given on application to
CHARLES TRASK,
Norton-sub-Hamdon, Ilminster, Somerset.
Agent: Mr. E. CRICKMAY, 4, Agar-street, London, W.C. —[ADVT.]

McLACHLAN & SONS, 35, St. James's-street, S.W. Builders, Decorators, and House Painters.
Designs and Estimates.
General Repairs and Alterations Executed.
Experienced Workmen always in readiness, and sent to any part of the country.—[ADVT.]

TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender—it adds to the value of the information.

CODNOR, DERBYSHIRE.—For the erection of a chapel at Codnor, for the Primitive Methodist Society :—
Simkin and Brown, Langley Mill* £1,195 0 0
* Accepted.

BRISTOL.—For constructing drainage at Fenton-road, Easton. Messrs. J. W. Trew and Sons, architects and surveyors, 1, Wine-street, Bristol :—

Dodge, J.	£104	0	0
Broad, J.	101	0	0
Roberts, G. and W.	95	0	0
Gillum and Brittain (accepted)	72	12	0

CAMBRIDGE.—For a foot-bridge from Coe-Fen to Sheep's-green, for the Town Council :—

Beales	£398	0	0
Headley, J., Mill-road, Cambridge*	295	0	0

* Accepted.

EARLS COURT.—For the erection of seven houses and shops at Earls Court, for Mr. Alfred Savigear. Mr. George Edwards, architect. Quantities supplied :—
Martin, Wells, and Co. (accepted) £6,984 15 0

FULHAM, S.W.—Revised tender for the erection of school for 1,200 children, in North End-road, Fulham, for the London School Board. Mr. E. R. Robson, F.S.A., architect to the Board :—
Tongue, W., Plumstead (accepted) £9,596 0 0
[On July 2nd, 1879, the tender of the same contractor was accepted by the Board at £5,106 for building a school for 600 children on the same site; by doubling the accommodation, the work will be carried out for £7 13s. 11d., instead of £8 10s. 2d. per head.]

LEICESTER.—For brickwork and tiling in completing Secular Hall, Humberstone-gate, Leicester. Mr. Larner Sugden, architect, Leek. Quantities by the architect :—

Riddett	£828	0	0
Mason	808	9	6
Major	720	0	0
Bromage, Derby (accepted)	685	0	0
Horsepool	622	0	0

LEWISHAM, S.E.—Revised tender for the addition of a department for 240 girls to the Lewisham Bridge School, for the London School Board. Mr. E. R. Robson, F.S.A., architect to the Board :—
Jerrard, S. J., Lewisham (accepted) £1,980 0 0
[On July 30th, 1879, the tender of the same contractor was accepted by the Board at £1,530 for adding 180 girls' school-places to the same building; by the provision of another classroom the cost per head of the enlargement will be £8 5s. instead of £8 10s.]

LITTLE YELDHAM.—For sinking a well and providing a water supply for Little Yeld, Luton, for the Halstead Rural Sanitary Authority, Essex :—
Arber, J. and Sons, Haverhill (accepted).

MAYFAIR.—For stable buildings, Fann-street, Mayfair, for James Innes, Esq. Mr. R. B. Marsh, architect. Quantities by Mr. T. R. Parker :—

Carr and Sons	£6,380	0	0
Greenwood and Sons	6,374	0	0
Cross and Son	6,168	0	0
Conder	6,114	0	0
Sprake and Foreman	5,988	0	0
Temple and Forster	5,984	0	0
Lawrence	5,500	0	0
Simpson and Son (accepted)	5,434	0	0

PRESTON.—For alterations to the Grammar School walls for the widening of Guildhall-street, for the Town Council :—
Christian, J. (accepted) £250 0 0

READING.—For a pair of semi-detached villas, Bath-road, for Dr. Lawson. Mr. Geo. W. Webb, A.R.I.B.A., 119, Castle-street, Reading, architect. Quantities supplied :—

Dodd	£2,039	11	2
Kingerlee	2,025	0	0
Simonds	1,919	0	0
Kemp	1,900	0	0
East	1,879	12	6
Jenkins	1,780	0	0
Margetts	1,698	10	0
Woodroffe	1,690	0	0

WAKEFIELD.—For supplying and fixing laundry and cooking apparatus in the workhouse, for the Wakefield Board of Guardians :—
Barford and Perkins, Peterborough* £510 0 0
* Accepted.

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N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION

THE BUILDING NEWS.

LONDON, FRIDAY, JANUARY 16, 1880.

NEW BUILDINGS IN THE CITY.

CORNHILL is fast losing its architectural dulness. At the eastern end we see a wide frontage has been turned to account in a block of shops, offices, and showrooms, under Mr. Thos. Harris, architect, of Gray's Inn Chambers, High Holborn. The front is plainly treated in stone, in a type of Renaissance, which, for want of a better name, we may designate as Vernacular. The windows are all square-headed, large in openings, and boldly moulded round the edge of the reveals—an expedient which is justifiably introduced here, and which has, moreover, common-sense in its favour anywhere in the City. Between these are narrow pilasters, which just break the front enough, without pretending anything in an extravagant sense. The horizontal mouldings or strings mitre round them, and one or two carved panels are introduced between the string-courses, which relieve the simplicity and breadth of the front, without destroying its quietness of effect. Relief to the upper story is managed by a broad centre dormer or break, crowned with a pediment, while the shops not yet finished are divided by stone pilasters in a very unpretending manner.

At the Bucklersbury end of Queen Victoria-street leading to Walbrook there are two new buildings, in which some effort after originality is visible. One of these structures occupies the corner between Queen Victoria-street and Bucklersbury, and is intended for shops or a warehouse. The front is executed with red bricks and black joints, the windows having moulded bricks. It is in a species of Late English Classic, and relief is obtained by a centre flat bay-window, recessed within the outer wall face, and having shallow canted sides. Stone pilasters and rustic quoins adorn the corners, and relieve the red brick façade; but the two pedimented windows at the sides in the first floor have a squeezed-up appearance, and are too depressed. The pediments are of cut brickwork. It would not be fair to the architect to express an opinion on his work, as the design is not wholly carried out, but the front invites comparison with the block of Mr. Whichcord—the Deposit Bank on the other side of road; Mr. Lawrence is the builder. Next to it is a new restaurant, called "Ye Gresham," presenting a finished façade in a style that partakes in its features of Late Gothic, with decidedly Renaissance or Elizabethan features. It has been designed, we are told, by Mr. Gould, a gentleman lately deceased, and is a narrow-fronted building, pierced by three stories of mullioned windows. Carved pilasters at the angles support entablatures between the stories, and the façade is surmounted by a steep gable, with open-pointed arch recess to the upper story. A warm, reddish sandstone is used. There is a certain degree of flexibility in the style chosen, which points it out as a common-sense one for the requirements of street business premises in narrow, darkened thoroughfares, and the architect has availed himself of open fenestration to insure good lighting. The mullion windows, which occupy the whole front, are well suited to restaurant purposes. The mullions are carried down into the ground-story with good effect, instead of being cut off at the shop window. The lozenge-shaped panels in the solid work above the transomed heads of lower windows make a sufficient separation, and give a pleasing variety to the front. The carved part of the pilasters at the corners, the moulded mullions, and the ornament generally, is refined and sparingly introduced. It is a style that appears to us well suited for terra-cotta decoration. Pleased with the outside, we enter the building. A long saloon, or buffet, occupies the ground-floor, extending the whole depth, and partly lighted by a side area light. The walls are lined with cream-colour enamel tiles, with dark-green borders, and along the centre are a series of figures in painted tile panels, representing Fruit, Pastry, Wine, Tobacco, Game, &c., &c. The counter is framed in panels of a dark wood, American ash in appearance, with wainscot oak panels, having the "linen pattern" carved. The doors and dado correspond, and the chimney-piece is made a feature with painted tile subjects in the jambs and mantel, and with an overmantel and mirror in characteristic taste. Ascending a staircase lined with light enamelled tiles, occupying a side lobby, we enter a similarly-planned room, intended to provide for *table d'hote* dinners. Like the lower room, it is lined with buff-enamelled tiles, with panels containing the portraits of illustrious poets and literary men. It appears to be fairly lighted. The second floor is also occupied by another large room for visitors, and the landings to the stairs are lighted by sconces. Mr. Saunders, of Endell-street, we are informed, executed the tilework decoration.

Messrs. Ford and Hesketh have finished a large block of shops, offices, and warehouses in Cheapside, which is remarkable for a light and open mode of fenestral treatment. The requirements of good lighting have dictated what we have before called a pier and entablature style, both members being treated with considerable freedom. One feature which calls for notice is the treatment of the central window bays of each frontage. These are emphasised by projecting compositions, crowned with pediments, and having emblematic figures in a reclining attitude sculptured at the ends. The front at this portion is corbelled out a column in depth, which supports the pediment, and the lower part is finished as a shallow balcony. There appears to be a want of coherence between these external adjuncts and the façade proper, while the effect is somewhat marred by the rather weakly-carved panels over the window heads, and the want of relation and scale between the circular shafts and their capitals, and those of other portions of the façade. The central columns and capitals are particularly small and ill-proportioned to the massive entablature over them. If we are obliged to take exception to the details, we must admit that they fail more from want of harmony than from any other cause, and, generally, the composition exhibits strength rather than rhythm. This City thoroughfare has been the battle-ground of the partisans of both Gothic and Classic, Old English, Venetian, and Vernacular, and it would be of interest to inquire to what extent the requirements of commercial buildings have been met by each. We do not forget one or two cleverly-treated Gothic fronts in this street, of which we have given illustrations; nor must we pass unmentioned a few striking buildings in a common-sense Classic, recently noticed by us. It may be sufficient for us to remark here that both the Classic and Gothic, as they were interpreted some years ago, find no place now. The idea of a wall, pierced by a few windows, in one or the other of these styles, is now abandoned for a principle of precisely an opposite kind, namely, a large front of glass, set in an architectural framework, the leading lines of which are the vertical supports and the floors. Late Gothic, both English and Flemish, lends itself, and expresses this principle; so does the Vernacular Classic of the present day, and both these styles have found exponents. We wait for results.

Going down Queen Victoria-street, we observe that many recent buildings, some in Gothic, others in a neat Victorian mixture of Classic and Gothic—a style which is supreme in this thoroughfare, and which owes its chief interest to all kinds of profuse ornament and carved monstrosities—have already assumed the veil of smoke. They certainly look less obtrusive since their features have become toned down, and a few are absolutely improved by the process; but we stop before a large pile of stone on the north side, near the Bible Society's premises. A huge scaffolding at present obscures more than half of the façade of this imposing structure, though, when we peer through its windows, the illusion of magnitude is somewhat roughly dispelled, for we find the building is very shallow, and that its impressiveness is chiefly due to its wide and lofty stone front overtopping the adjacent buildings. On inquiry, we find the building is a Government one for the new Post Office and Savings Bank. Mr. Williams is the architect. It affords some relief to the eye, after so much frittered wall surface and extravagant fenestration), to come across a front of good broadly-treated wall. The elevation is in the astylar Italian style, with details of severe Greek in its composition. There are four stories, in addition to a mezzanine and ground-story, and these are marked by plain square-headed windows, after the Florentine manner, some enriched by pediments and well-treated architrave members with panels. The basement is rusticated, and is pierced by two bold square-headed doorways at each end, executed in solid stonework, with transom and fanlight, and surmounted by a massive projecting cornice on consoles. The ground-floor windows have moulded and recessed architraves of effective design with transom heads. The details are characterised by a boldness and correct Classical feeling, but the striking feature of the façade is the upper or attic story, crowned by a very massive dentil cornice, without balustrade, and of considerable projection. This is made to mitre within the width of the façade at the ends, and a bold ramped scroll, with carved eye, of the whole depth of the attic story, resting on a deep string-course with a carved Greek fret on its face, forms a good finish at the ends. The interior is yet in a rough state; iron-plate girders are used for all the floors. The architectural progress in Queen Victoria-street leads us naturally to inquire what is likely to be done with the continuation of it—the Victoria Embankment. There is a talk of several new buildings. Recently at a meeting of the Court of Common Council, the City Lands Committe presented a report recommending the granting of a lease to the governor of Sion College, for the erection of a new hall and library upon a plot 75 feet frontage, and 130 feet deep. Then we have the new City of London School, which will take up about 193 feet, though, if we are rightly informed, the architects have now to modify their plans to a smaller frontage of 135 feet. About 270 feet of the 650 feet frontage, is to be let to the Government for a new Mint, leaving about 75 feet of frontage, to deal with which the committee, by a new arrangement with the City of London School, are endeavouring to increase so as to enable them to negotiate with the Grocers' Company, who require 140 feet frontage for a new hall. We are inclined to think with Mr. Felton, that after competition designs from nearly fifty architects have been received, based upon a frontage of 192 feet for the school, it is something like a farce to cut the plans down to meet a new arrangement. It is certainly unfair to the competing architects, but nothing more than was to be expected

from a Corporation like that of the City of London. We know what the school will be like, and we have no doubt that one or two of the other buildings will be conceived in a style that will not be altogether foreign, but it is to be hoped that something like architectural consistency will be maintained by the Corporation authorities. It would be rather grotesque, if not ludicrous, to see for instance, a pronounced Gothic building perched between the Mint and the City of London School; or indeed, to see any violent variation of composition attempted in this important City thoroughfare, but a positive disfigurement in the guise of a huge Government building would be infinitely more regrettable.

OLD MASTERS AT THE ROYAL ACADEMY.—No. II.

WE must add to the notice of English portraits in our last number a very rare and satisfactory picture by the great cattle-painter, James Ward, R.A. We can well imagine what a labour of love it was to put down, line for line, the expressive features of this fine old lady of eighty, the artist's mother, who was destined still to live nineteen years. No. 29 also, by G. Romney, is very pleasant and sunny; the general effect is excellent, but otherwise there is no question of its inferiority to the masterly work both of Gainsborough and Sir Joshua Reynolds. The Hogarths are only fair specimens. No. 46, "The Fountaine Family," is pleasant. There are some fine Dutch interiors. Mr. Addington's picture by Adrian von Ostade is good. Mr. Gibbs' Gerard Ferburg is called "A Glass of Lemonade"; the bottle of Hollands, however, closely suggests something stronger than what the Temperance Society would understand by that term. Taken as a whole, it is a carefully-painted picture; but the drawing of the arms and hands, if original, is very faulty. A better piece by this artist, without regard to subject, is "The Smoker" (No. 51); the crispness with which the sword-hilt is touched is above all praise. Baron Ferdinand de Rothschild exhibits a peculiarly good example of Gabriel Metzu (No. 74), "The Tête-à-tête." Inside a room sits a lady, in a white satin dress, at a table, playing a guitar, amusing a fine gentleman, elaborately dressed, who sits opposite her, and divides his attention between her music and his glass, which he holds in his left hand. No. 84, said to be by the same artist, is on canvas, and so has a less finished appearance; the touch is a good deal broader. Nos. 54 and 81 are the only paintings by Rubens which are worthy of his great name. The latter is supposed to be one of his wives, and is a pretty slight example, but 54 shows great power and strength. The lady is splendidly painted. The pictures being upon panel, the colours have kept a deal better than usual. Parmegiano's portrait of a Count San Vitale has great dignity; but without doubt Sir F. Leighton's portrait of Paolo Paruta, who is known in England by his "Storia Venezia," translated by Henry Carey, is the best Italian portrait in the collection. All antiquaries will be glad to see the fine portrait (No. 57) of Thomas, Earl of Arundel, by Vandyck, the property of the Duke of Norfolk. He was the first known collector of works of art in England. To him we are indebted for the famous collection of inscriptions, &c., which we know as the "Arundel Marbles." Those who are acquainted with Hollar's works are also aware of the fine things he brought together in paintings and drawings. Mr. Fountaine's "Il Diamante" is an unusually good specimen of Guido Reni at his best. It is seldom that so perfectly preserved a picture by him is to be seen. The subject is Venus seated on a couch, teasing Cupid, who wants to get back his bow, which she has got hold of, and is keeping out of his reach. In the background there is another Cupid gathering a posy for his queen-mother.

We now come to Gallery No. 4, which is really the great feature of the collection. Viscount Middleton exhibits an excellent portrait of a lady, by Lucas de Heere. Sir Richard Wallace's picture, by Janet, No. 159, the Earl of Hertford, and No. 208, which belongs to Lord Northbrook, are first-rate examples of this delicate painter. The Society of Antiquaries' portrait of Queen Mary at the age of 38, by Lucas de Heere, is almost too well known to require description; while lacking the vigour and colour of Holbeins which surround it, in character and the amazing accuracy of its details it has few rivals. She stands in a gorgeous embroidered dress, covered with pearls, sapphires, and other precious stones. She also has a full allowance of very valuable rings, two on the right, and four on the left-hand. All her character is plainly written upon the cold, severe face, with its compressed mouth and small grey eyes. On either side of her are portraits of her half-sister, Elizabeth, the more important being No. 195, from St. James's Palace. This is attributed to Holbein; but as she was born in 1533, and Holbein died in 1543, it would make her only 10 years old. She could not, however, have been less than 16 at the time that the picture was taken, and so it was probably by one of his successors—unless it does not represent Queen Elizabeth. The magnificence of the dress and jewels forbids its attribution to any but a royal lady. The style of jewellery is similar to that of Queen Mary, especially in the slashing of the sleeves, each slash terminating in an ouch of chased gold, enclosing a table-cut sapphire. The "richly embroidered" (? raised silk plush) skirt is rather coarsely painted, and appears to have suffered from successive cleanings. There is now no doubt that there were several painters who followed the teaching of this great master, whose work has been attributed to him, just as we find all first-rate silver and gold chased work of the date attributed to Benvenuto Cellini. The other portrait of this Princess, by Sir Antonio More, if indeed it is a representation of her, must have been taken several years later. It has a greater likeness than the earlier portrait to Queen Elizabeth as we know her afterwards from the coins and paintings; at any rate, it is a fine vigorous portrait, correctly drawn, though not reaching the delicacy and truthfulness of his great contemporary. As an absolute test by which to try the authenticity of Holbein's picture, we should point decidedly to the admirable portrait of Lady Butts (No. 178), wife of Sir Wm. Butts, the principal physician to Henry VIII., who was honoured by a passing mention in Shakespeare's play of Henry VIII., Act v. scene 2, whose portrait is also a fine example. The old lady is drawn nearly full-faced, in a mantle lined with sable with black embroidery on the collar, wonderfully painted. It will throughout bear a strong magnifying glass. It is absolutely genuine in every particular. No. 188, Sir Brian Tuke, is also most valuable. The gem of all the collection is, without doubt, the delightful picture of Christina of Denmark, Duchess of Milan. We cannot better describe her than by giving the words of John Hatton to Lord Cromwell: "Very high of stature for her age, she is higher than the Regent, a goodly personage of body, and competent of beauty, of favour excellent, soft of speech, and very gentle in countenance. She weareth mourning apparel after the manner of Italy." And there she stands, just expressing all this in the calm sweetness of her face, the grace of her demeanour, and the excellent taste of her dress, so strangely contrasting with the gorgeous display of the costume of the time of Henry VIII. and Elizabeth. Her only ornament is one fine ruby in the single ring on the third finger of her left hand. This masterpiece, upon the whole, is in a good state of preservation. The dress is perfect and splendidly executed, but the face is a good deal retouched; but not so much as to mar its tranquil comeliness. The background is all wrong—apparently entirely repainted—whether there is anything better underneath it would most likely be unwise to try. It is so beautiful as it stands, that it would be a sin to run any risk in trying to improve it. The portraits of Sir Henry Guildford, No. 174, and Thomas Howard, 3rd Duke of Norfolk, were once, no doubt, very fine, but have so suffered from successive restorations, that nothing but the bare likenesses (very valuable in their way) remain. Nos. 184 and 150 have such a decided, crisp touch, as to suggest a doubt of their being Holbein's work. Lord Spencer's lovely "Portrait of a German Lady" is quite delightful; it has suffered a little from time, but, fortunately, not from restoration. There is no end to the amount of information which can be gained from these beautiful portraits as to the details of goldsmiths' work and intricate costume. Who knows anything of the School of Holbein? and yet what fine painters of portraits there were then — some, absolutely nameless! Sir Thomas Gresham (No. 165) is as interesting a portrait as any in the collection, and in a most pleasant state—even surrounded by the original frame. As the founder of the Royal Exchange, and connected with the great company of the City of London, his likeness would be full of interest; but here we have much more than a bare likeness—we see the staid, religious, upright citizen, in the pride of his integrity, just as he was, and painted with more vigour, though no doubt, less labour and refinement, than some of the finest Holbeins. Mr. J. E. Millais has a beautiful portrait of a man (No 170). Apparently, not a speck has been altered since it was painted, and the same may be said of No. 185, belonging to the Queen. It is a portrait of John Reskimer, of Merther, in Cornwall. We must not omit to mention the portait of Edward the Sixth when a baby (No. 165). It is chiefly of consequence as showing what the royal child was at so early an age. In quality and condition it cannot compare with any of the finer works in the room; the drawing of the hands and other parts are very weak. Few collectors have seen so good a work of John Bettes as No. 158, in the possession of Mr. George Richmond. Anton Fugger was one of the richest men of the 16th century; he is said to have died worth 6,000,000 golden crowns, besides other property, which may probably account for the extra amount of work bestowed upon his portrait (No. 190). At any rate, it is a very beautiful specimen of Holbein's best work. There are only two figure-subjects by Holbein in the collection. No. 187 is exhibited by the Queen (from Hampton Court), "*Noli Me Tangere*," and would not command much attention if it was not by the master. It is wonderfully defective in drawing. "The Wheel of Fortune" (No. 160), which belongs to the Duke of Westminster, is, in every respect, most curious. It was painted in distemper, in the year 1533, ten years before his death, and is noteworthy as showing the influence that mediæval art had upon the painter. The various turns of fortune are described in German rhymes. Gallery No. 5 contains early Italian and Spanish, and French paintings, all of considerable interest, but few of very high quality. There are several pictures reputed to be by very great men—as Raffaelle, Leonardo da Vinci, Memling—but none that can be accepted as more than interesting pictures by good artists of the period, except the Mabuse, No. 217, "Virgin and Child," and the four paintings by Sandro Botticelli, in illustration

of a story in Boccaccio's "Decameron," where the cruel maiden is brought to a right mind by the sight of the fate which, in a future state, awaits those fair ones who have, for worldly motives, defied the claims of true love. This series was painted for one of the de Medicis family. No. 235 is said to be by Lucas van Leyden, and seems to be a somewhat tame imitation, taken from two of his engravings. Nos. 221 and 224 are both interesting, but could scarcely by any possibility be by the same artist. In conclusion, we congratulate the Royal Academy upon the interesting notes they have appended to their catalogue.

THE EXHIBTION OF THE SOCIETY OF PAINTERS IN WATER-COLOURS.

THE Society of Painters in Water Colours, or the Old Water-Colour Society, as it is sometimes called, numbers among its members several artists whose names rank high in the school. It includes also in its list of honorary members the names of the Right Hon. W. E. Gladstone and John Ruskin. This year its list of lady members is conspicuous, headed, as it is, by the Marchioness of Lorne, and including works from a very accomplished lady artist, Miss Clara Montalba, whose contributions to the Grosvenor we had an opportunity of speaking of very highly last week. Mrs. Allingham, too, is represented by a few works of considerable merit. The Exhibition has a more than passing interest to the architect or archæologist from the fact that it contains Mr. Ruskin's coloured sketch and some photographs of St. Mark's, Venice, about which there has been so much written lately. The drawing made by Mr. Ruskin, showing two arches, of the façade or west front proposed to be restored, conveys a faithful and characteristic idea of the northern arches, and indicates, with painstaking elaboration, the tints of the marble and the actual state of this portion of the beautiful front. It is by no means an architect's drawing. Mr. Ruskin has given us rather an impression, a feeling, soft, and delicate drawing of the marble shafts and veneer, with their tints and veins (we must not look for lines and perspective); the divergence from the vertical of the angle shafts, the depressed arch of the doorway, and the varying levels and sizes of the capitals and bases, with their exquisite, delicate, and Byzantine carvings being indicated. In his recent notes on Prout's drawings Mr. Ruskin dwells at some length upon the chiselling and marble acanthus leaves of these pillars. He there speaks of the threatened re-erection of the west front of St. Mark's—"that which Barbarossa knelt under, and before which Dandolo took his vow for Palestine"—the destruction of the floor and north and south aisles, and alludes to his own efforts to secure faithful copies of the whole series of mosaics. In the Fine Art Society's Galleries several drawings and photographs may be seen, the work of an artist trained by Mr. Burne-Jones, who has been engaged by Mr. Ruskin to copy the mosaics. We cannot resist quoting an eloquent passage in the recent "Circular," respecting these Memorial Studies, accompanying the drawing and photographs in the present Exhibition. Referring to these, Mr. Ruskin says, "In the mean time, with the aid of the drawing No. 28, every touch of it from the building, and left as the colour dried in the morning light of the 10th May, 1877, some of the points chiefly insisted on in the 'Stones of Venice' are of importance now. Of these the first and main ones are the exquisite delicacy of the work and perfection of its preservation to this time. It seems to me that the English visitor never realises thoroughly what it is that he looks at in the St. Mark's porches; its glittering confusion in a style unexampled, its bright colours, its mingled marbles, produce on him no real impression of age, and its diminutive size scarcely any of grandeur. It looks to him almost like a stage scene got up solidly for some sudden festa. No mere guide-book's passing assertion of date—this century or the other—can in the least make him even conceive, and far less feel, that he is actually standing before the very shafts and stones that were set on their foundations here while Harold the Saxon stood, by the grave of the Confessor, under the fresh-raised vaults of the first Norman Westminster Abbey, of which now a single arch only remains standing. He cannot, by any effort, imagine that those exquisite and lace-like sculptures of twined acanthus—every leaf-edge as sharp and fine as if they were green leaves fresh springing in the dew, by the Panchoreion—were indeed cut and finished to their perfect grace while the Norman axes were hewing out rough zig-zags and dentils round the aisles of Durham and Lindisfarne. . . . Or going down two centuries (for the fillings of the portico arches were not completed till after 1204) what 13th-century work among our grey limestone walls can be thought of as wrought in the same hour with that wreath of intertwined white marble, relieved by gold, of which the tenderest and sharpest lines of the pencil cannot finely enough express the surfaces and undulations? For indeed, without and within, St. Mark's is not, in the real nature of it, a piece of architecture, but a jewelled casket and painted reliquary, chief of the treasures in what were once the world's treasuries of sacred things, the kingdoms of Christendom. A jewelled casket, every jewel of which was itself sacred. Not a slab of it, nor a shaft, but has been brought from the Churches, descendants of the great Seven of Asia, or from the Christian-Greek of Corinth, Crete, and Thrace, or the Christian-Israelite in Palestine—the central archivolt copied from that of the Church of the Holy Sepulchre, and the opposing lions or phœnixes of its sculptures, from the treasury of Athens and the citadel of Tyre." Such is the poetical description given by Ruskin of St. Mark's. He concludes his circular with the following words: "There will yet, I doubt not, be time enough to obtain perfect record of all that is to be destroyed. I have entirely honest and able draughtsmen at my command; my own resignation of my Oxford Professorship has given me leisure, and all that I want from the antiquarian sympathy of England is so much instant help as may enable me, while yet in available vigour of body and mind, to get the records made under my own overseership, and registered for sufficient and true. The casts and drawings which I mean to have made will be preserved in a consistent series in my museum at Sheffield, where I have freehold ground enough to build a perfectly-lighted gallery for their reception. I have used the words 'I want,' as if praying this thing for myself. It is not so. If only some other person could and would undertake all this, Heaven knows how gladly I would leave the task to him. But there is no one else at present able to do it; if not now by me, it can never be done more. And so I leave it to the reader's grace." We have allowed Mr. Ruskin to speak for himself; last week we published a long letter from a *Times'* correspondent upon the other side, showing that the renovation and repairs already done were absolutely called for to arrest further subsidence of the brick wall behind the shell of marble veneer. The writer contended that, far from a demolition of the façade being intended, only a portion of the veneer and the pillars near the south-west angle are intended to be restored. Those who desire to study the question might do so profitably, after reading the remarks, by inspecting the drawings and photographs in this Exhibition.

But, to proceed with our notes. From a rapid survey of the drawings, we must place on a higher level than a number of works near it Mr. Cuthbert Rigby's "After Work" (2), in which the dusky effect of evening is skilfully managed. Mrs. Allingham's "Sketches by the Sea" do not strike us so much as a few of her other studies of children, to be noticed by-and-by; but our attention is at once arrested by the forcible and touching subject upon which Mr. Arthur H. Marsh has employed his pencil, entitled "Wayfarers" (6). Two sallow-faced and rather disconsolate-looking girls are seated by a bank on the roadside, apparently tired of their long journey on foot. The dark colouring, and the sombre garments, with the serious but delicate features, throw a sentiment of sadness over the piece that is clearly felt. Close to this work, Miss Clara Montalba's "Blackfriars Bridge" (No. 7) must strike the visitor as a very powerful work, in which both real artistic energy and spirit, combined with a true sense of the picturesque, are evident. The dome of St. Paul's, seen above the bridge, is correct in outline, and the colouring, though generally low-toned, displays a clever contrast, as that between the red granite shaft of pier, and the grey misty effect of water distance. In truth, it is no exaggeration to say that this, and the other works of Miss Montalba, such as her "Grey Day on the Thames" (26), "London Bridge" (27), "Southwark Bridge" (65), her view under Cannon-street bridge (224), and especially her "Thames Wharf" (247), are perfect poems in their way; the artist has a thoroughly appreciative sense for all that is charming in grouping, light and shadow, and misty effect; the monotonous tints of grey vapour, and the colourless masses of the Thames scenery have been seized upon as only the true artist can do, and made to tell with a wonderful mastery for effect. Although Miss Montalba paints in low tones, in sepias, bistres, and greys, she invariably makes them tell, and we have seldom seen what Ruskin calls the "mysteries of the clouds" painted with more effectiveness. Mr. R. Thornwaite in his pleasing "Out-of-door Study" (No. 35), gives us a fine bit of common, painted with considerable vigour, and near it Mr. Carl Haag's "Egyptian Mother" (42) exhibits a specimen of his acknowledged power as a delineator of character. For a sunny effect, we must note Mr. H. M. Marshall's "View of Rye" (41), and Mr. Albert Goodwin's "Among the Water-Weeds, Bisham" (44) as a careful and very natural study of clouds and weeds. "Clovelly Pier, North Devon," (46) is a spiritedly-drawn subject; the curling wave and the stormy-looking sea are quite worthy of this artist's work. Mr. Samuel Read is a large contributor. No. 43, "The High Altar of the Cathedral of Aoila, Spain," is a good example of Mr. Read's skill as an architectural colourist; the subject, a fine Romanesque Church, glows with a warmth and richness of colour, but the artist's view of the transept of Burgos Cathedral (58) is even a finer instance of warm-toned stonework, and rich detail. The grand staircase, with its scrolled balustrades, is in good perspective; the detail is skilfully handled, and the artist has shown as thorough a feeling for Renaissance as he does for the older style. His other architectural subjects are No. 158, an old house in Exeter, some old houses (213), and "Allan Ramsay's Shop in Edinburgh" (342), a very picturesque bit of domestic work rendered with masterly effect, though in a more sketchy style, and with less depth of colour than his larger works. Hard, but vigorous, is H. Moore's "Machrihanish Bay, Kantyre" (54). Mr. F. Smallfield, in his impromptu sketch called a "Brush-sketch from the Model" (67) presents a capital idea of the simple and unaided effect produced by a brush of colour. The features of the

lady's face and her dress are expressed with much precision and breadth in plain unglazed tints. A natural study of sunlight on a distant bank of trees, with the half-misty effect of evening, is afforded in Mr. S. P. Jackson's careful rendering, entitled, "Shades of Evening" (89). In 109, the artist shows another companion-picture, a river's bank, tinged with the warm sunset of an autumn evening. We cannot pass by Mr. H. P. Riviere's pleasing and carefully-drawn sketch entitled "the Beautiful View in Rome" (93), showing St. Peter's, the Castle of St. Angelo, and the bridge, without admiring the bright transparent tinting; nor his "Arch of Constantine" (107), and "Interior of St. Peter's" (221), both possessing refinement in detail and other qualities which place Mr. Riviere's work in the foremost rank as architectural water-colour drawings.

Several landscapes attract attention, among the best of these we notice "The Stelvio Pass, Switzerland," by T. M. Richardson (99), "Loch Torridon, Ross-shire" (76), by A. P. Newton; St. Monance Harbour, Fifeshire," by Basil Bradley (102); "The Needles," by Walter Goodall (112); "On the Conway, above the Falls," by C. Branwhite; also another, "On the Lledr, N. Wales" (98), by the same artist. A few of these exhibit forcible body-colouring and individual qualities that place them above the average, as in Mr. C. Branwhite's work, but in his view on the Conway there is a want of repose in the foreground of rocky *débris*. Of quieter scenes, we may mention pleasing sketches at Ipswich (75) by Mr. E. Buckman, and of the High-street, Salisbury, by Mr. A. Goodwin, both painstaking, evincing correctness in the architectural drawing, and a natural perception for colour. This remark applies especially to Mr. Alber Goodwin's drawings generally. His "Ayles ford" (139), "East Farleigh, on the Medway" (140), "To Market" (105), and one on the screen, "From the Old Bridge, Maidstone" (346), are exceedingly truthful delineations, all in bright pearly tints of pure water-colour. As a sketch of an architectural character, we commend the visitor to Mr. W. Callow's pleasing "Street in Rouen" (129), in which the author has thoroughly caught the picturesque sentiment of that old French city. The same artist's "Dover and Sandgate" (114); his view "On the Moselle" (226); his "Belgian Market-place" (298); "Old Inn at Langen" (343); his "Distant View of Sherborne, Dorset" (366), are among the best of the many drawings exhibited; all displaying harmonious colouring, and show that Mr. Callow looks at scenes of this kind with the poet's sense. We cannot pass by a couple of pieces of a rather different kind as Mr. J. J. Jenkin's view "On Southampton Water," and Mr. A. P. Newton's "Swanage Bay" (137); Mr. E. K. Johnson's "An Intruder" (143) is far too realistic; the leaves and flowers are painfully minute and fatiguing. The Marchioness of Lorne, who sends several pieces, executed during her Canadian visit, many of which occupy conspicuous positions, manifests a degree of talent for water-colours which in less favoured circumstances would scarcely find a place on the walls of this gallery. There is a careful drawing and a sense of colour in her views from Citadel, Quebec (101), and in "View of Woods" (408); but it is the sort of work we may expect from a young lady who needs experience in the handling of the pencil. We pass on to a black inky mountain study by Mr. A. P. Newton (153); a pleasing sunny view of Venice, by Mr. E. A. Goodall; and another Venetian bit, No. 164, by Mr. Walter Goodall, to notice an exquisite study of ash and rock, in Mr. P. J. Naftel's "Where the Wild Hemlock Grows" (167), and a clever study of a "Girl Feeding Geese" (168), by Mr. J. Parker. Full of invention and rich colour-grouping is Mr. E. A. Goodall's "Fishing Boats on the Lagunes, Venice" (185), Sir J. Gilbert's "Gipsies" (189), and "Wise and Foolish Virgins" (409). The former is a forcible figure group against a gravel bank, while the seaside-scene entitled "A Summer Evening on the Coast of Cornwall," by J. P. Jackson, is noticeable for its suffused sunlight and warmth, and transparent sea. We must not omit to mention Mrs. Allingham's delightful studies of wild flowers, "Stitchwort, Stonecrop, and Forget Me Not" (190), exquisite, delicate, and minute in the manipulation; Mr. Carl Haag's group of "Caireen Musicians" (206), Mr. H. Wallis's "Nearest the Door" (264), Miss Montalba's fine bit of river and sky in her "Moored" (287), and on the screens among other subjects fine chalk studies of heads, by H. S. Marks, R.A., (325), one of a student and the other of a serf; nor must we forget to note Mr. Alma Tadema's refined and delicate drawing of "An Old Bachelor," breathing of Greek repose, as he quaffs from his cup of bronze.

THE CLASSIFICATION OF ARCHITECTURAL ILLUSTRATIONS.

By HUGH STANNUS.

A PAPER was read at the Architectural Association, on Friday, the 2nd inst., bringing forward again the suggestion of an Index for all architectural illustrations. The subject is a large one; and the labour of such an undertaking, even if shared between ten or a dozen enthusiastic young men, giving their whole leisure, would be found to be almost insurmountable. Without pretending or attempting to catalogue *all* the drawings, engravings, and photograms which have been produced, the student can, at any rate, classify such illustrations as he himself has; and he may also prepare such a select list of approved works as he may have come across during his studies, or may have had recommended to him by men of previous experience.

Both of these are practicable, and within the reach of any man—Firstly, to classify and separate the drawings he already *possesses*; and, secondly, to classify and catalogue the places where *others may be found*. I propose to deal with the first of these; to exlain the method of classification I have had in use for some years. It has worked well for me; and as several friends knowing of the method used to prefer coming to me rather than looking up any particular subject through a number of volumes of the professional journals, I conclude it has worked well for others.

I do not bind my copies of the professional journals. It is, doubtless, very nice to look upon one's bookcase neatly filled with the gilt-lettered backs of the thick tomes, labelled Vol. I. to Vol. XXXV. or XL.; but I confess to a lurking doubt as to whether they are quite worth their room, and for this reason:—they are a mixture of the magazine and the newspaper. The magazine is supposed not to deal with news, but is devoted to essays and treatises, or reviews. The newspaper, on the other hand, caters for those who wish information of the events happening around them; and, whether this information be collected and communicated once per day or once per week, the object is to give the *news*. Hence, while a magazine is worthy of being bound, a newspaper is of ephemeral interest; and, therefore, in the case of our journals, the news part may generally in London be destroyed when read, especially as we have always access to filed or bound copies. Wherefore, as before said, I do not bind the journals.

I preserve the Illustrations generally, and also those Articles which are good and complete on their respective subjects. Sometimes it happens that there are two articles of importance on different sides of the same leaf; in such a case, it is necessary to buy duplicate numbers, in order that each article may be placed in its proper class. The "Intercommunication," also, contains sometimes very valuable suggestions; and these are duly cut out and preserved. I have always classified these illustrations instead of binding them up in yearly volumes with their indices, as has been suggested, because it is so much more easy to find any particular one in its proper class than to wade for it through the indices of a lot of yearly volumes; and the name and date, which are marked on each plate, will always enable the letterpress to be referred to.

There is another advantage, which is common to all systems of classification. Just as the Naturalist, in classifying the objects of nature, learns their differentiating qualities, which were often before unsuspected or overlooked, so will the thoughtful student take cognisance of the varied elements required in various buildings, and also, by comparing the varying solutions by different minds, he will acquire a mastery over their governing principles similar to that gained by the Comparative Anatomist. Thus, to take one instance: when the drawings for the subject of "Shops," in division No. 21, are collated, what an interesting diversity of requirements will be observed! The jeweller is satisfied with small narrow windows for his costly objects, of which he can show a great number in a small space, but he requires thick plate-glass and all other securities against burglars; the butcher, the poulterer, and the fishmonger, require their windows to be removable, besides various modifications in the tables and sloping slabs necessary in each trade, and the provision for stowage, ventilation, &c.; while the linen-draper and fancy-goods dealer want as much plate-glass as possible. There are other trades, again, which do not have a show in the windows, and this makes a further variety. And in the matter of fascias or name-boards, the student may learn, often with amusement, how, when the architect has ignored these necessary fittings, the shop-fitter, in revenge, ignores him and his work by fitting a huge ugly one over cornice and architrave alike.

I suggest this Classification in preference to binding, not only for the illustrations published by the journals, but also for all sketches a man makes, or comes across in his studies, which are worth keeping. It is better not to use a sketch-book, but rather loose pieces of paper, when out; and if a sketch-book have been used for any reason, I would advise that it should be "unbound," so that each sketch may be placed in its proper class.

He would be indeed a lucky man who should be called upon to design buildings for half of the purposes I have tabulated; but I suppose we all wish for knowledge of them, not solely in order that we may be prepared with some ideas on any particular subject *if called upon*, but also for the sake of the knowledge *itself*, for the pleasure the mind feels at adding to its stores. However, the same or similar problems might be presented to any one; and it would be absurd to cut himself off from the solutions arrived at by other minds.

When I first found, with my accumulated riches, that *a* system was necessary for quick and easy reference, the consideration arose—Upon what *principle* of classification to proceed? Style was first tried, but it was soon found *that* system would not work, as there were many good buildings which could not be classed according to the received demarcation of style, but were simply in the "common-sense style"; and, again, *plan*, the basis of design, would be lost sight of, while it would be a work of time to collate the drawings for any collection of

buildings for a particular purpose. Therefore I divided them, firstly, into groups:—

A. Buildings for instruction, &c.
B. ,, ,, commerce, &c.
C. ,, ,, residence, &c.
D. ,, ,, refreshment and amusement.
E. ,, ,, legislation, &c.
F. ,, ,, manufacture, &c.
G. ,, ,, public utility, &c.

In addition to the drawings, &c., which could be easily allotted to the above seven groups, there was a mass of material which required further consideration; and this was finally divided as follows:—

H. Parts of buildings.
I. Materials, constructively.
K. ,, decoratively.
L. Figures, &c.
M. Ornaments, &c.
N. Colour decoration.
O. Miscellaneous.

The different groups were sub-divided according to the list given below. The divisions were not all made at once, but gradually, as in the course of years, they were required. I think the list is a complete one, but if not, suggestions are invited.

List of Folios:—

GROUP A.—BUILDINGS FOR INSTRUCTION, &C.:—

1. Temples, Synagogues, and Mosques.
2. Cathedrals, Chapter-houses, &c.
3. Churches with spires, or towers.
4. ,, without spires or towers.
5. ,, Interior views only.
6. ,, theory of, and printed notes.
7. Universities.
8. Colleges.
9. Schools, middle-class,
10. ,, elementary.
11. Observatories.
12. Laboratories, and Scientific Institutes, and Lecture-rooms.
13. Aquaria.
14. Museums, and Schools of Art.
15. Picture galleries.
16. Libraries, public.
17. Working Men's Clubs and Mechanics' Institute.

GROUP B.—BUILDINGS FOR COMMERCE, &C.:—

18. Exchanges and Loggie.
19. Markets.
20. Warehouses.
21. Shops.
22. Banks and Offices.

GROUP C.—BUILDINGS FOR RESIDENCE, &C.:—

23. Castles.
24. Palaces.
25. Country mansions and "Halls."
26. Town mansions.
27. Villas, detached, or semi-detached.
28. Houses in rows.
29. ,, flats.
30. Workmen's and Model houses.
31. Cottages, and Labourers' houses.
32. Lodges, Gates, and Gate-houses.
33. Stables and Kennels.
34. Farm-houses and buildings.
35. Laying-out of estates, and Gardening.
36. Country Inns, and old-fashioned ditto.
37. Menageries, Aviaries, Apiaries, &c.
38. Buildings for particular climates, or of special materials or construction.

GROUP D.—BUILDINGS FOR REFRESHMENT AND AMUSEMENT.

39. Club-houses.
40. Hotels.
41. Publichouses, Restaurants, and Eating-houses.
42. Dining and Guild-halls.
43. Theatres.
44. Music-halls, Ball-rooms, and Halls for meetings.
45. Gymnasia, Race-course buildings, &c.
46. Temporary buildings and decorations.

GROUP E.—BUILDINGS FOR LEGISLATION, &C.:—

47. Houses of Parliament.
48. Government and Public Offices.
49. Law Courts.
50. Town Halls, Municipal Offices, and Police-courts.
51. Prisons and Police Offices.

GROUP F.—BUILDINGS FOR MANUFACTURE, &C.:—

52. Studios.
53. Breweries and Distilleries.
54. Foundries.
55. Miscellaneous, including Engine-houses and pumps.

GROUP G.—BUILDINGS FOR PUBLIC UTILITY, &C.:—

56. Bridges, Piers, and Aqueducts.
57. Canals, Embankments, Waterworks, and Docks.
58. Railway stations, Sheds, &c.
59. Custom-houses.
60. Lighthouses, Beacons.
61. Towers for clocks, water, or bells.
62. Baths and Washhouses.
63. Turkish, and vapour baths.
64. Fountains, small Monuments, Columns, Arches, &c.
65. Mural and flat monuments, Brasses, &c.
66. Abattoirs.
67. Barracks.
68. Hospitals, large.
69. ,, cottage, and Convalescent Homes.
70. Cemeteries, Mortuaries, Lych-gates, &c.
71. Workhouses.
72. Reformatories and Industrial schools
73. Convents, Clergy-houses, Alms-houses, and Orphanages.
74. Abbey ruins (as to plan).
75. Lunatic asylums.
76. Deaf-and-dumb and blind asylums.

GROUP H.—PARTS OF BUILDINGS:—

77. Towers (not in 61), Steeples, tall Chimneys, and Lightning-conductors.
78. Fonts, Benches, Pulpits, Lecterns, Screens, Stalls, Altars, Reredoses, and Baldacchini.
79. Domes and Vaulting.
80. Doors and Doorways.
81. Windows, window fittings, and Stained Glass.
82. Chimneys, chimney breasts, Mantelpieces, &c.
83. Ceilings and roof panellings.
84. Staircases.

GROUP I.—MATERIALS CONSTRUCTIVELY:—

85. Wood, including scaffolding, shoring, &c.
86. Stone, Geology, and Stereotomy.
87. Brick.
88. Plaster, cement, concrete, and "Fireproof" construction.
89. Iron roofs and construction.
90. Crystal palaces, and large glass buildings.
91. Conservatories, and small glass buildings.
92. Chemical notes, recipes, and miscellaneous.

GROUP K.—MATERIALS DECORATIVELY:—

93. Ironwork, constructive.
94. ,, railings, gates, &c,
95. Metal-work, illustrated catalogues.
96. Wood fittings.
97. Mosaic and inlays.
98. Tiles.
99. Terra-cotta and ornamental brick.
100. Detail, classic.
101. ,, mediæval.
102. ,, "Queen Anne."
103. ,, miscellaneous.

GROUP L.—FIGURES, &C.:—

104. Decorative, i.e., in friezes, panels, or of Caryatids, &c.
105. Statues and monuments, with figures.
106. Mediæval, and figures by Dürer, &c.
107. Religious and symbolic.
108. Cupids and Angels.
109. Portraits, Busts, Medals, and Seals.
110. Costumes of different times and countries.
111. Miscellaneous figures and pictures.
112. Animals, natural.
113. ,, grotesque and monsters.
114. Plants and Flowers.

GROUP M.—ORNAMENTS, &C.

115. Friezes, Pilasters, and Borders.
116. Panels.
117. Diapers and powderings.
118. Heraldry, Shields, Plaques, &c.
119. Inscriptions, Mottoes, Alphabets.
120. Monograms.
121. Trophies and attributes.
122. Miscellaneous ornaments.

GROUP N.—COLOUR DECORATION.

123. Egyptian and Assyrian.
124. Greek, "Neo-Grec, and Etruskan."
125. Roman and Pompeian.
126. Byzantine.
127. Mediæval.
128. Italian.
129. Elizabethan and French Renaissance.
130. Barocco, and miscellaneous examples.
131. "Adams," Louis XVI., "Style Empire."
132. Naturalistic.
133. Notes on processes, styles, &c.

GROUP O.—MISCELLANEOUS:—

134. Heating, Ventilation, Drainage, Plumbing.
135. Maps, Plans, and Views of places.
136. Guide and Handbooks to places.
137. Professional practice.
138. Drawing, Mathematics, Perspective.
139. Indices to professional journals, and to R.I.B.A. Sessional Papers.
140. Catalogues of libraries.
141. ,, ,, exhibitions.
142. Manufacturers' catalogues and price-lists.

This classification appears, at first sight, a formidable one. It might have been made more minute, *e.g.* No. 128 includes every style from Giotto at Assisi and Padova, through the Quattro-centisti to Giulio Romano, and No. 129 includes styles which we discriminate as "Elizabethan" and "Jacobean," and that fine shading-off in French work from "François Premier" through "Henri Deux" and "Henri Quatre" to "Louis Treize," and again "Barocco," or *Baroque*, includes those rich and complicated but depraved medleys which obtained at Venice, towards the end of the 16th century, and afterwards infected the West of Europe, developing here as the "Grinling Gibbons," and in France as the "Louis Quatorze," and culminating in that "sink of perdition" the "Louis Quinze"; but these fine distinctions are those of the Decorator rather than of the Architect.

Those also who have "l'Art pour Tous" (a book much affected by a school of architects who have sprung up lately), in loose plates, would have to make separate divisions for:—Chinese, Japanese, Persian, Hindoo, Turkish, and Alhambresque, and for furniture, textiles, faience, &c. I have not included the above-mentioned Oriental styles in group N., Colour Decoration, as I made them for the work above-mentioned; but others who have not the book might make one folio for "Oriental Decoration" to include all stray sketches they have.

Also when a Series of plates has been published (*e.g.*, Dr. Zerffi's, in illustration of his papers on the Historical Development of Art, or that on Plant-form by E. W. Hulme, or the plates from Piranesi and D'Agincourt), it may be deemed well to make a special folio for each. Again, some one of the two or three subjects included in one division might so swell that it would be necessary to give it a folio to itself. On this, as on the question of *reducing* the number by consolidating, several divisions of a similar character (*e.g.*, 3, 4, and 5, or 40 and 41, or 62 and 63, or 64 and 65, or 68 and 69), each one must judge for himself. I commenced with one folio for 115, 116, and 117, and another for 118, 119, and 120; but I found it saved time to subdivide the subjects. This is really the justification for the elaborate system—*that it saves time in reference.*

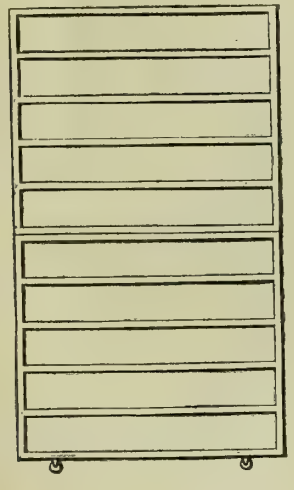
Occasionally the divisions will be found to *overlap*, *i.e.*, certain drawings may belong to two separate classes. This difficulty of classification, which happens in other things besides architecture, may be overcome by setting an order of precedence or dominancy. Thus folio 50 contains Town-halls, &c. The town-halls built in Yorkshire and elsewhere often contain a large room with organ, orchestra, and other provisions for musical performances; and the question arises—to which division, No. 50 or No. 44, does the drawing belong? In such a case we see that the municipal work of the town is more important than the music; and I placed the plans and elevation, &c., in the town-hall folio; while if there were an interior view of the large room published, I placed that in No. 44. Other instances of this will occur in the separating, which each must settle for himself.

The only other points I would now note are as follows:—Nos. 1 to 6, Churches, &c., are of course for purposes of worship as well as instruction; but the latter word with its "&c.," is more comprehensive. No. 13, sometimes aquaria, are connected with concert-halls or skating-rinks; each case must be judged by itself; but I would, however, place the drawings in the aquarium folio. No. 18, "Loggie," *i.e.*, open arcades like those in many Continental towns, where people congregate for trade shelter. No. 23, to include ruined ones. No. 29, for middle and upper-class tenants, and also including "Chambers." No. 30 includes the "Peabody" and other working-men's houses, whether in flats or not. No. 42, including the halls of the Inns of Court. No. 43, to include the old Greek and Roman theatres and amphitheatres. No. 45, including pavilions for Cricket, &c. No. 46, includes all preparations for illuminating and for festive or pageant occasions. No. 58, "Sheds," includes skating-rinks, drill-sheds, &c. No. 104 to 114. Men who go in for a thorough scientific and practical knowledge of planning, of economic disposition of means, and of rational external expression of fitness, usually have no time for the study of the figure, but when their work demands Sculpture are glad to adapt from others' drawings for their sketches, leaving the further elaboration of such adjuncts to the proper artist: in such cases these divisions will be found useful. Nos. 123 to 133. Where men are developing themselves into "Artists," and abandoning the superintendence of building to the Engineers; these divisions will be useful for preserving studies, &c.

It will be necessary to explain that by "Folio," I do not mean the expensive portfolio, but simply a sheet of brown paper folded. I obtained a quantity in sheets 4ft. by 3ft.; these, when folded, make serviceable

folios 3ft. high by 2ft. across, which will hold Imperial size easily. [When double-elephant paper is placed in the folios it only projects a few inches.] Good stout brown paper, as above, can be bought at Molyneaux's, 193, Newington Butts, near the Elephant and Castle, at something under 10s. for the quarter ream of 120 sheets; and probably that number would suffice for most students. Each folio should have the title of its contents, and the letter indicating its shelf, marked in 1in. letters on the L.H. top corner with a brush or quill-pen. It should also have a sheet of ruled foolscap pasted inside, on which to note the titles of monographs or exhaustive treatises on the particular subjects. There are some capital monographs published, *e.g.*, the (late) "Hotel de Ville" at Paris, the "Hotel de Ville" at Lyons, the "Bourse" at Lyons, the "Parks and Promenades of Paris," the "Arc de l'Etoile," &c., and there are treatises on Stables, Theatres, Clock-towers, &c., about which the student should carry out Capt. Cuttle's famous dictum, and "when found make a note of." There are also some very good treatises on special subjects among the sessional papers of the R.I.B.A.; and it is well to purchase these, and place in their respective folios.

The shelves on which to lay the folios are made of inch-stuff deal throughout; they are very much like the framework for a chest of drawers. One stands upon the other, as shown in the sketch, and the lower set has



large castors for convenience of moving. The clear inside measures are: 3ft. 6in. wide by 2ft. 4in. deep, and 6in. in height between shelves. The ten spaces hold the fourteen groups: the top shelf takes A and B, the second C and D, the third E and F, the sixth I and K; and the others take single groups. The shelves will take double-elephant size paper; some might be satisfied with smaller, in which case they would have a less bulky piece of furniture. The above size should be held together by screws, that it may not be like Robinson Crusoe's boat. If I possessed the erudition of the great Clarkson, I would have given several more quotations. I regret that I do not; but, however, the student can interpolate them for himself.

With the above-described arrangement anyone with order in his head will be able to put his hand on *any* drawing he has, in five minutes; and herein, as I have found by experience, is one great use of the whole method.

The Lambeth Board of Guardians, at their meeting on the 7th inst., received and considered plans, prepared by Mr. Aldwinkle, for raising the workhouse by a story, and other alterations, and ordered the same to be forwarded to the Local Government Board, for their approval.

ART IN THE CONSERVATORY AND GREENHOUSE.

THE following paper was read before the Leeds Architectural Association, by Mr. Maurice B. Adams, A.R.I.B.A., on Thursday, Jan. 15th, 1880.

Probably there is no branch of domestic architecture which has received less attention from the hands of the profession than that which comprises the several kinds of structures known under the generic term of horticultural buildings, while the entire absence of any concise or practical treatise of recent date on the subject renders unnecessary, I trust, any apology on my part for bringing the matter before your notice on the present occasion. When your secretary renewed his previous application to me last autumn, to read a paper before your Society, I was busily engaged in designing a series of conservatories and greenhouses, and having experienced a difficulty in obtaining technical particulars embracing the more recent improvements in buildings of this class, it occurred to me that a few notes for the use of others would, perhaps, be of some value. The subject under the title of "Art in the Conservatory and Greenhouse" is a very wide one, and the limited time, both at your disposal and mine, will render anything like an exhaustive paper quite out of the question. A few leading details, from a constructive and architectural point of view, is all that I can pretend now to contribute for your discussion. And, indeed, in these days of restless haste, when most affairs have to be considered and executed with as little delay as possible, facts, above all things, must be required, and that in a concise manner, at once straightforward and of easy access. Mere literary display in a paper on a practical subject, such as that before us, is better avoided as out of place, and as tending to confuse. I would therefore, ask your forbearance, should my lecture appear rather dry and matter-of-fact in its character.

The great advantages of conservatories and glass-houses of all kinds, both in immediate connection with dwelling-houses, and as detached buildings in garden-grounds are, of course, beyond dispute, while all intelligent minds can but find delight in the cultivation of flowers and fruit, even if circumstances will but allow of such a pastime being conducted only in a very limited degree. Lord Bacon tersely says: "God Almighty first planted a garden: and, indeed, it is the purest of human pleasures: it is the greatest refreshment to the spirits of men"; and Cowper adds, "Who loves a garden loves a greenhouse too." Nothing can add to the grace and comfort of a house so much as natural flowers. Decorators and furnishers, whether they belong to the Classic, the Mediæval, the Queen Anne, the French, Modern, or any schools, will never make the comforts of a well-appointed dwelling in any sense complete, without some judicious use of flowers in their living state. The charm of a cottage, more than often, is to be found in its window-flowers, while the not very hospitable arrangements of an almshouse home are rendered enviable by the charmingly bright flower-beds and pots which nearly always are found in connection with such dwellings. Simple and trite as such commonplace remarks are, they refer to facts which really lay at the root of the matter: for if there be one question of domestic economy, so to speak, occupying the attention of ordinarily cultivated people at the present time more than another, it is, in hackneyed phrase, "art at home." How to make one's home in some sense artistic? In the days of the Gothic Revival, as it is called, almost every effort was concentrated on the artistic building and furnishing of churches, and so generally has this feeling extended itself, that Nonconformists of every shade have long since become by no means behind-hand in imitating the High School of the Church of England, which may claim to have originated the movement in ecclesiastical matters. For all this enthusiasm architects can but be very thankful—this desire on the part of the public for a more artistic and appropriate treatment of things. Of course, much of it is no deeper than mere fashion, still use seldom fails to prove itself a second nature, and, already, the honest seeking for art at home has established itself as a fact. Furniture manufacturers, paper-hangers, and even drapers, have had discernment sufficient to notice this; and further, it may be remarked that in several very important instances, much that should have fallen into the hands of architects to design has been executed by trading firms such as these, while some tradesmen have gone so far as to charge and obtain professional fees as decorative artists. The architectural profession has failed to secure much of the work alluded to, chiefly because it shrank somewhat from the opportunity thus presented, and it has been much the same with horticultural buildings, which either have been treated as of very secondary importance or relegated to the carpenter and builder to design. Why should anything do for a conservatory? Often, and more than often, one sees adjoining a pretentious and evidently costly house a mere glazed shed of the ugliest proportions, evidently the production of some house carpenter or mere greenhouse builder, and occasionally when an attempt has been made by the architect to render the conservatory in keeping with the architectural character of the house, it is to be feared that almost all the requirements of a building for plant-growing have been overlooked, the chief and only thought being to make the structure architectural. In the days when Gothic was thought to be the only style for every kind of building, some of the most singular things conceivable were built in the way of conservatories. All the glories of the stop chamfer were intensified, and heavily-braced framing, which was quite out of place, with diagonal jointed boarding, *ad lib.*, in short, all the incongruous mouldings and shapings of the residence itself, were brought to bear in the glasshouse adjoining; and if one looks back to earlier days, when Classic architecture was thought more suitable, it will usually be found that conservatories were constructed in such a heavy style, and of such lofty proportions that it was almost impossible for any gardener to grow either flowers or fruit with success in them. But surely at the present time there can be no excuse, seeing that eclecticism rules with absolute sway in everything, especially in art. I do not say that such a rule is a good one—far from it; but it is evident that no trammels of any architectural school need prevent conservatories and horticultural buildings from being treated in a common-sense and really artistic manner, whether they belong simply to the limited form of a window fern-box and glasshouse of a town dwelling flat, or the more extended character of conservatory proper and winter garden. The regular nurseryman's glass buildings also might with advantage, and without much extra cost, be made more picturesque, and the thought is worth consideration, even from a money-making point of view, seeing that his stock would show to better advantage, though it is to be feared that a long time will elapse before many are led to take this view of the matter. On the walls are exhibited a series of more than 30 designs of buildings, embracing most forms of garden architecture, which I have prepared for execution alone and in conjunction with Mr. E. W. Godwin, F.S.A. These designs must be taken simply for what they are worth, and judged according to their merits; but probably they will illustrate my ideas better than a written description alone of what one has carried out. At the conclusion of my paper I will briefly allude to some of the drawings in particular. It may, however, be here remarked that nearly all the exhibited designs are in either "the Adams" style, or, perhaps, rather in what has been called "Queen Anne," and it is in this respect of style I fancy that we have a considerable advantage over those who worked either in the Classic or Gothic manners. Neither Classic nor Gothic forms are, *per se*, suited for the interior finishings of ordinary domestic dwellings now, and most people will, I think, agree that the later styles just referred to are eminently adapted for our modern requirements. Mr. E. W. Godwin has very cleverly introduced an adaptation which he calls Anglo-Japanese, for one or two conservatory designs, and these will commend themselves to you. There is this to be said, however, about styles: that although the "Free Classic," to use an appropriate term, lends itself to the horizontal lines and square openings of our modern houses, it really matters but very very little what style a thoroughly competent architect determines to work in, though of course he will succeed best in the style with which he is most familiar, but under most circumstances a true artist is able to produce a suitable design with thought and study in any style, and he often, out of the most elementary materials, suc-

ceeds in giving his client a well-proportioned and inexpensive building devoid at once of bad taste as well as the commonplace. On the other hand, an indifferent architect or designer will fail in producing anything good, be the style or outlay what it may, and the chief cause of failure is generally to be found in the fact that too great an attempt is made. And if this be true in house and church building where the precedent is frequently followed, how much more must one expect it to be the case in horticultural building in which the most simple forms are needed, and where all pretence should carefully be avoided. Any architectural design worthy of being classed as a work of art should first of all be simply the outcome of the purposes for which the structure is intended, and it must always be folly on the part of the architect if he attempt to persuade himself or his client that a building is in good taste when it fails to fulfil the objects for which it was built. A conservatory of whatever kind must above all things be a practical building, and there is no reason why it should not be made in an equal degree a thoroughly artistic one, even where limited outlay governs the proceeding, provided of course a reasonable amount is to be expended. With these few preliminary remarks we may turn to a few particulars regarding the practical requirements of the class of structures under notice, in all of which light and heating requirements, with a ready means of ventilation, are among the chief considerations to be observed. The working houses in a garden, that is the houses which are exclusively devoted to the growing of plants and fruit, are rather numerous. They comprise the plant house, intermediate house, stove, forcing houses, propagating houses, orchid house, vineries, peach house or orchard house, pine-pits, melon and cucumber houses, &c. In large establishments we frequently find houses devoted to one particular flower, as camellia-houses, azalia-houses, palm-houses, rosaries, &c., &c. Vineries have also to be so arranged that ripe grapes may be had all the year through. In order to do this special attention has to be paid to heating, so as to ensure a proper temperature as may be required, no matter what may be the temperature out-of-doors. It is also of equal importance, as I have just said, that a thorough ventilation should be obtainable at any time, and without special attention to these points in particular, no house can be considered a success. To briefly notice the various houses already enumerated may not here be out of place, giving at the same time a few details, most of which will be of service to an architect who may have to build glass-houses for general purposes of any kind, such as those in connection with houses especially requiring a more ornamental treatment than the special buildings now referred to.

We will take the Plant-house first. This is frequently made a span-roofed structure, and 18ft. wide is found to be a width which will admit of the most advantageous arrangement of fittings. It is usual to place a flat stage on either side and a stepped one in the centre, thus leaving a walk all round the house. The pipes for heating can be conveniently arranged under the side stages. A span roof is the best form that can be erected, as the plants, having light all round them, are not so liable to be drawn to one side or the other, and thus become of bad shapes, as they are likely to be in lean-to houses. A span-roof house should be placed with the ends north and south, as by this means each side secures an equal amount of sun. The length from end to end may vary according to circumstances, but it is generally advisable not to have one house more than 40 or 50ft. long, as by dividing it up and heating each house separately, the gardener is afforded greater facilities for growing his plants. The heating-apparatus can easily be regulated in connection with one furnace as at Kew, where one big boiler heats three or more houses.

The HALF-SPAN house is the next best, and is very frequently used where a back wall exists. The light is not so well distributed as in a span, but the house has a great advantage over the lean-to-house for plants. Internally, the most convenient arrangement will be to have a flat stage in the front and a stepped stage at the back. I may here say that if no other provision be made for obtaining water, warmed in proportion to the temperature of the house in which it is to be used for watering the plants, a tank or cistern should be arranged in the floor of the structure for this purpose, a trough under the passage-way is a good method.

A "LEAN-TO" would be fitted in the same way; both half-span and lean-to buildings should run east to west facing the south, and rather inclining towards the east. In this country the angle of 45° is, for most purposes, found the best pitch for horticultural buildings generally.

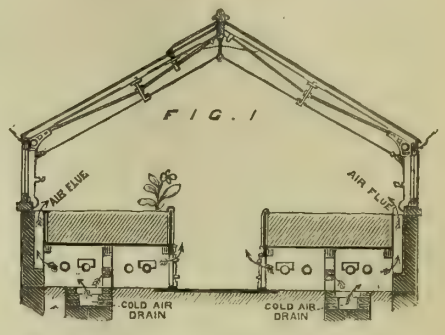
For PLANT-HOUSES 1ft. of 4in. pipe for every 28 or 30 cubic feet of air will be found to give a proper temperature.

The INTERMEDIATE house is used for growing plants that require a somewhat higher temperature than the plant-house, but not so high as the stove. One foot of 4in. pipe to about 25 cubic feet of air will answer best in this case, and in other respects the building resembles the plant-house.

The STOVE-HOUSE is more usually made with iron stages carrying slate shelves covered with stone-chippings, sand, or small shells, on which the pots stand, thus obtaining a soakage for the superfluous moisture after watering; and from an artistic point of view, this system of gravelling the shelves with small shells is much to be recommended, especially in ornamental houses, where the ground space should be laid out, as far as possible, in natural beds instead of devoting the room entirely to stages. If wooden stages were employed in stoves similar to those employed in the plant house, where they are made of stout laths 1½in. by 1in., about ⅝in. apart, it would be found that owing to the great heat kept up and the quantity of moisture usually produced that they would be liable to speedy decay. The stove may be either a span, half-span, or lean-to structure. Each form has its advantages, though all things considered, the span roof is the best. This house is heated in the proportion of one foot of 4-in. pipe to about every 20 cubic feet of air, and the same system applies to the orchid house. These proportions must, of course, be taken as a medium guide, for it is evident that the quantity of pipe necessary to keep up a given temperature will vary according to different situations and local influences; thus houses in the north of England and Scotland will require more pipe than those in the south of England. Also, a span roof, because it has a much greater cooling surface, will require more pipe than a half-span or lean-to, where the back consists of a brick wall, but the proportions of heating power which I have just given will be found sufficiently accurate for a basis. At the risk of being tedious, permit me to say a few words more with reference to the subject of heating, because the particulars may be of value for future reference, when a more strictly accurate rule than the above calculations is required. It has been found from careful experiments that one square foot of glass will cool 1¼ cubic feet of air per minute, as many degrees as the difference between the external and internal temperature. Therefore, having taken out the number of square feet of glass, multiply this by 1¼, which will give the number of cubic feet of air to be warmed per minute. Then proceed by the following rule:—Multiply 125 by the difference between the extreme external and internal temperature, and divide the product betwixt the temperature of the building and the pipes (the latter being usually calculated as at 200°), this quotient being again multiplied by the number of cubic feet necessary to be warmed per minute, and divided by 222, will give the number of feet of 4-in. pipe required to bring the building to a proposed temperature. Suppose it be required, for example, to ascertain the quantity of pipe to heat a vinery with 400 square feet of glass to 75°, and, estimating the lowest external temperature at 20°, the calculation will be as follows:—125 × 55 (difference of external and internal temperature) = 6875 ÷ 125 (difference between temperatures of pipes and house) = 55, which multiply by 500 (number of feet of air to be warmed per minute) = 27,500 ÷ 222 = 123¾, the number of feet of 4-in. piping necessary.

THE FORCING-HOUSE is used, as its name implies, for forcing-on plants, &c., before they are placed in the conservatory or other plant-houses. It is usually fitted with beds having pipes below them to heat the soil with what is called bottom heat, and Fig. 1 gives a section showing how the arrangements may be advantageously carried out. The beds are made with iron pillars supporting slates which form the bottom of the bed, the same material being used for the sides and ends. The air flues are formed in the wall of the building, and are so arranged in conjunction with the slate trough, so to speak, which carries the bed, that the heated air may pass up in the front as well as at the back, fresh air being admitted below in a flue, or air drain running from end to end, and which can be regulated at will. By this means the house

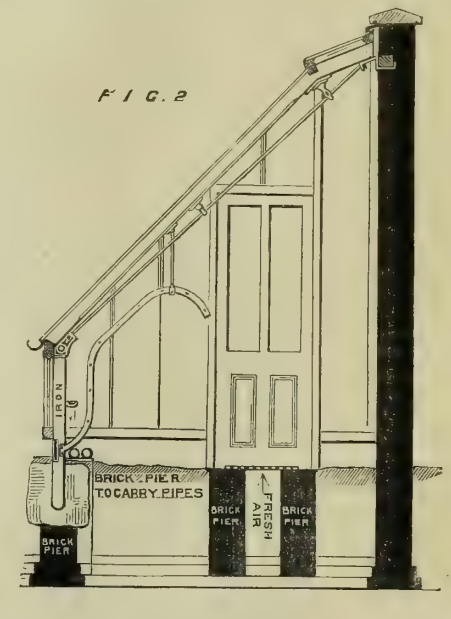
FIG. 1



can be supplied with fresh heated air when it is not desirable to open the front ventilators. And here it may be said that the most usual way of ventilating buildings of this kind is by allowing fresh air in at the lower portion of the building, either by an air-drain or by front ventilators, as shown in Fig 1, which, in some cases, are also repeated below the lights in the brickwork in the form of wooden doors or flaps. The heated and vitiated air is then allowed to pass off at the apex of the roof by lifting lights worked from below. Any system which admits fresh cold air over the whole surface of the roof equally does not practically do the work so well, simply because no draught is set up, as is the case in buildings such as I have described; and in very windy weather, much cold air which is not wanted must find its way into the building, when so many small ventilators exist all over the roof, a good number of which must necessarily soon fail to fit exactly as they may do when first fixed. With regard to the pipes being carried on bearers above the ground instead of their being buried in the soil, as is sometimes done, it is worthy of note that by this means they are less subject to moisture, and less liable to corrode. For forcing-houses, about one foot of 4in. pipe to from 15 to 16 cubic feet of air will be found a good proportion.

PROPAGATING HOUSES are very similar to those last described, but are fitted with striking-boxes in addition to the beds; and this class of house is also suitable to cucumber and melon growing when provided with wires and frames, as shown by Fig. 1, on which the plants may grow.

FIG. 2



My diagram, No. 2, gives a good section for PEACH HOUSES, which are frequently narrow, lean-to structures, from 8ft. to 14ft. wide, devoted to growing this beautiful fruit. A curved wire trellis (fixed on a pivot to lift up and

down, bringing the fruit near or not to the glass) is provided in the front, as will be seen, on which to train the trees, and the back wall may be wired for other fruit. It will be observed in our section that the front is constructed with iron uprights or muntins, let into rough blocks of stone at the foot: pockets cast on these uprights receive slates about ¾in. thick, and about 6in. deep. The rafters are secured to a bracket-head at the top, and provision is also made for the plate which carries the gutter. Thus a building is erected without brickwork, except for the back wall, and I am told that there are many competitors for the credit of having introduced slates into the construction of houses of this kind. The trussed rafter is used for the purposes of lightness, and the tension-rods are useful for creepers to grow over, and for fixing other wires, for the same reason.

ORCHARD HOUSES may be like the last, but are generally span-roof structures of about 30ft. wide, the height being in proportion. The trees are planted out in the soil, as they would be out of doors, care being taken to leave openings in the external walls under the surface, as in the peach-house, Fig. 2, where blocks of stone are used, or by means of arched brick walls, so as to allow the natural moisture of the earth from rains to permeate the soil-beds inside the building. Orchard-houses are often unheated, but sufficient pipes to keep out the frost should be provided.

(To be continued.)

BUDDHIST ARCHITECTURE IN THE JELLALABAD VALLEY.*

THE extension of our knowledge of Indian architecture to the region of the Indus has been productive of important results. Twenty years ago, scarcely any materials existed from which an idea could be formed of the styles of architecture that had been practised there in the past. Now we have considerable data upon which to work, and already some valuble deductions have been reached. Standing out prominently among the points arrived at, is the fact of a Greek influence having filtered through the Bactrian provinces to the Indus, which it crossed and penetrated as far as the Punjab and Punjab and Cashmere—how much further is a point not yet worked out. This fact is of very great value as bearing on Indian architecture, and of equal importance to the history of Greek art. We have another point now equally well-established, and of high value to the art historian, which is, that previous to the Greek there was an influence brought from the Euphrates Valley, most probably from ancient Persia; this not only crossed the Indus, but penetrated at least as far south into India as the Karli on the west, and Buddha Gaya on the east. The bell-shaped capitals in the Karli cave, and on the Buddhist Lats, as well as in the sculptures at Bilsa, and other places, had often been identified with the well-known Persepolitan examples, but all doubt now ceases regarding their source; that point having been made clear from the details found in connection with them on the western bank of the Indus and in Afghanistan. It has been commonly affirmed that all remarkable things in the past had their origin in India. This is now exploded. All inquiries seem to tend to the opposite conclusion, that religions, conquerors, ideas, art, and architecture, all crossed the Indus into India, and that, with the exception of the Buddhist propaganda, nothing ever went in the opposite direction. The first suggestion of the existence of Greek art in the region of the Indus is in the account of Elphinstone's mission to Kabul. In 1808, while returning through the Punjab, the mission visited the Manikyala Tope, and remarked the Greek character of of some of its parts. Professor Wilson discards the opinion, because, as he says, "it has been since fully proven the work of Indian artists." In 1860 I visited this well-known monument and made sketches of it, and the result of doing so was to leave no doubt in my own mind as to the Greek origin of its details. The capitals were undoubtedly Corinthian; I made the section of a frieze, which was sufficient in itself to establish the Classic character of the architecture. The year following I visited Cashmere, and these conclusions of a Greek influence were confirmed by finding traces of Doric, and also of what I took to be Ionic. The explorations at Takht-i-Bahi, Jamal Garhi, and other places in the Yuzufzai district, situated on the west bank of the Indus north-east of Peshawer, carried on about ten years ago, resulted in the discovery of Corinthian capitals which brought conviction home to everyone. Numerous sculptures were also found in which the pose of the figures, the treatment of drapery, and other details, bore clear evidence of an influence from Classic Greek sources, These sculptures are now in the Lahore Museum, and form a unique collection in connection with this subject. These details of progress all refer to ground within what was the British frontier before the present Afghan war began. Beyond the frontier our knowledge was almost a blank. Masson is about our only authority, and his explorations made in 1834-41, were undertaken to procure coins. I have seen the excavations which he made in the Jellalabad Valley, and he does not seem to have made a single effort in any case to bring the architecture to light. His drawings are so small that no details can be made out of them, but the great quantity of coins which he collected were of the highest value as to the ancient history of the region.—I joined the headquarters of the force at Jamrood on the 20th of November, 1878. On the road to this place, about half-way from Peshawer, I passed Hari Sing Ke Boorj, where there are considerable remains in the form of mounds of the Buddhist period. The Fort of Jamrood is built over the remains of an old tope. Lieut. Bartram, R.E., gave me sketches of some mouldings of the old masonry which he found projecting at one place through its later walls. On the 22nd November I climbed the steep ascent and entered the fort of Ali Musjid, and here for the first time I saw the peculiar kind of masonry which belongs to the Buddhist period in Afghanistan. The hill being partly isolated there is a long wall on its western side which our fire did not touch, and which is wholly of this Buddhist masonry. Rudely squared stones are placed at intervals, with slates built in between each stone; a continuous layer of slates is then made forming a course in itself, and on this is placed the next course of stones with slate between them again—the whole presenting the appearance of a diaper pattern. The quantity of slate varies considerably in this masonry, but it always forms by far the greater part of the superficies of the wall. This Buddhist masonry is found in the Yuzufzai country, but I have not heard of it on the east of the Indus, and it may be stated with confidence that this manner of building did not come from India. The interior is formed of rude stones, often water-worn boulders, imbedded in mud, the whole forming a solid mass. The identity between Buddhist masonry and that of Northern Media, as described by Sir H. Rawlinson, is very striking, and if such a mode of construction was common to the hill countries on the east of the Euphrates, where the material could be easily obtained, the style may have been carried as far as the Indus as early as the time of Darius, or at whatever date we may give to the arrival of the Persian style of architecture in India. Careful inspection of ancient structures to the west and north of Kabul, if any exist, will be the only means of giving safe data on this subject. The Buddhist wall in the Fort of Ali Musjid seems as old as the Buddhist period. Whether it was originally a religious establishment or a fortified position is doubtful. At Lundi Khani there is an old fortified place, all of Buddhist masonry, and in it there is no appearance of topes or viharas. It is high up above the pass on a rocky height, perhaps 2,000ft. above the road. The cliff is perpendicular on one side for about 400 or 500ft., and a strong wall, nowhere less than 6ft. wide, runs along the slope on the other side, enclosing a narrow space all the way which is not over 30ft. wide at any part, and the greater part of it is not half of that width. There are the remains of a stair down the side of the cliff behind, also some walls large enough to have formed a good house, and a communication once existed to a small stream of water. There are remains of a few houses on the crag above, but they are of the smallest dimensions, owing to the narrowness of the inclosed space. After passing the rocky gorge above Ali Musjid the Khyber Pass begins to open, and at Lalabeg it widens into a valley, with villages and flat cultivated land. It was when approaching this that we got the first sight of the Ishpola Tope, standing on the summit of a mass of rock which projects into the valley. The effect of this fine monument, in contrast with the mud villages of the present day, tells plainly of a past when the country was in a flourishing condition, when there was wealth, and when art and architecture were not unknown in the region. In the present day Afghanistan has fallen low in these pursuits. Houses are formed of mud, and the carpentry of the doors and windows is of the rudest description. The walls of Jellalabad are all of mud, and the wooden gates would be sure of the first prize if given for the worst kind of work. As for art, there did not appear to be anything of the kind in the country. There are here and there a few Hindoos who make gold and silver ornaments, but their work is poor and of the coarsest character. In such a country you can imagine the effect produced by the Ishpola Tope. I had no means of measuring it, but should say it could not be much less than the size of the Manikyala Tope, which is close upon 130ft. in diameter. The dome is still nearly complete on the south side. It differs conspicuously from the Manikyala Tope in having a square base, which is one of the marked characteristics of Jellalabad examples. This square base has 14 pilasters on each side. Three of the spaces between the pilasters were recesses in which there may have been sitting figures of Buddha. At the north-east corner there is a retaining wall, made to support the monument on that side, where the rocky surface was lower than the other corner. The capitals of the pilasters are Corinthian. There are no pilasters on the circular part of the Tope. On my return in June I made a second inspection of the remains, and found that some one had made excavations. The stair which led up to the top of the square base was partly cleared; it approaches from the north. Round the lowest member of the base had also been exposed a continuous row of small sitting Buddhist figures, about 18in. high, placed so close that they touched each other. The remains of the Vihara were quite distinct on the side of the hill behind, in some parts the walls stood a considerable height above the ground. In one or two places were the circular courses of the masonry of small topes, one of which was about 6ft. in diameter. At Lundi Khana there were remains with Buddhist masonry on each side of the pass; and in the valley leading to Daka from Lundi Khana there are other similar remains. Near Hazar-Nao, and close to Basawnl there are isolated hills covered with fragments of walls and quanties of débris, which no doubt belonged to the Buddhist period. At Chardeh there is a prominent hill overlooking the plain, with the remains of a tope upon it. The tope is only a rude mass of masonry, all its outer surface has fallen away, and only one or two stones of the external surface remain. These are of one of the varieties of Buddhist masonry, the stones having been squared and touching each other on their perpendicular surfaces, but the courses are separated by a layer of slates between, producing a streaked effect, instead of the usual diaper pattern. There are remains of the monastery on the north and south sides of the tope, and on the south some of the cells, small places not over 8ft. square. The hill is so narrow on the summit that the base of the tope entirely covers it, and the buildings on the north had to be supported by a very high retaining wall, which is still in very good condition. Although much obliterated, the old way up to this Chardeh hill is still visible, and at its foot there is the Ziaret of Peer Kamil Baba, that is, the tomb of a Mahomedan saint. These shrines are made of mud, and often decorated with white pebbles, and their existence can be known from a distance by a long pole and a piece of coloured cloth on the end of it. The march from Chardeh brought us to Ali Bogan, and the next day we went on to Jellalabad, remaining there four months. The valley is about nineteen miles from east to west. The quantity of Buddhist remains and the construction of the monasteries, with large and costly topes, tell of a wealth no longer to be found there, and their decorations are evidences that art was practised. We know from the Chinese Pilgrim, Fah Hian, that there was a monastery at Hada "entirely covered with plates of gold." The seven precious substances are constantly mentioned as the decorative materials of the structures. These were gold, silver, lapis lazuli, crystal, cornelian, coral, and ruby. Precious and veined stones were also used. I found some

* By WILLIAM SIMPSON, F.R.G.S. A paper read before the Royal Institute of British Architects, Jan. 12, 1880, (see p. 82).

remnants of gilding, which is confirmative so far of these accounts. Most of these buildings must have been thickly coated with plaster, and decorated with bright colours—red and yellow being the predominating tints. Hiouen Thsang describes a Tope at Nagarahara, the then capital of the district, as being 300ft. high, which was not only remarkable for its construction, but also for the sculptures upon it. There are at Hada, also mentioned by this pilgrim, a number of level-topped heights and ridges, all covered with the remains of topes and viharas. The rock is conglomerate, and wherever it is scarped there are caves forming a sort of underground town in addition to the one above. There are also subterranean channels for water cut in the rock. On all the heights round there are mounds, with caves in the rock below. The topes and rectangular mounds, this last form indicating that they were viharas, as well as the caves, show that this extensive place had been in itself wholly a town of Buddhist ascetics. About a mile south of Jellalabad there is a low ridge of heights extending as far as Sultanpoor, a distance of seven or eight miles. The whole length of this is covered with remains. The base of the Siah Koh, towards where the Kabul river enters the valley, is covered for about three or four miles with the remains of topes and the mounds of viharas. On the north bank of the Kabul river is a large group of topes and caves, extending a distance of about two miles. On the Jellalabad side of the river are the remains of what I consider to be the site of the ancient capital, known in the Buddhist time as Nagarahara, where there are so many mounds of stones that the natives call it Wuttapoor, or the "City of Stones." From the extent of these Buddhist remains you may form some notion of what the Jellalabad valley was when "the land glittered with the yellow robes" of the ascetics who dwelt there. At the present day nothing is left but mounds, and here and there a tope, although dilapidated and fast passing to the mound condition, still with some architectural features remaining. The heaps formed by the topes and the viharas are tolerably distinct, the one being a rounded knoll and the other a hollow square. In many cases the centre of the square and the tope are on a straight line, showing a symmetry in the design, but the Buddhist devotees were indifferent as to the "eastern position." It is impossible to attempt an enumeration of the topes, as there are monuments of this kind of every size, some being only a few feet in diameter, and such has been their quantity, that even when they were perfect above ground it would have been a long piece of work to have determined the exact number, and now it is impossible. In conjunction with one or two officers we subscribed a few rupees, and had a small exploration carried on at Hada. This was close to one of the larger topes, which had an extensive chasm in its side—most probably made by Masson; our operation did not extend over a great space, still we cleared out part of what had been a tope 29ft. in diameter, and it was surrounded by a series of smaller topes about 4ft. or 5ft. in diameter. Here we found some interesting fragments of sculpture, and the quantity of plaster figures (some of which were exhibited by the author at the meeting) embedded in the earth, and close to the surface, was a matter of surprise to us all. As some may not have given much attention to Indian architecture, it may be as well to explain what a tope is. Its genealogy may thus be given:—The primitive grave heap became a mound; stones were added, producing the cairn, the stones of the cairn were arranged in various ways, and at last were built into a structure. From this last result most probably grew the seven-storied Tower of the Euphrates Valley, the Pyramid of Egypt, and the Buddhist Tope. Thus the tope belongs to an ancient and most important branch of architectural development. We have as yet no reliable evidence as to what the tope was in the pre-Buddhist time in India. At the time of Asoka, about three centuries after the death of Buddha, these monuments appear as being regularly constructed after an established style of architecture. At that date in India they were solid hemispherical domes, surmounted by a *Tee*, over which were placed the symbolical umbrellas. The one at Sanchi, known as the Bilsah Tope, being, perhaps, the best example to refer to. There is a small model of this monument in the South Kensington Museum, but it is to be regretted that it should be incomplete, as it wants the *Tee* and the umbrellas. On the cast of the gates, exhibited in the same room with it, sculptured representations can be seen with all these details. On crossing the Indus a marked peculiarity appears, and that is the existence of a square base. In the Sanchi Tope there is a circular ledge 14ft. above the surface, with stairs leading up to it. In the Yuzufzai country there are the remains of a tope with a round base at Jamal Garhi, and one with a square at base at Takht-i-Bahr. After entering the Khyber the circular form disappears, and in every case the square base is the rule. This square base seems a very important feature of the tope in the Indus Valley and Afghanistan. There must have been some influence from which it originated, and if this could be followed up and the sources explained from which it sprung, a new light might be brought to bear on a subject we are much in the dark about. The chortens, or topes, erected by the Lamas or Buddhist monks in Tibet, have a square base, and I have before suggested that they derived this form from Afghanistan, or, as I expressed it—"from the right bank of the Indus and not from the left." There was added the suggestion that this might prove important as showing the probability of the Buddhist propaganda having first crossed into Afghanistan before it penetrated into Tibet. What is here hinted at as only a possibility, resulting from a peculiarity of architecture, Colonel Yule confirms as being perfectly historical; he shows that Koeppen states that the first Buddhist king of Tibet was Srong-tsan-Gampo, who in 632 A.D. began the work of conversion and establishment. He sent his minister Thu-mi Sambhola with sixteen companions to India to bring back books and doctrines, probably to a district afterwards mentioned as Udayâna, a region on the right bank of the Indus between the Khyber and Cashmere, the present Swat and Yuzufzai country. The same author also adds that Padma Sambhava, who is still the most famous Apostle of Buddhism in Tibet, came from Udayâna in the eighth century. The date of Srong-tsan-Gampo was the very time when Hiouen Thsang was in India. The most splendid tope in India at that time was at Peshawer, and the Peshawer Valley was full of viharas and topes, and the fame of these monuments would be enough in itself to carry the style of architecture into new regions. An idea has suggested itself to me about the mound graves of Northern China in relation to the square base. Under the conical heap of earth the Chinaman forms a square base of the same material. The square form is *Yang* and the round heap is *Yin*. These are the dual powers of such profound symbolic significance in Chinese ideas. If the square base of the Chinese grave could be traced towards the Hindoo Koosh, the origin we seek would be explained. The Turanian invaders, the Su and the Yuchi, who overthrew the Greek rule in Bactria, and under whom Buddhism flourished in Afghanistan, may have brought the form and constructed it with the prevailing style of architecture in the locality. The word "Tope" is understood to be derived from the Sanscrit of *Stupo*, the *S* having been dropped out. The term was first used in reference to the Afghanistan monuments, from which region the word came. Masson uses "Tappa" as an Afghan name in relation to both topes and mounds, and my working parties of natives seemed familiar with it.

(To be continued.)

THE LARGEST METAL "TABERNACLE."

MESSRS. THOMASON and CO., of Birmingham and Manchester, have just completed, for a Roman Catholic church near London, a tabernacle, which it is claimed is the largest ever made of metal in this country. The ornamentations are elaborate and costly, and at the same time effective, the whole being covered with and having additions of gilt metal, engraved and jewelled with stones, many and various. The tabernacle is circular in shape, 6ft. in height and 2ft. 6in. at the base. The mouldings at the base are enriched by beaten foliage. The "safe" portion is made of wrought-iron, but is covered with gilt plates both inside and outside, the latter being decorated with ornamental bands, mouldings, and engravings. Around the centre of the tabernacle is the inscription—"Hoc est depositum Corpus, de Virgine natum." The door is beautifully engraved and jewelled, and inside a vesica upon a diaper ground are represented the chalice and paten, surrounded by the wheat and the vine (emblems of the sacramental elements). Outside this are engraved the rays, while the door is ornamented by a border in which the passion-flower forms an effective feature. Surmounting this is a massive moulding, jewelled with malachites, rubies, and crystals, and finished by a cresting which is also jewelled. From the cresting rises a large dome, and above it a smaller one, while at this point there is a wreath or crown of thorns, all of gilt metal. The domes are covered with small pieces of metal representative of tiles, each engraved and put on separately—one overlapping the other. The work altogether is quite above the common. Mr. W. Millward, of St. Paul's Square, was entrusted by Messrs. Thomason with the gilding.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The third meeting of the Session was held last Wednesday week, Mr. Thos. Morgan, F.S.A., in the chair. Mr. Watling reported the discovery of some elaborately ornamental bronze vases of Roman date at Ixworth. A large collection of antiquities from various places was exhibited by many members, among which was a portion of an iron shot 4in. in diameter, found at Allington Castle, a relic of the siege of that building. Mr. Compton produced a deed of admittance of the Manor of Woking, granted to John Macknell, 1654, and which was found in Ewhurst Church, Sussex, during repairs. Mr. Loftus Brock, F.S.A., described the works now far advanced at the Tower of London, and which have so far resulted in the clearing of the space between the inner and outer walls. The towers and walls now thrown open to view present an aspect of great strength, and are well worthy of inspection. A portion of the original Norman work of the White Tower is also visible by the removal of the armoury. Mr. Romilly Allen, C.E., read a paper descriptive of a remarkable prehistoric cist, at Kilmartin, Argyleshire. It was found about ten years ago during some trenching works for plantation. It is 6ft. 10in. long by about 3ft. broad. Its construction, of rough stone, resembles many others; bnt in this instance it is remarkable for having two of the end stones sculptured with singular devices. One of these are seven axe-heads, and on the other a singular comb-like grouping which Mr. de Grey Birch considered to resemble a tree ogam. Mr. Allen pointed out that these carvings are unique in Great Britain, although a few of somewhat similar form have been met with in Brittany, rubbings of which were shown. The second paper was read by Mr. I. H. Jeayes, on "Ancient English Guilds," with reference to some unpublished documents which were exhibited or described. One of these was a form of admission to the Guild at Boston, a printed sheet by Pynson, with the names left blank for filling up. These documents mostly related to the days or period from which the members were to be absolved from the pains of Purgatory, and were in others respects very curious.

LIVERPOOL ARCHITECTURAL SOCIETY.—The fifth meeting of the thirty-second session of the Liverpool Architectural Society was held on Wednesday week, the president (Mr. Henry Sumners, F.R.I.B.A.) in the chair. A description of Boyle's patent air-pump ventilator, illustrated by working models, was given by Mr. Gibbs, of the firm of Messrs. John Gibbs and Son, of that town. The chief features of these ventilators are familiar to our readers. The President remarked that he had used several of these ventilators, and had found them efficacious. The thanks of the society were accorded to Mr. Gibbs.

The Hull Town Council on Thursday week advanced the salary of Mr. Dale, the inspector of nuisances, from £150 to £175 per annum. A letter was received from the Commissioners in Lunacy declining to reconsider the plans submitted in the recent competition, as that duty would fall to the Secretary of State. It was therefore resolved to apply to Mr. Cross to allow the plan of "Lucidas Ordo," placed third in the competition, to be carried out in place of that by "Argus," chosen by Mr. Hartley and by the visiting justices.

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ILLUSTRATIONS.

CAPS FROM LAON CATHEDRAL.—RETURN STALLS AT ST. ALBAN'S ABBEY.—ROYAL ACADEMY PRIZE DESIGN FOR A TOWN RESIDENCE FOR A PRINCE.—HOUSEHOLD STORES ASSOCIATION, MANCHESTER.—STEWARD'S RESIDENCE AT NALDER HILL.—STABLES AT EASTBOURNE.

OUR LITHOGRAPHIC ILLUSTRATIONS.

CAPS, LAON CATHEDRAL.

THE three caps which we illustrate are from the principal arcade of the nave, and are good examples of a double cap, which is a treatment of frequent occurrence in the large churches of the N.E. of France. The square abaci occur alternately with the octagonal, the latter being the caps to the intermediate piers of the bays of groining. The caps are 3ft. 9in. in height from neck mould to top of abacus, the shaft of columns being 2ft. 10½in. diameter. Our illustration is from a pen-and-ink sketch by Mr. Brightwen Binyon, A.R.I.B.A.

ST. ALBAN'S STALLS.

THESE stalls have been designed by Mr. G. Gilbert Scott, F.S.A., upon the lines laid down by the foundations, discovered some few years back, of the ancient choir fittings. Edward II. gave the timber for these in 1314, and they were executed under the direction of one Master Geoffrey. They were not, however, completed until 1369. Abbot Wheathampstead gave an organ, and made "a certain wooden construction" for the support of the same, and also for the singing of the gospel at the High Mass. Mention is also made, in the old authorities, of a lectern in the midst of the choir for the reading of lessons, and of a bench to the west of it for the use of the cantors. In accordance with these indications, the style of the newly-designed stalls is that of Edward II.'s reign. The details of the canopies will be carefully studied from those which exist upon the western face of St. Cuthbert's screen, which crosses the church, one bay to the westward of the line of the returned stalls, and which is, even in its ruined condition, an exquisite specimen of the work of the first half of the 14th century. The stalls and their desks are designed to be of English oak, upon a stone basement. The panelling above the stall-elbows is to be of the same, with columns of Purbeck marble. Upon these panels the names of the respective prebends to which each stall is attached will be illumined. Above this level the canopies will be executed in clunch, or, if funds permit, in Chellaston alabaster, and it is hoped that a certain amount of enrichment in gold and colour may be ultimately added. Of the general arrangement of the panelling, canopies, &c., the stalls of the cathedral at Albi (in Languedoc) have afforded the model. In the details, the screen of St. Cuthbert and the choir-enclosures of Prior d'Estria, at Canterbury, have been followed. It is intended to commence this great work by the erection of the returned stalls, figured in the view here given, as a memorial to the late Archdeacon Mildmay.

ROYAL ACADEMY TRAVELLING STUDENTSHIP, 1879.

THIS competition differs materially from the others open to the Architectural Students of the Academy in respect of time. The work is required to be executed within the Academy in the month of October. Mr. R. W. Gibson, the author of the successful design of the past year, desires that these conditions may be kept in view in criticising his work. He has attempted to plan a building as much as possible in accordance with modern theories of arrangement. The plan is the outcome of a careful consideration of the first or state-room floor and its requirements. The staircase being placed at the rear of the cortile, and the principal drawing-rooms in the front; two top-lighted galleries, "thoroughfare apartments," of sufficient size to accommodate a large waiting assembly, complete the circuit, independently of the dining-room and ball-room. This floor would be warmed by a hot-air or water system, the open fireplaces being provided, if desirable, as accessories for cheerfulness and comfort. The chapel is at the north-east corner, with the library beneath, and without any apartment over. The one lofty story taking the place of two, would be sufficiently distinctive to mark, externally, the purpose of this portion, without too much disturbing the general balance. The east and west fronts, arising from, and, to some extent, indicating, the plan, are not quite symmetrical or similar. The original intentions and sketches for the elevations included, among other things which, doubtless, would have improved the design, and which had, for want of time, to be abandoned, a less simple method of decorating the piers and arches of the first floor, and a more liberal use of open stonework about the dormers and chimneys to break the sky-line. The inclinations of the site, with rapid falls on each of its sides, have been taken advantage of to some extent, although, from the assumption that such a building must be, in front, at least, symmetrical, recourse has been had to terraces of made ground, in part. The carriage-road is planned to the same slope as the road without. The pavement is arranged in level sections, with steps, for the same reasons that a wall-plinth is so treated. It forms a sort of base or platform to the whole edifice, far more satisfactory than the sloping line would be. The walls would be faced with a hard freestone, jointed undisguisedly and irregularly to suit the best construction. The glass, where not stained, should be plate, the roofs covered with copper in narrow widths. And lastly, the one colour of the walls being considered and harmonised with that of the roof, no other variation of tint should be introduced in any quantity, save what might arise naturally and accidentally.

NEW PREMISES OF THE HOUSEHOLD STORES ASSOCIATION, LIMITED.

THE premises in Albert-square, Manchester, where the business has been hitherto carried on, have been found too contracted and inconvenient for the increasing operations of the association, and about eighteen months ago the directors entrusted to Messrs. Mangnall and Littlewoods, architects, of Manchester, the duty of designing and carrying out suitable erections for the special purposes required upon an eligible plot in what was then called Lower King-street, but is now King-street West. The space of ground covered by the buildings is about 1,300 square yards in all, 300 yards of which, at the end furthest from Deansgate, are devoted to the purposes of a hotel. The style adopted in the entire erection is Italian, and the principal frontage in King-street West is five stories in height, the lower portion being of Yorkshire stone, and the upper story of brickwork intermixed with stone dressings. The main entrance to the household stores, at the angle formed by King-street West and Southgate, is octagonal in plan, with three semicircular-headed doorways of handsome treatment, surmounted by stone cornice and pediment. This octagonal feature of the design is carried upwards to a steep octagonal slated roof and lofty flagstaff. The entrance vestibule is floored with marble concrete, which, with the similar tiles to the floor and marble concrete on the wall of the entrance to the hotel, have been supplied by Messrs. Patteson. The building is well lighted by the numerous large windows, and has, likewise, an extensive central area on each floor, octagonal in form, over which is a roof light, rendering valuable the counters which surround each area opening. The heating apparatus is on the principle of distribution of hot water in small wrought iron pipes, and Mr. Renton Gibb, of Liverpool, has executed this work. The cellars for storage are spacious and convenient, having floors of asphalte. Messrs. Neill and Sons are the general contractors for the buildings, fittings, and fixtures. The cost, including fittings, will be about £25,000.

STEWARD'S RESIDENCE, NALDER HILL.

THIS building was erected a short time ago by the late Sir Richard Sutton, Bart., as a steward's residence upon his estate in Berkshire. The whole of the bricks, tiles, and other brickmakers' goods, were manufactured upon the estate; the oak used for the open-timber work was also grown on this property. The materials are chiefly red bricks up to the first floor, broken up above by oak open-timber work, filled in with stucco, and by the walls and gables being partly hung with tiles. The architect is Mr. G. Atkinson Barnes, of Newbury, Berks.

A STABLE AT EASTBOURNE,

ILLUSTRATED this week, is built with stock bricks, the first floor timber-framed, hung with red tiles, and roof covered with Broseley tiles. The interior walls of stable are faced with pale green glazed bricks, floor paved with Dutch clinkers. The stable fittings, enamelled mangers, ventilating valve windows, &c., were supplied by Messrs. Musgrave and Co. Fresh air is admitted by ventilating windows and fresh-air inlets, all under control, while each stall has an extract flue for vitiated air, and ventilating shaft in centre of ceiling, carried up back of fireplace. The work is being carried out by Mr. James Peerless, builder, Eastbourne, from the designs and under the direction of Mr. Thomas W. Cutler, F.R.I.B.A., 5, Queen-square, W.C.

CHIPS.

At the Suffolk Quarter Sessions last week, Mr. H. M. Eyton, county surveyor, was appointed, at an annual salary of £30, to survey and report on all main roads now disturnpiked. At the same meeting a claim by Mr. Eyton of 4 per cent. commission for supervision on the £1,210 recently expended at Melton asylum was disallowed, the magistrates being of opinion that, as the greater part of the work consisted of repairs to old buildings, the claim could not be sustained.

The salary of the borough surveyor of Liverpool has been raised by the town council from £850 to £1,000 a year.

The Croydon local board are about to erect public baths in the district of Norwood, at an estimated cost of £4,000. The architect is Mr. Lambert, of Norwood.

New Board schools for 150 boys are about to be built at Hollington, Sussex, from the designs of Mr. Sydney Smith, of the firm of Messrs. Smith Brothers, architects to the board.

The Wesleyan chapel at Penarth, near Cardiff, was reopened on Sunday after renovation and ornamentation, the lowering of the pulpit, addition of choir seats, and other improvements, all carried out by Mr. Tape, of Cardiff.

The Salford Town Council on Wednesday week accepted tenders amounting to nearly £10,000 from Messrs. Lewin and Evans for the construction of lines of tramway; they also decided to expend £52,600 on the extension of the gas-works. Mr. N. R. Bradshaw was also appointed surveyor for Pendleton, under the borough engineer, at a salary of £160 per annum.

The Dorset magistrates at the Epiphany Quarter Sessions last week appointed Mr. Walter Fletcher to discharge the duties required by the Highways and Locomotives Act, 1878, and also to continue to act as county surveyor, the salary being raised from £200 to £300 a year in consideration of the performance of the first-mentioned duties. Similar increases of £100 per annum have been made to the salaries of the county surveyors of Hampshire and Wiltshire for the extra work entailed by the Highways and Locomotives Act.

The masters and fellows of Pembroke College, Cambridge, are about to restore their old college buildings facing Trumpington-street and Pembroke-street, and also to build a block of new buildings on the side of the tennis-court.

The salary of the county surveyor of Westmoreland was raised, at last week's Quarter Sessions, by £40 for the present year, and subsequently £30 per annum, in consideration of extra work involved by superintendence of main roads, under the Highways Act of 1878.

HOUSEHOLD STORES ASSOCIATION
MANCHESTER

MANCNALL & LITTLEWOODS
ARCHITECTS.



Photo-Lithographed & Printed by James Akerman, 6 Queen Square, W.C.



Thackeray Turner del.

SAINT ALBAN'S ABBEY
DESIGN FOR RETURN STALLS.

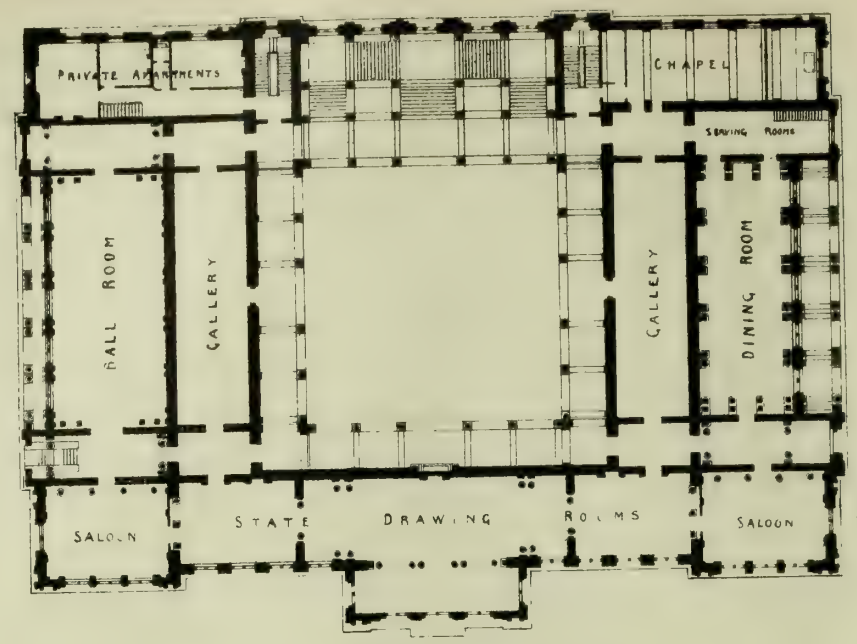
SCALE. 12 9 6 3 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 OF FEET.

G. Gilbert Scott.
31. SPRING GARDENS
LONDON

Photo Lithographed & Printed by James Akerman, 6 Queen Square W C



CAPS FROM LAON CATHEDRAL NAVE



PRINCIPAL FLOOR

ROYAL ACADEMY TRAVELLING STUDENTSHIP 1879

A TOWN RESIDENCE FOR A PRINCE

THE PRIZE DESIGN · ROBERT W. GIBSON

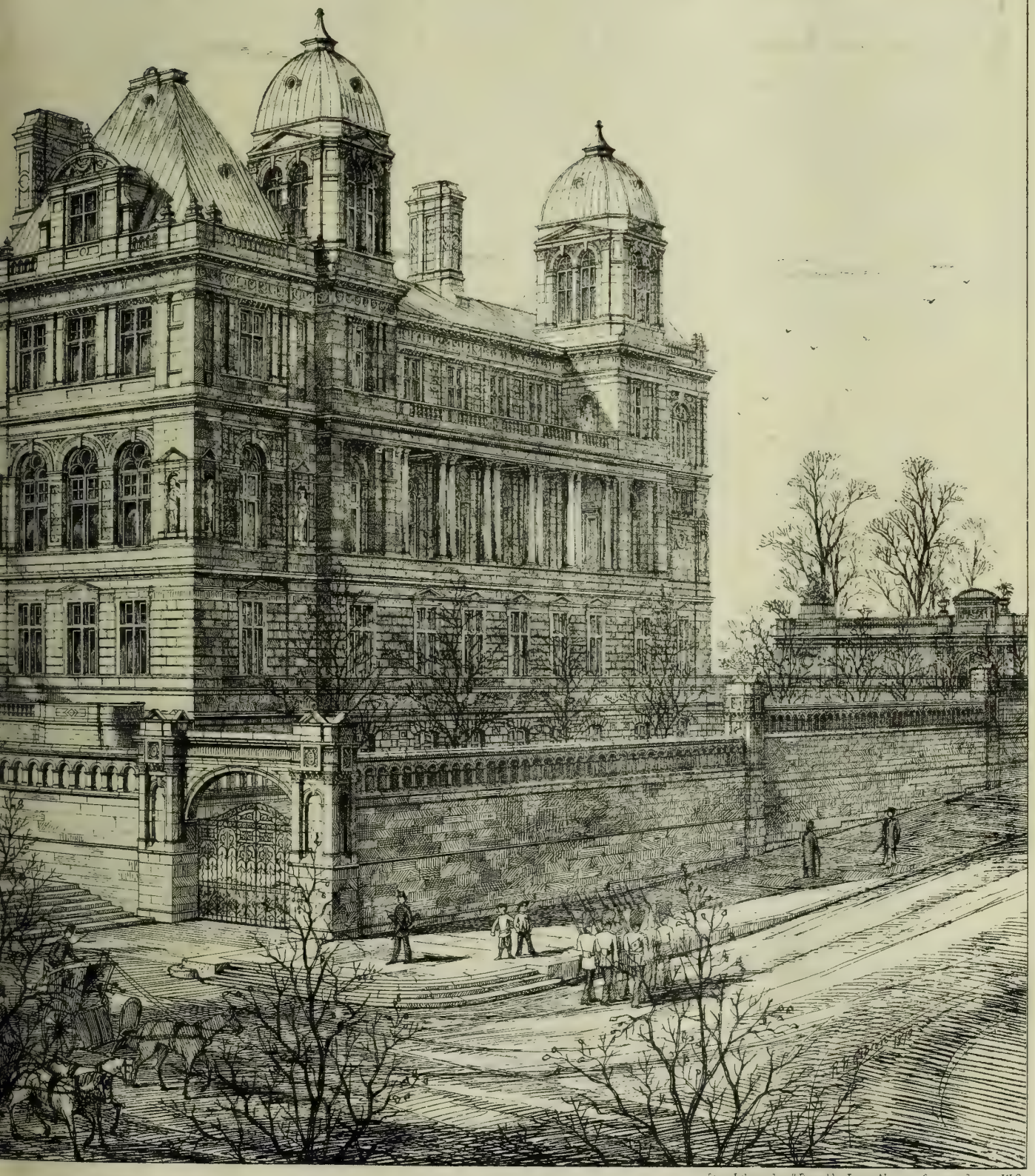
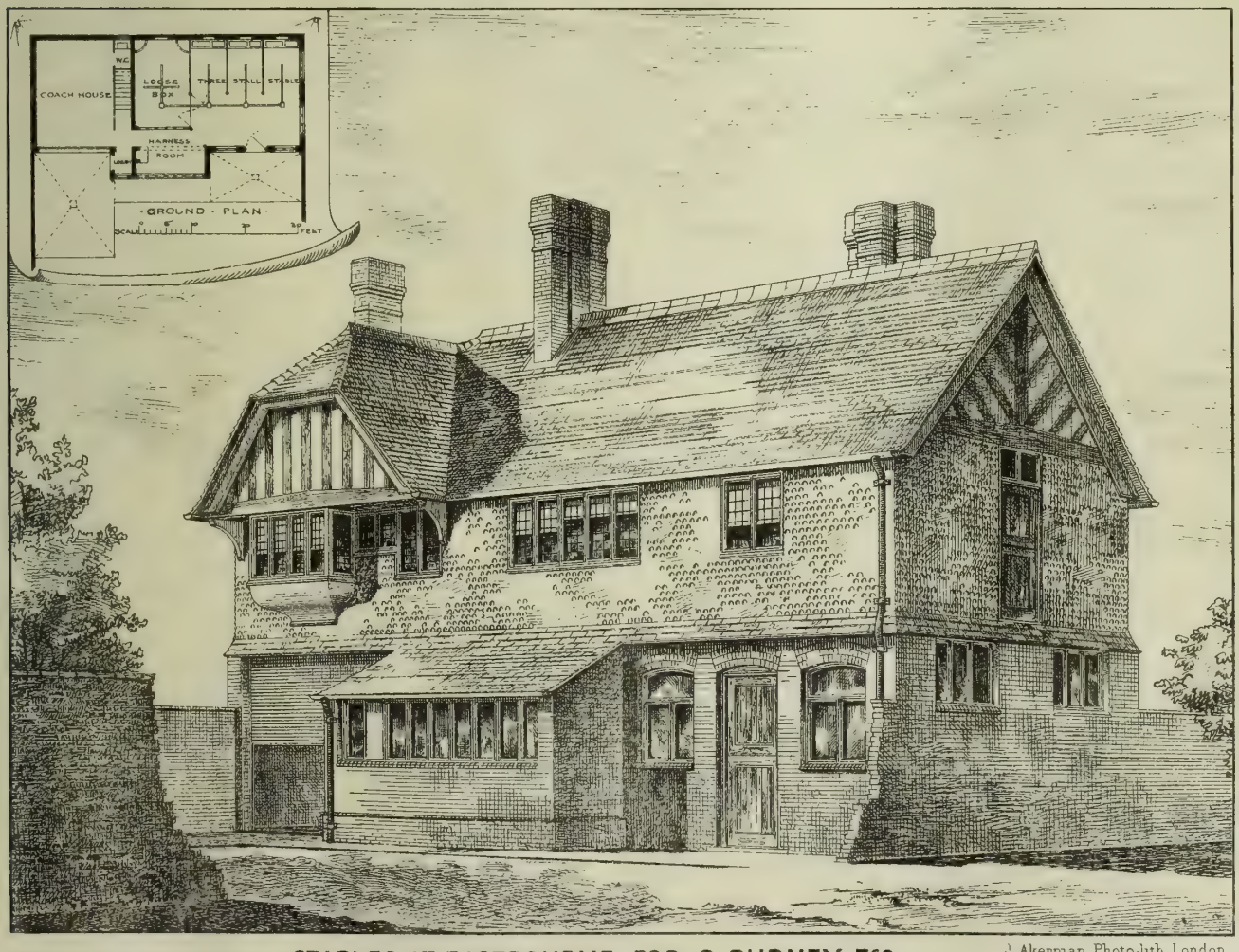


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New Steward's Residence NALDER HILL, for Sir Richard Sutton Bart · G·Atkinson Barnes·Architect·



STABLES AT EASTBOURNE FOR G.GURNEY ESQ
T.W.CUTLER ARCHITECT

J. Akerman Photo-lith London

MODERN ARCHITECTURE SINCE THE RENAISSANCE.

THE first of a course of two lectures upon this subject was delivered yesterday (Thursday) afternoon at the Royal Institution by Mr. H. Heathcote Statham, F.R.I.B.A. By the Renaissance was meant the gradual recognition, about the period of the decline of Gothic architecture, that there had been a great literature in the past of Greece and Rome, and the admiration bestowed on the works of Virgil, Livy, and other Classic writers, led by an association of ideas to the examination of the architecture by which they were surrounded, and so, by a natural sequence, to its revival and re-introduction. Thus buildings were no longer the outcome and expression of the wants of a nation, but were designed entirely in accordance with precedent; architecture was no longer national, but individual, a building being recognised as representing the special taste and genius of an individual artist. Architecture was indeed no longer the unconscious working-out of problems in plan and construction, but the conscious effort to reproduce Classical beauties, or to form old materials into new combinations. Their works had not, therefore, so great an interest to the student as those of mediæval times, but still possessed a value of their own and a distinctive character. He would treat of Renaissance architecture chiefly in connection with some of its chief designers. The author illustrated his subject by elevations and plans hung on screens, by blackboard sketches, and lantern views. The writer most influential in forming the style, although he lived prior to the decline of Classic, was Vitruvius. He is believed to have lived during the reign of Augustus Cæsar. Of his buildings and life no trace remained, and even his book was scarcely ever read at the present day. Yet obscure as his life was and had been, his writings were a powerful influence with the men of the Renaissance; and so, while Marcus Pollio Vitruvius breathed, ate, and drank in the reign of the great Cæsars, his spirit lived in the 15th and 16th centuries of our era. Vitruvius laid down some rigid rules for building in a grand manner, and proposed formal canons for use and proportions of each of what he styled the "five orders." Although there was reason to suspect they were not generally adhered to by his contemporaries, yet his rules had great interest, not alone as expressions of opinion by a Classicist, but as the Bible of the Renaissance architects, and the key to much of their work. Vitruvius had a very high opinion of the dignity of his profession; in one passage he admits that he had done but little, but says he will not canvass like some architects, thinking it in greater propriety to be requested than to request. It was, therefore, probable that with these lofty views of his profession, he lived and died in obscurity and poverity. Passing on to the Italian architects of the Renaissance, the lecturer showed typical examples from façades of Florentine palaces, each of three stories, of three phases of their work. In the first, except that the joints of masonry were accentuated by "rustication," there was little alteration from the previous style, except the more formal fenestration, and the addition of a heavy cornice to the line of the front; in the next, dwarf columns were placed between the lights, and a continuous cornice divided each story from the next, the effect gained by the columns being almost compensated for in the loss of a crowning feature by the multiplying of the cornices. In the last stage two stories were made to appear as one, by the plastering of a huge order upon the building, the third story forming an attic; for this false construction Palladio, one of the most formal followers of Vitruvius, was largely responsible as an originator. Almost all the work of the Renaissance was revival of some forms of the past, with details adapted from the Gothic: almost the only original features were the rustication already alluded to, by which, when not over-done, an appearance of massiveness and solidity was given to basements and angles, and the balluster, an ornament whereby scale was given to the building. The lecturer then described the history of the three domes of the cathedrals of Florence, Rome, and London, comparing and contrasting them with the aid of the lantern. He described the mode in which Brunelleschi won the competition for that of Florence, how ingeniously he managed to rid himself of the embarrassing partner with whom he was yoked—Lorenzo Ghiberti, who, thoroughly successful as a metal-worker, proved incompetent as an architect—and the painstaking way in which he devised every detail of the Duomo, even to the supports for hanging scaffolds to be used in decorations, before commencing work. This thoroughness he carried throughout the work, for he visited the ovens to see that the bricks were of proper material and well baked, and inspected the stones before coming on to the building. The authorities wished the dome to resemble that of the Pantheon, but he adopted an octagonal form, as he showed them that the outline they desired would not appear of sufficient height, nor would it withstand the lateral thrust of a lantern. The result was the elegant Duomo so generally admired. He must pass on to his second dome, that of St. Peter's at Rome; this was a work revised and altered by many architects. The first of these was Bramante, selected on account of his relationship to Pope Julius II., but not an architect worthy of the appointment. His design showed a dull and formal structure based on a Latin cross. At his death in 1514, the work was continued by Peruzzi ,to whom in turn San Gallo succeeeded. He possessed more originality, and made a new design for the cathedral, by which it would have had lofty turrets at each angle of east and west fronts, and a wide central dome and lantern, the whole having somewhat of the multiplicity of parts of a Gothic edifice. Most of San Gallo's time was occupied, however, in putting adequate foundations to Bramante's work, and he never seems to have determined how his own conception of a dome should be supported. At his death Michael Angelo, a man greater as an artist and sculptor than as an architect, took up the work in 1546, and again remodelled the plan and design. So deeply was he impressed with the spirit of Vitruvius, that he decided that the building failed in the smallness of its parts; he accordingly simplified the design, reduced the parts, and finally constructed the enormous dome as we saw it. The very alterations Michael Angelo thought so desirable were the faults of the building; everyone was at first disappointed with St. Peter's, and failed to realise its size. In fact, instead of seeming by its many points of interest a great building, it simply appeared a building of ordinary size magnified. A west front was subsequently added of heavy and poor design, and subsequent alterations had detracted from its appearance. The architect of New St. Paul's was originally noted as a mathematician and astronomer rather than as assistant to Sir John Denham, surveyor of Old St. Paul's. The design as carried out was very different to Wren's original conception, which showed an open area surrounding the dome. The lecturer pointed out the shams that impair the building, including the concealed cone between the two domes which carries the lantern,—and which, however clever as a piece of engineering, is not, he said, true architecture, —and the concealed flying buttresses forming a Gothic skeleton within the Classic nave and aisles. Returning to Italian architects and their works, the last portion of the lecture dealt with Alberti and his Farnese Palace, Sansovino and his library of St. Mark, Fontana and his Rialto and Bridge of Sighs, also at Venice, Vignola, and Scamozzi. In the second lecture, to be given to-day, the Modern Renaissance will be considered.

WINDOWS AND LIGHTING.

IN buildings situated in dark and confined parts of the City, the architect is limited in his choice of expedients for admitting as much light as he can into his rooms. He can make his windows as large as possible, but by doing so he has to encounter an architectural difficulty perhaps; he can splay the jambs of his aperture, but though he may obtain a great deal more light by this means, it rather detracts from the solidity of his reveals. Of course the use of reflectors such as Chapuis's assists him very greatly, and, indeed, were it not for their use, the gas bills in many of the City offices would be proportionately increased. Another very useful means for obtaining additional light was described in an old paper read by Sir D. Brewster in 1866. "On the Lighting of Houses," the gist of which we may give here for the benefit of our readers. We may remind the reader that the dispersion of light is a valuable fact, and that by the aid of certain materials the diffusion of daylight may be rendered of considerable use. Dr. Brewster's suggestion is based upon this principle. He proposed, in short, to substitute for windows set within the face of the brickwork some inches, another placed flush with the wall's outer face, the glass being ground on the outside. The light from the illumined sky and street will be thus diffused throughout the apartment by the dispersion of the rays passing the glass. He goes on to refer to the National Picture Gallery in Edinburgh, where certain small rooms are lighted by apertures which interfere with the symmetry of the façade, and recommends sheets of thick plate-glass roughly ground placed flush with the stonework. This method, he goes on to observe, "will enable architects to light the interior of their buildings by invisible windows, and thus give to the exterior façade the full æsthetical effect of their design." The last remark we quote, not because we approve the idea generally, but as a suggestion to architects under difficult lighting arrangements for smaller and insignificant apartments of a nameless description. Small window openings not uncommonly have to be introduced into a façade, the effect of which is certainly injurious to it.

But to revert to the main idea of diffusing light in dark neighbourhoods, the hint, as far as we are aware, has not been so generally taken advantage of as it deserves. We readily admit that ground-glass windows introduced flush with the outer face of wall could not be adopted in important façades without destroying completely the architectural effect of solidity that is so essential; but nearly the same effect of distributing light may be produced by grinding the surfaces of the plate-glass in windows of ordinary construction, which have not the advantage of a large illumined surface of sky. It is well known that an ordinary blind of white material increases the useful light in a room during a dark day; and a blind of fine white muslin has even a greater effect, as anyone may prove for himself. Another thought suggests itself to us in considering the matter, namely: whether prismatic-shaped glass, such as are now used with such good effect for lighting underground rooms, could not be applied to ordinary vertical windows in the darker lanes of our cities for commercial purposes. If plates of thick glass moulded to the necessary form to divert the rays inwards, were fixed in the upper part of dark window openings outside the ordinary windows, something might be done to relieve the eyes of those who have to work till late hours in offices in which gas has to be burnt during a large part of the working year, while even architectural considerations might be met by the use of a white enamelled glass, or by the introduction of some washable material in lieu of ordinary blinds.

CHIPS.

On Friday evening, the workmen, numbering over 40, engaged in making additions to Friendly House, Tacket-street, Ipswich, sat down to supper in the new carpet-room of the establishment. The health of Mr. Ede, the architect, and of Messrs. Bennett, the contractors, were duly honoured.

New works have just been carried out at Leith, Docks. This work was carried out at a cost to the Dock commissioners of £240,000. The contract was taken by Messrs. Scott and Best, of Leith.

New Central Board Schools at Dudley, which have been erected at a cost of £8,700, and accommodate 800 children in their departments, were opened by the mayor of the borough on Monday.

The office of secretary to the Society of Engineers has again changed hands. Mr. Graham Smith who recently succeeded Mr. Perry F. Nursey in the appointment, has resigned, and Mr. Edgar has been appointed to fill the vacancy. Mr. P. F. Nursey has been unanimously elected by the members to a seat at the council-table.

Extensive improvements at the Cumberland and Westmoreland asylum at Garlands, from plans prepared by, and under the superintendence of, Mr. J. A. Cory, county surveyor for Cumberland, are in progress.

The annual municipal report shows Paris to contain 74,740 buildings, containing 337,587 sets of rooms used for businesses, and 684,952 for habitation. The rental of the former is estimated at 248,000,000f., that of the latter at 32,000,000f. In the 13th and 20th arrondissements nine-tenths of the tenements are below 300f. rental. The population of the city at the end of 1876 was 1,988,806.

The schools erected by the Derby School Board, in Ashbourne-road, were opened on Monday week. The total cost has been £10,238 of which that of site was £2,257 10s. equal to 6s. 9d. per square yard.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AN ordinary general meeting of the Institute was held on Monday evening, Mr. J. Whichcord, F.S.A., in the chair. The secretary (Mr. White) announced the deaths of Mr. Charles Augustus Gould, associate, and of Mr. E. W. Cooke, R.A., hon. associate. To this the President added that Mr. Cooke had not been unmindful of the fact that he had become an honorary member, for he had bequeathed the Institute a very beautiful portfolio, containing reminiscences of his visits to Egypt. In Mr. Gould they had lost a rising member of the profession, and, although by no means a young man, he had only within the last few months joined the Institute. Among a number of donations to the library acknowledged with thanks, special mention was made of the gift by the newly-appointed librarian to the Institute, Mr. Alexander Beazeley, of a fine, well-bound copy of Canina's "Indicazione Topografica di Roma Antica, distributa nelle XIV. regioni," 3rd. Ed., 8vo, Rome, 1841; which, it was stated by the donor, was not previously to be found either on the Institute or the British Museum shelves. The following gentlemen were balloted for and elected:—As Fellows: W. Stephenson Varley, New Market-chambers, Blackburn; F. W. Burwell, Invercargill, New Zealand; W. Lister Newcombe, 2, Higham-place, Newcastle-upon-Tyne; E. Norton Clifton, East India-avenue, Leadenhall-street, E.C.; R. Emeric Tyler, 16, Caroline-street, Bedford-square, W.C. As Associates: F. H. Humphreys, Luton; Elry Emlyn White, 11, Bedford-row, W.C.; G. Canning Richardson, Warwick House, Shepherd's Bush, W.; J. W. Walter, 5, South Molton-street, W.; Edmond Egan, Loughton, Essex; G. Edwards, 68, Brompton-road, S.W.; G. McDonell, Sunnyside, Upton, E.; Wm. Samuel Weatherley, 20, Cockspur-street, Pall Mall, S.W.; W. Jaques, 106, Fenchurch-street, E.C.; Hugh G. McLachlan, 17, Redcliffe-street, South Kensington, S.W.; F. Ebenezer Jones, 20, Cockspur-street, Pall Mall, S.W.; and Oswald Cane Wylson, 10, Florence-street, Islington, N.

THE BUDDHIST ARCHITECTURE OF THE JELLALABAD VALLEY.

Mr. WILLIAM SIMPSON, F.R.G.S., then read a paper on this subject, which will be found in a condensed form on p. 66. It was illustrated by a collection of small plaster figures, taken from one of the topes described, and by numerous photographs and water-colour and pencil sketches. At the close of the lecture

Mr. JAS. FERGUSSON, F.R.S., said in the paper they had just listened to the author had arrayed a vast number of new facts relating to Buddhist architecture in a most interesting manner. Mr. Simpson was indeed the first person who had attempted to describe these topes. Masson had professed to delineate them, but drew so badly that it was impossible to understand his work. Mr. Simpson was not only an artist who could show them the details, but had devoted much thought to their purpose. The chief point in his researches was that he established the Classic character of the decorations—features evidently derived from Greek and Roman sources. While a wooden style of construction extended on either bank of the Indus, this Classic treatment was confined to its western bank. Not a single Corinthian column could be found in India, whereas in Afghanistan all were derived from this source. The problem arose how this Classic work got to Afghanistan. The first suggestion was that it was a reminiscence of the Bactrian Kingdom which Alexander left, about 160 B.C., but there was no coin or capital which might not be at least 100 years after the Christian Era, and how that long gap was to be got over, he (the speaker) would not say. The inference was that during the Byzantine period there was a considerable commerce between the West and the East, of which these architectural details and coins were the only remaining trace. Some of these figures and capitals were so like the Byzantine work that, if placed in the Vatican, they would pass muster as of that period. In the museum at Lahore is a considerable collection of similar remains, and some existed at the India museum recently dispersed.

Col. YULE, C.B., said the resemblance brought out by Mr. Simpson, of this work in the Jellalabad Valley to Byzantine, was striking and entirely new to him, although he had long held the older view, that it was Greek in character, and derived from the Bactrian monarchy. In the whole of that region they found an ancient coinage which proved the extent of such a monarchy. Earliest of all were found gold coins of tolerably pure Greek art, struck in honour of kings who were of Greek origin. Then, as the empire was overrun by barbarians, the coins gradually became less legible, were worse executed, and at length vanished as coins into barbarism. As with numismatic art, so he had considered it was with architecture, which, however, developed into Hindoo forms. He regretted that Mr. Simpson had not brought a map of the district; the Jellalabad valley lay on the banks of the Cabul river, at the point where it passed into the Indus—before England became scientific our frontier line. It was one of the chief seats of the Greek monarchy, but the population remained Indian, and this continued till the eighth or ninth century of the Christian Era. In the sixth or seventh century of the era the Chinese Pilgrim, Fah Hian, mentioned by the author, visited the valley and described the topes. All this civilisation, religion, and art was swept away by the invasions from the south-west of the Afghans, a people without the rudiments of art, and ignorant to this day of decent brickwork and carpentry. The term "Vihara" had been mentioned; it signified a monastery of the Buddhists, and the name survived in the western parts of India, and as far indeed as Bokhara. Yet no Buddhism existed now in continental India, but the Mahommedans worshipped their own saints at the same tombs.

General MACLAGAN asked whether there were vertical shafts in the Jellalabad topes, as in some of those further East, to which Mr. Simpson replied there were not.

The PRESIDENT proposed a vote of thanks to Mr. Simpson for his paper, which was marked by originality as well as being rendered of unusual interest by the late unhappy war in the region described. He should have ventured to regard the details drawn as showing a Roman rather than Byzantine or Greek character, and the semi-Corinthian capitals confirmed the suggestion. The complimentary vote having been passed by acclamation, Mr. Simpson briefly replied, pointing out how much remained to be done by archæologists in Afghanistan to solve the numerous problems as to the origin of its architecture.

ROYAL ACADEMY LECTURES ON ARCHITECTURE.—I.

THE first of the annual course of half a dozen lectures before the Academy students, on Architecture, was delivered by Professor E. M. Barry, R.A., on Thursday evening. Having considered the English Renaissance in 1878 and the Italian Renaissance last year, Mr. Barry, in this series of addresses, takes up the study of architecture in the abstract, the announced subject of the first lecture being "Architecture in Theory, a Matter of Public Interest." As an art having an important social mission, and being even an element of national greatness, he desired to interest all students of the Academy, whether painters or sculptors, in architecture, for without intelligent co-operation between those who practised the sister arts the production of a perfect work could not be realised. The earliest and most necessary of the arts, architecture, had grandeur, proportion, and associations as handmaidens at her call. While the painter and sculptor looked abroad and saw the masterpieces in which successive generations had delighted, they would not be slow to allow the full claims of architecture as a fine art; and when tempted to think their architect friends too mechanical, because bent on drawing not only with a free hand but also with rule and compass, they would admit that the spirit of an artist might exist, even among straight lines and geometrical forms. While it might be assumed that architecture could not be a matter of indifference to any follower of art, the same held good with regard to any cultivated society of civilised men. Nor could her claims be placed alone on this narrow ground; surrounding the cultured minority was a vast constituency, a nation of hewers of wood and drawers of water. To them was denied in great measure the enjoyment of pictures and statuary, but a noble building was a possession in their midst in which all had their share. The historical associations with which architecture was technically associated formed another and a great claim on behalf of the study of the art—one which only those living in a modern country, such as the United States, could fully appreciate. This art brought home to them the value of antiquity, recognised its value as a factor in education, and offered a standing protest against the hurry and high-pressure of modernism. To the evidences of an ungrudging labour of love in design and execution, as well as to their historical associations, ancient architectural remains owed much of their value, and for this reason, apart from their often great beauty, the world regarded them as heirlooms, to be cherished and treated tenderly in their reparations. Having referred to the Academicians' protest against the alterations at St. Mark's, Venice, to the recent destruction of Temple Bar, which he for one regretted, although not worthy to be classed in artistic value with St. Mark's; and in condemnatory terms to the restorations by our military engineers to the Taj and Dewan-i-am at Agra; he pleaded for "intelligent Conservatism," in the interest not only of art, but of historical associations. Turning from this to consider the successive tendencies of the world as exemplified in its buildings, Mr. Barry said that succeeding to the Age of Feudalism and to the reaction from that, the Renaissance, the present time might be called the Mechanical Age. As a result of this development, the engineering and utilitarian element in our public works had assumed an exaggerated importance and the question had arisen whether the quality of usefulness were not inconsistent with beauty in architecture. The practical application of science had advanced by bounds so rapidly that architects were not forward to satisfy, and engineers came to the front, girdled the earth with iron, improved communications by sea and land, and found success in subduing the elements of nature and applying them to the service of man. But the claims of art had not thereby been set aside; the inner aspirations of man remained, and would remain, unalterable, and these would never be satisfied with mere mechanical triumphs. In many of our English buildings there were proofs of constructional skill showing that our own architects had been both artists and constructors. Surely in these later days, architects would not allow their art to separate itself from the life of their day, until it became a luxury rather than a need. Society, while it would never give up the use of the enlarged powers which science had taught it to exercise, had, nevertheless, need of art, and so, amidst all the pressure of a so-called utilitarian age, architecture was still a teacher, and alone among the Fine Arts could bring her chastening influence to bear directly on the great works of the age. But to return to the claims of architecture on public consideration. They often heard of the difficulties of art in presence of the spread of machinery, and the consequent increase of mechanical execution of things made formerly by hand. While it was true that improved taste had been shown of late years in many manufactures—as in plastic and textile fabrics, in wall-papers, and in pottery—it must be admitted that the mechanical perfection of modern manufactures had a tendency to sink art in a dead uniformity of machine-like production. While in towns builders had afflicted them with mean designs, all alike and carried out by hundreds, the great public buildings of a country could never be constructed as if cast in a mould. Moreover, if the design of the architect must have an individual character, the same might be said of the handiwork employed for its realisation. Machinery, as applied to architecture, could never supersede the necessity of reliance on the intelligence of the workman. It might be rightly used for diminution of distressing toil, such as carrying heavy materials to a great height; but what machinery could supply the place of the skilled mason or carver, say in setting out the stones of a groined roof, or decorating its bosses? The charm of workmanship, which had been lost in so much else, still belonged to architecture. Over and above the beauty of the design, there was scope for the individuality of the workman, shown by those accidental irregularities which distinguished all hand-made work from mechanical reproduction. No true friend of English working men would delude them with the idea that their handiwork, however, would ever equal, in artistic value,

that of preceding ages, unless each man did his best, and unless the great trade societies adopted as a maxim to rule their daily work, "Whatsoever thy hand findeth to do, do it with thy might." If artisans did not always add to their confessed mechanical pre-eminence, those gifts classed under the general head of taste, in the same degree as some of their foreign competitors, they must not hastily assume national inferiority, but might profitably inquire as to the steps taken by Government and those who have influence and power to recognise art, to develop taste, and to reward its possessors. Why were our national buildings left bare and undecorated with pictorial art? Why, for example, should our Houses of Parliament display empty panels intended for historical pictures, but now covered only by the paperhanger, while empty pedestals abounded for which no statues were forthcoming? The erection of this building was hailed by all lovers of art as a great opportunity. Good intentions were announced, great designs invited and encouraged, and while the late Prince Consort was alive, progress was made under his fostering care, seconded by the action of a former President of the Royal Academy. Now all seemed to be forgotten. No Royal Commission exerted itself in the direction of art. If, however, artistic progress were really a matter of public interest, might we not hope some day to witness a renewal of intention and activity, some angel's stir in the dull pool of apathy? Artistic schemes for the public advantage, supported by the highest authorities would surely not be allowed to remain indefinitely in abeyance, and perhaps, he suggested, a day might come when others—possibly within the circle of the same Royal House—would take up the congenial task, which only dropped from the hands of Death. Was it not time that artists should declare that they represented no unimportant part of a healthy national life? Would it not be well for our public men to cease to regard art as an extravagance to be repressed, lest it should give rise to calls on the public purse, which is readily filled at will whenever their policy requires it, but is always empty when Art prefers her claims? It would be hopeless to expect at present to have a Ministry of Fine Arts, but the Minister responsible for public artistic matters might at least be a member of the Cabinet, with some power of initiative and independence of action. Our great national edifices, under such a system, might assume a new aspect, and no longer proclaim, by their barrenness of artistic completeness, that they were the work of those who began to build but were not able to finish. In conclusion, the lecturer said he had endeavoured to show that architecture had claims on the attention of civilised society, not only as the gratification of a sense, still less as a mere æsthetic plaything, but as a serious object of enlightened national policy. In asserting this position, she urged not her individual rights alone, for in painting and sculpture she recognised her truest allies, and with them she desired to advance. Architecture need not despair. Born of the necessities of man, appealing at one time to his highest artistic instincts, at another to the requirements of utility, and through all possessing historical and archæological interest, denied, to a great extent to the sister arts, architecture could never die. It was to be hoped that, in the future, she would show herself, as in the past, a worthy leader in the great cause of progress; and would thus maintain and justify the position claimed for her of being, in no ordinary sense of the words,—a matter of public interest.

ARCHITECTURAL ILLUSTRATIONS AND THEIR CLASSIFICATION.*

(*Concluded from p. 54.*)

OUR profession is much behindhand, however, in the work of indexing. The Institute has no index of its transactions; we do not even publish ours; and none of the journals have any means of disclosing what articles or facts of value they contain. Other students have classified our books for us, but I do not believe that it is generally known amongst us where their lists are to be obtained. Yet the number of writers on architecture and building is only about 380—a small total compared with the 1,300 on fine arts, the 5,000 on poetry, or the 12,829 on divinity; and the trouble, therefore, of reducing their works to the classified order of a subject index would not be so very alarming. But this is a work that would have to be considered apart from the index to the journals.

Now, as to the practical part of the subject. How is an index to be made that will tell one at a glance what has already been published, and where it may be found? We require a work of easy reference, compiled on a simple system, and without the introduction of any signs, abbreviations, or intricate plan of arrangement that must be known familiarly before the work can be used at all, the objects in view being, as Mr. Cutter, the librarian of the Boston Athenæum says, threefold.

First.—To enable a person to find a book or print of which (*a*) the author, (*b*) the title, or (*c*) the subject are known. Second.—To show what there is published (*d*) by a given author (*e*) on a given subject, or (*f*) in a given style or kind of literature. Third.—To assist the choice of a book or print.

This could be accomplished by the systematic noting by readers of all remarkable essays or illustrations, with a view to their ultimate arrangement and classification. But to do this properly great care and attention would have to be exercised by the readers, or ridiculous errors, like those referred to, might be the result. If well done, however, such an index, like that to Thomas Carlyle's "Essays," would be both interesting and useful to read by itself, particularly as a refresher after having once read the book, though perhaps the style might be in a manner like what the Frenchman found Dr. Johnson's "Dictionary," which he heard was a standard English work. He read it conscientiously through from beginning to end, and said at the conclusion that it was no doubt a charming English book, and full of information, but that it seemed to him somewhat disconnected.

I venture to propose a plan by which the greater part of the work of indexing by subjects, authors, places, or any other way, matter relating to our profession, could be got through in a comparatively short time.

A committee should be appointed to arrange and supervise. They should nominate readers of known ability, discretion, and care, each of whom should become responsible for a complete index of some one volume. In reading, the indexer should note down the contents on sheets of wide paper divided into eight columns. The first for the subject: Whether an illustration of a building, an essay, or a report. The second for the name: Either of the building or of the essay or report. The third for the place: In which the building is situated, or to which the essay or report refers. The fourth for the town. The fifth for the country: If necessary. The sixth for the description: As in the case of an illustration,—plan, detail, or perspective view; or in the case of a paper,—an indication of its nature. The seventh for the name of the author or designer. The eighth for the reference. It might be necessary to have either more, or to alter what are here given, but that is a matter of detail for after consideration.

The sheet when filled would look like this, which I take from one of the professional journals:—

A line would be kept for every entry, and a cutting line ruled between each, and by filling up this form you would have enough information in one line to indicate what it is all about, which would save waste of time and trouble in turning up such a one as I did the other day when looking for the name of a great English painter. Under the letter G in the index of one of our best-known journals I found Gainsborough, the very thing I wanted; but imagine my disgust when I found it was only a couple of lines to this effect:—"Gainsborough: It is proposed to commence the paving and drainage of this town next spring." These eight columns might be multiplied or diminished at discretion. By one of the numerous copying processes now so easy to manipulate, and so cheap to obtain, eight copies could readily be made of each sheet as soon as it was full. These being sent to the committee, would be cut into strips along the cutting line, and would furnish materials for as many indexes as may be desired—that is, of places, subjects, authors, journals, or anything else—by the simple act of arranging the requisite columns in alphabetical order; or the duplicate slips could be exchanged with other committees for copies of the work that they had done. The strips, being arranged alphabetically, would be fixed to sheets of paper, and either printed from or kept in MS. and bound. Volumes of reference that are likely to be of general use, say one of authors' names and one of subjects, might be printed every five years or so; while the MS. catalogue, to which yearly additions could be made, in the same way as at the British Museum, might be kept at some central library, where anyone could refer to it, so that there should be no period of pause between the appearance of the volumes of the index, whereby students lose reference to the more recent, and consequently the most valuable information. I should be inclined to apply this system to the subject matter of books, as well as to journals and illustrations, so as to make the index really a complete undertaking.

It certainly will be a troublesome question hereafter what is to be done when these volumes of reference shall in turn increase to their fifties and hundreds. Each one being a complete alphabet in itself, will make in process of time fifty or a hundred letters to search through in looking for any one subject. It would be better, therefore, to try to arrange the sequence of the letters in printing, so that the books could be taken to pieces from time to time and rebound in volumes, according to letter, or even to subject, as the case may require. Such a plan would be materially aided by printing the indexes on one side of the paper only. Desirable though a plan of this description might be if carried out in its entirety, it would be Utopian to expect to see it done, at least for many years yet. In the mean time, however, a great deal might be done by publishers and authors if they would first be careful to make their indexes more accurate and rather more descriptive than they do at present; and next, if they would in all cases, whether of periodicals or of books, issue two copies, one to be incorporated with the volume as heretofore, and the other loose and printed on one side of the paper only, so as to enable librarians and those desiring it to cut them out and paste them into large blank index books.

Subject.	Name.	Place.	County.	Description.	Author.	Reference.
Dwelling-house	—	Grove Park, Lee.	Kent	Perspective and plans	Newton, E.	BUILDING NEWS, v. 30, 797.
Shops, Warehouses, and Offices	—	Aldersgate-street, London	Middlesex	Perspective	Vickery, G.	BUILDING NEWS, v. 30, 798.
Warehouses & shops	—	—	—	See shops	—	—
Offices and shops ...	—	—	—	See shops	—	—
Dwellings in flats ...	Lambeth Dwellings	Lambeth-road	Surrey	Perspective and plan	Hoole, E.	BUILDING NEWS, v. 30, 799.
Monastic precincts...	Benedictine	Gloucester	Gloucestershire	Plan (sketch) of cathedral	Walcott, M. E. C.	BUILDING NEWS, v. 30, 800.
Monastic precincts...	Cistercian	Beaulieu	Hampshire	Plan (sketch) of Abbey	Walcott, M. E. C.	BUILDING NEWS, v. 30, 800.
Monastic precincts..	Benedictine	Winchester	Hampshire	Plan (sketch) of cathedral	Walcott, M. E. C.	BUILDING NEWS, v. 30, 800.
Monastic precincts...	Cistercian	Netley.	Hampshire	Plan (sketch) of abbey	Walcott, M. E. C.	BUILDING NEWS, v. 30, 800.
Dwelling-house	Plaw Hatch	Bishops Stortford	Hertfordshire	Perspective and plans	Foggerty, J.	BUILDING NEWS, v. 30, 801.

* A paper read by R. L. Cox before the members of the Architectural Association, on January 2nd. (See p. 39.)

It is a great assistance, in referring to periodicals, to keep all the indexes together instead of binding them up with the volumes—a reason for publishers to issue two copies of the ordinary index, so that each volume may not be made incomplete by such omission.* In keeping periodical illustrations, I have found it very useful to arrange them by themselves, apart from their respective journals, in three or four great classes, such as ecclesiastic, civil, domestic, and scholastic, each being sub-divided into as many classes as possible. Thus the civil will have town halls in one portfolio, museums in another, libraries in a third, and so on; the drawings in each being again divided by paper covers into minuter details, so that you get all the plans together, all the elevations together, all perspective views together, or all drawings in sets together. Every portfolio and every wrapper is of course labelled outside, and a perfect plan would be no doubt to have pasted in the cover of the portfolio the contents cut from such an index as I have described. The trouble of looking for a drawing is here limited to that of turning over one subdivision of a portfolio: whereas, if they were bound up with the volumes, as no doubt they should be, you might take a week to find what you want. A general index, such as the one I have been urging, would admit of each volume being made perfect, while it would show at a glance where anything was to be found.

It might here be asked, Is all this trouble worth taking with what is only meant to be ephemeral literature? Shall we keep and quote as authorities hereafter articles and reviews that are only intended to fill up so many columns of a paper for the purpose of enabling professional gentlemen to whittle a stick, as Elizabeth Barrett Browning terms the desultory reading of the present day, in a professional manner. With regard to the illustrations in the journals, I say emphatically, Yes. In them the history of our art is more clearly written than it can be by any volume of descriptive letterpress, and to them I believe it owes its present advancement as much as to any other cause. They are the means of enabling one man to know and study the works of his fellows, and thereby to improve and correct the errors of his own.

With regard to the letterpress I would still say the same. If there were a more general appreciation of the fact that what appears in the journals will be kept, and must be referred to as the true records of the time, journalists would become more careful of their words and more accurate in their statements and reviews; and the here-to-day-and-gone-to-morrow air of much that appears would be replaced by one more suited to the historical character that such things really possess, and indexing, by giving a separate and independent existence to all the numerous articles and tracts that at present are sunk in the mass of the journals, will in a great measure aid in accomplishing this work.

In concluding, I must apologise if this paper has proved too long or wearisome. It is my fault, and not that of my subject. I have omitted many points that I could have wished to refer to, but I hope you will take advantage of the discussion to bring them forward. I feel that I have done scant justice to the subject, but I have striven to open the question here, and if I have succeeded in arousing your interest in it, I shall rest satisfied that I have not spent my labour in vain.

LIGHTNING CONDUCTORS AND THE PROTECTION OF ST. PAUL'S CATHEDRAL.

WE lately had occasion to review a book on the subject of "Lightning Conductors," in which the author, Mr. R. Anderson, has brought into convenient compass the existing theories and systems. We there referred more particularly to the system adopted at the Hotel de Ville, Brussels, one of the best-protected buildings in the world, to which Professor Melsen's method of numerous small rods with points and good earth connections, is applied. There can be little doubt but that a perfect metallic connection in which all the metal in the building is brought into relation with the rods and earth is the secret of protection from electrical discharge; but, like every other application of physical science, the art of protecting buildings by conductors has been one of slow growth, the best improvements having been the result of experience and disaster. For instance, the old plan of terminating the rods with balls quickly fell into disuse from experience, and the point termination took its place. So with the old iron rod conductors: when they were used it was soon found that the rods rusted at the socket connections, and the lightning was conducted into the building from finding no continuous conveyance to the earth. The experiments of Sir W. Harris, Faraday, Touldas, Du Monsel, and other electricians, and the conclusions that have been drawn from the actual injury caused to edifices by imperfect modes of protection, have taught some practical lessons to the electricians in charge of buildings.

We allude to the subject again to draw attention to the success which has attended the application of conductors to St. Paul's Cathedral, a work undertaken in 1872-3 by Mr. John Faulkener, of Manchester. Though there have been many severe thunderstorms since that time, we understand that the structure has never been injured by lightning, and that the recent examination and test of the conductors made by Mr. Faulkner in October last year proved satisfactorily the perfect working-order of the system, and the protection of the Metropolitan Cathedral from lightning. It may not be out of place to briefly recall the time, not many years since, when St. Paul's Cathedral was practically without efficient protection from the shafts of electrical agency, and this, notwithstanding the numerous masses of insulated metal on its summit and roofs. It is true that a Committee of the Royal Society, about 120 years ago, undertook the erection of a set of iron rods or conductors, which to a large extent protected the building; but it was found that oxidation had dangerously impaired their efficiency. The stanchions at their connections were found quite rusty, and in many cases, we are informed, where the stanchions had been left by the old Committee connected to the iron hoods of the rain-pipes, stone hoods have been substituted, leaving the electric current to pierce some 6 or 9in. of dry granite. In 1872 this state of things continued, and St. Paul's was pronounced to be a model till the report of Mr. John Faulkner, Associate of the Society of Telegraph Engineers, opened the eyes of the Dean and Chapter. Thereupon Mr. Faulkner was appointed to prepare a plan for an efficient system of conductors, which plan has been carried out with the results we have already stated. Mr. Faulkner's plan consists of bringing into metallic connection every portion of the building that has metal, and in connecting these with the moist earth. To describe this in his own words, "In the metallic connection, with cross, and ball, and scrolls, are eight copper conductors, each being a half-inch strand of copper-wires. The octagonal strand has been adopted as giving most metal in the least space. These eight conductors pass to the metal railing of the golden gallery, with which they are in metallic connection. Thence they are carried down to the dome, to the metallic surface, of which they are again connected at several portions of their length. Then down the rain-falls over the leaden roofs of the aisles, in the angles formed by the aisles themselves, again down the rain-falls to the sewers. Further, the choir and nave roofs are connected together by a saddle, or conductor stretching over them both, and joined to the conductors, proceeding from the summit of the west towers." To show with what care was expended over the work, the lead sheets of the roofs were tested one by one, the worse insulated sheets being connected by copper bands to the better conducting surfaces. It will be observed, therefore, that the dome, ball and cross, nave and aisle roofs, and the two western towers, are so connected that they form one immense metallic conductor. The conductor, or strands, are led into the sewers, to afford a moist earth connection, the strands being riveted to copper plates, which are pegged into the earth. The advantage of frequent inspection and testing the conductors must not be disregarded. The method of testing adopted by Mr. Faulkner is simple, and by its means every square yard of the roofing has been tested to insure perfect earth-connection.

Even now there are misconceptions as to the requirements of buildings, as to the shape and size of the conductors, the mode of attaching the rods, the proper kind of insulator, the sort of connection with earth, and the proper number of conductors necessary for the protection of certain buildings. Bearing upon the last point, it may be as well to remind the reader that Arago observed that the zone protected by a conductor may be limited by a circle whose radius is equal to twice the clear height of the point above its last bearing. In 1878, the Institute of British Architects, the Meteorological and one or two other societies, appointed delegates to consider the subject of protection of buildings, &c., from damage by electricity, for the purpose of preparing a code of rules, and we have no doubt, from the details of buildings injured by lightning and various other data that they are collecting, a few plain and practical rules for the guidance of both the architect and electrician will shortly be established. The position and proper connection of metal guttering and other metallic surfaces, the effects of large masses of metal in the building, such as stoves, the influence of chimneys, &c., are important points that demand settlement, and it would be as well to know the least number of conductors a building of considerable area, and with several lofty summits or towers, ought to have to protect it from the stroke of an electric discharge.

SCHOOLS OF ART.

CARDIFF.—The annual distribution of prizes to the students in the Science and Art Schools was made, on Wednesday week, by the Dean of Llandaff. The annual report stated that, whereas when the classes were established in Cardiff only two students were entered for drawing, and, with that small number, now there was a large school, with better results throughout this year than last. In freehand drawing, thirteen certificates and two prizes were gained; in model drawing, five certificates and two prizes; in geometry, four certificates and two prizes. A third-grade prize had been awarded at the National competition for modelling from the antique, and another for modelling from design. The Science School's reports were equally satisfactory. Dr. Vaughan delivered an address on art, in which he remarked that some of the very best work of the world was done by people who would never win a prize, if they lived to the age of Methuselah.

OLDHAM.—The prizes gained by the students at the Oldham School of Science and Art were distributed on Monday evening. The report stated that during the summer there was a slight decrease in the number of students, which caused the year's total to be rather below that of 1878. The number of successes, 422 in 1879, was greater than ever before, and the increase in the advanced stages showed the steadily improving character of the work accomplished. An improvement had taken place in the number of students supplied by the cotton trade, although, taking into account the firms in the town and district, about 238, 64 students were felt to be a low average. The aggregate amount of the prizes, exhibitions, and scholarships obtained in 1879 was £1,228, against £740 in 1878.

STOURBRIDGE.—The annual distribution of prizes to the students took place in the Stourbridge School of Art, on Thursday evening. Mr. J. H. Chamberlain, of Birmingham, presided. Referring to an expression in the report as to the value of art in relation to manufactures, Mr. Chamberlain said he wanted art for art's sake, and because it would give them new possibilities and powers. Manufacturers were wise, and did not give their money to these schools, because they did not believe in the results promised them. And he advised committees not to prophesy if they could not ensure their prophecies coming true. They ought not to expect definite and good designs from students, for they might be trying to do something that it was the will of the gods they should not do. There were certain things all art schools could promise, because they were what they could do. Not forgetting the possibilities, they should remember the certainties, and devote their attention to accomplishing these. They had a little school, but out of small schools, really and truly, the best results ought to come. There was a greater possibility on the part of a master to

* A reason for the intending indexmaker to buy an extra copy of the number of the journal in which the index appears. We hardly see why publishers should be expected to supply two indexes—unless, of course, they charged for them, and this, we are sure, the majority of readers would object to.—ED. B. N.

nurse what he saw of individual talent in a small school, than in one where it was overlaid by hundreds of competitors. The thing they could do was to teach people how to draw. Five or six hundred years ago it was thought wonderful if a man could write. It was thought that a man who could read and write should have his benefit of clergy, and be licensed to do certain things that he could not do if he was not a scholar. They thought it wonderful in these modern days if a man could not read and write. Yet, even amongst students, there were a good many who thought it a fine thing to draw, and that they could draw and Mr. Smith could not, or that they could draw and Miss Robinson could not. Now, if they could write they could draw ; if they could not write they could not draw. Drawing was the art of seeing something accurately, or more or less accurately, and then being able to take their fingers—holding a pencil in them—where they wanted their fingers to go. There was plenty of splendid drawing which was not art. Mechanical drawing might be beautifully accurate, but it was not art. He never had a violent affection for the drawing of the steam-engine, but it was useful, and anatomical drawings were all nasty, but they were useful. There were other works they did not like, though they knew they were cleverly drawn. The first duty of a master, especially in elementary work in all schools, was to teach his pupils to see, to perceive. Most of them did not see a third of what there was to see around them, and they went through the world staring at things without seeing them. Each of them could see what the attention of the brain was directed to, but if they did not understand they did not see anything at all. If they drew in an unthinking manner, they could not possibly see the things they were supposed to be looking at. This was the reason so much of the work in their art schools was dead. There was so much unlovely drawing, because it was not sympathetic drawing. If they loved art they would care for Nature, and they would discover what provision Nature had made for them, even in every ditch which grew wild flowers. There were as many ferns a hundred years ago as there were now, but people did not see them. When he went out he tried to think, What is there here I have not seen before? and he advised them to act in this spirit.

CHIPS.

Extensive drainage-works are in simultaneous progress in two districts on the Duke of Leinster's estates in County Kildare, in order to provide employment through the present distress. One of these is a canal three miles long, and firmly embanked, which has been cut near Athy, and supplied with inlets from the bog. A bridge carries the main road over the cut. The work here is under the direction of Mr. Rutherford, C.E., and about 250 men are employed, at wages ranging from 9s. to 18s. per week. The second undertaking is near Castle Dermott, but there only 80 men are employed, the monthly expenditure being from £700 to £800.

A new Liberal club is about to be built at Hightown, near Manchester, at an estimated cost of £3,500. Mr. J. T. Gunson, of Manchester, is the architect.

At the last monthly meeting of the Frome local board Mr. Tomlinson, the engineer of the waterworks, reported that, by deepening the well to the extent of 4ft., the supply of water had been increased from 300 to 568 gallons per minute, or over 80 gallons per day for the estimated town population of 10,000 persons. The surveyor to the board was appointed manager of the waterworks, which will be in operation by the 1st proximo.

The Brighton Town Council considered at their last meeting a report from the sanitary committee and the borough surveyor with reference to the proposed adoption of the Artisans' Dwellings Act, 1875, with reference to "unhealthy areas," consisting of courts and alleys near Cumberland-place and Leicester-street. Seven alternative schemes were suggested by the surveyor for the rearrangement of the sites, and plan B, the most thorough and expensive scheme, was adopted by the council. By this 1,854 members of the working classes will be displaced and provided for, at an estimated cost, including new roads and sewers, of £120,762, of which it is hoped that £59,630 will be recouped by the sale of land, leaving a net cost of £70,132; a sum equal to a 1d. rate if the money be borrowed for 50 years, or one of 1½d. if borrowed for 30 years.

Building Intelligence.

BEDFORD.—The chancel of St. Paul's Church, Bedford, has been nearly rebuilt, and the work is now complete. It has been carried out from the designs of Mr. G. Gilbert Scott, F.S.A., architect, of London ; and under the immediate personal superintendence of Mr. John Day, of Bedford, the diocesan surveyor. The style of the work is Perpendicular. The old roof of the chancel has been raised, and a new clerestory built beneath ; there are new arcades, new north aisle, choir, vestry, and organ-chamber, and a piquant turret has been erected at the N.E. corner of the transpt and choir-vestry. The new east window is a large and fine one of six lights. The chancel roof has had all the varnish, &c., removed from its timber ; and the old oak now stands out in all its original beauty. The doors are of oak, moulded on the face with vertical and horizontal boarding. The parapets of the chancel and aisle are particularly effective. Clipsham stone is used for all weatherings, sills, columns, springers, and battlements, whilst the window-jambs and tracery are of Ancaster. The roofs are, in accordance with the style, of low pitch, and covered with lead. The stone carving is by Mr. Harry Hems, of Exeter. The cost of the works just completed is about £3,000. They have been carried out by Mr. Albert Kimberley, of Banbury. The tower, which is a central one, was newly built, and the old spire refixed over it, in 1868. For that work Mr. R. Palgrave, of Westminster, was the architect.

BLACKHEATH.—The new High School for Girls, in the Wemyss-road, Blackheath, was opened on Wednesday week by the Princess Louise. The chief feature of the building is a central hall, measuring 62ft. by 32ft. 9in., around which are grouped 8 class-rooms on the same level, lighted from the left side and connected with the hall. These class-rooms each measure 21ft. by 20ft. The two at the end are arranged so as to be capable of being thrown into one and then together into the hall. The hall is entirely lighted from the roof, the south side being screened from the sun by other buildings. In the basement are lavatory, with tip-up basins, stove for drying garments, and seats available for girls changing goloshes, and separated by partitions from the corridor, kitchen, pantry, and servants' offices. The principal floor of the main structure is occupied by a wide central entrance connected with the hall by a loggia of 5 arches and a grand staircase entirely of terra-cotta. At the opposite end of the hall is a cast of the Venus of Milo at the Louvre, presented by the architect. The rest of the building is occupied by the head teacher's and assistant-mistress's rooms, music and drawing rooms, two class-rooms, and, on the second story, caretaker's and servants' rooms. The playground covers over half an acre of ground, and will be laid out on the north side with garden terraces. Every class-room is fitted with Tobin's ventilating pipes, and each lavatory, sink, and rain-water pipe discharges into the outer air over an open grating and trap. The w.c.'s within the building are sought to be protected from pressure of sewer gas by the soil-pipe being carried its full diameter straight upwards through the roof. The external architecture shows a building of stock bricks with red edges and a carved stone portal. The building is ostensibly for 300 girls, but will be available for a larger number. Mr. E. R. Robson, F.S.A., was the architect ; Messrs. Wall Brothers were the contractors, and the stone carving was executed by Mr. McCulloch. The total cost of erection has been £5,300.

BRISTOL.—The new Institute for Sailors which has been erected in Bristol was opened last week. On the ground-floor is a concert-hall about 60ft. in length, at the end being a platform. On the second floor is a church. The edifice is in the Venetian style, will accommodate about 300 worshippers. The designs for the premises were furnished by Messrs. Voisey and Wills, architects, of Bristol, and the builder is Mr. G. Gay, of Cotham. The cost was £4,500.

DERBY.—New premises have just been opened in Irongate, by Messrs. Crompton and Evans's Union Banking Company. The street frontage is divided into three stories, of which the ground floor is faced with stone, and is massively treated; the first floor is of red brick, while above is panelled work and carvings. Approached by a corridor from the centre of the building is the banking-room, measuring 70ft. by 45ft., from which the manager's consulting-room is reached. Lavatories and retiring-rooms are provided at the rear, and from the entrance corridor rooms open off for the secretary, directors, and county treasurers. The floor in front of the banking-room consists of marble laid in mosaic. The manager's residence is over the bank, and is approached by a side entrance and stone staircase. The strong-room is in the basement, and is served by a hydraulic lift. The whole of the work has been carried out by the Messrs. Walker and Slater, of Old Uttoxeter-road, Derby, from the plans and under the superintendence of Mr. J. A. Chatwin, of Birmingham. Messrs. Stacy, Davis, and Co. supplied the iron palisiding, Mr. Jerram, of Derby, the heating apparatus, and Messrs. Chubb and Son, of London, provided the strong-room doors and grates.

HANWELL, W.—The new church, dedicated to St. Mark, was consecrated on New Year's Eve. The church was commenced early in the past year, the first contract comprising the chancel, transept, and one bay of the nave ; but during the progress of this portion the funds of the Building Committee enabled them to order the vestry, and second bay of the nave, and aisles, then the third, and finally the fourth bay, which completes the church, except the south porch and tower and spire. The church is built of stock bricks, with red brick quoins, and specially-moulded arches and jambs, the shafts of columns are of Bristol Pennent stone, with Bath stone for caps, bases, and window tracery. The floor or chancel is paved with tiles, but the whole of nave, aisles, vestry, &c., with wood laid herring-bone. The pulpit, which is of pitch-pine, was presented by a lady member of the congregation, as a memorial to her late husband ; and a handsome stone reredos is preparing as a memorial to the late Sir A. Spearman, and is presented by members of the family ; there is a sedilia and credence, both of stone, in the thickness of walls. The altar, stalls, &c., are of a plain character in deal and pitch-pine, stained and varnished. The design for the church was prepared by Mr. W. White, F.S.A., of London, and the whole of the works have been carried by Mr. Gregory, of Clapham Junction, Mr. J. Newton being the foreman of works.

METROPOLITAN BOARD OF WORKS.—At the meeting of this board on Friday, a long discussion took place relative to a report from the works committee, with regard to the Inner Circle Completion Scheme, recommending the board to contribute to the two railway companies concerned the sum of £500,000 towards the cost of making, in connection with the railway, a new street from the south-east corner of Mark-lane, to the west side of Trinity-square, and of widening Eastcheap and King William, Little-Tower, and Great-Tower-streets. An amendment to reduce the contribution by £100,000 having been defeated by 22 to 15 votes, the committee's recommendation was adopted by 21 votes to 14. Sanction was given to the borrowing of £35,000 by the Vestry of St. Luke's for the Golden-lane improvement. Drawings prepared in the superintending architect's offices, of the new fire-brigade station at Chelsea, were submitted and approved. The annual report of Captain Shaw, C.B., as chief of the fire-brigade, was read, and stated that the value of property destroyed during 1879 by fire was less than in any year since the formation of the board. There were received 1,718 calls to fires, of which only 159 resulted in serious damage. In 96 cases life was seriously endangered, and 32 lives were lost at 27 fires. The quantity of water used for extinguishing fires in the Metropolis was 16,122,128 gallons, three-fifths of which were taken from the street-pipes, and the remainder from the Thames, canals, and docks. The present strength of the brigade, in all ranks, was 452 firemen. It was decided to fill up the vacancy in the office of district surveyor for the district of East Hackney (South), and North Bow at the next meeting of the board (this day, Friday).

ROYAL LUNATIC ASYLUM, MONTROSE, N.B.—Alterations and additions of an extensive character were begun last week. The old kitchen, and kitchen offices, which were built about twenty years ago, when the largest part of the present building was erected, are now pulled

down. The new additions, &c., will be built according to drawings prepared by Mr. Robert Anderson, A.R.S.A., 6, Wemyss-place, Edinburgh, which are: dining-hall, kitchens, and kitchen offices, &c., on the ground-floor, and on the first-floor there will be a private dining-hall, a recreation-hall with large platform, retiring-rooms, and organ gallery. There will be a small museum above the private dining-hall. Outside the main building there will be erected nearly 500ft. of covered passages about 8ft. wide. The cost of the additions, with the exception of heating, lighting, painting, &c., is about £8,230.

SOUTHWARK.—The workmen employed upon the new church of All Hallows, Southwark (to the number of about forty), were hospitably entertained on New Year's Eve to an excellent dinner at the Clergy House, in Nelson-square, S.E., by the vicar, the Rev. G. W. Berkeley, M.A. After dinner, the healths of the architect (Mr. George Gilbert Scott, F.S.A.), his managing clerk of the works (Mr. Edward Deacon), the contractor (Mr. Harry Hems, of Exeter), and the Reverend Vicar were drunk with much heartiness. The foundation-stone of this church was laid last June by Earl Beauchamp. The building when completed will seat 1,200. A feature in the general arrangement is the position of the clergy and choir vestries, which although upon a line with nave floor, are underneath the floor of the sanctuary.

WORCESTER.—A new tower has just been completed to Hallow Church, Worcester, which i comparatively a new church, having been erected about ten years ago. It is 23ft. outside measure, is carried up to a height of 80ft., and is covered with a temporary slated roof. The contract was taken for completion of spire as well, which was intended to have been carried to height of 150ft.; but this part, owing to want of funds, has had to be postponed for the present. The present amount expended has been over £2,500. The general walling is built with faced ashlar outside and inside, with moulded strings. Arches, weatherings of same material, red sandstone from Holt quarries, near Worcester. The tracery to windows is out of Coombe Down stone. The work was carried out under the superintendence and from plans of Mr. W. Jeffries Hopkins, architect, of Worcester, by Mr. H. Welsh, contractor, of Hereford.

CHIPS.

The New Sarum Diocesan Church Building Society, at their meeting on Tuesday week, ordered payments of £120 for the parish-church Handley, and of £125 for that of Child Okeford, also in Dorset, the restoration of both churches having been completed.

A new peal of bells was hung in St. Peter's Church, Lancaster, last week. They were cast by Messrs. Warner and Son, and the contract for raising the belfry floor and hanging the bells in their oak frames was carried out by Mr. T. Dickinson, the contractor.

The Provincial Council of Venice will shortly sanction the engineer Buffo's scheme for a bridge, 3 miles long, from Venice to the mainland, to serve for a tramway as well as for pedestrians and vehicles.

Mr. Estcourt, the contractor by whom the restoration of Cheltenham parish-church was carried out, has promised to place in the church an oaken reading-desk and stand, to correspond with the pulpit recently given by Mr. R. Davis.

At the Surrey sessions on Thursday, the 8th inst., William Solby, builder and decorator, for nearly twenty years in business at Norwood, was indicted for stealing lace curtains and inkstand and other articles. Prisoner got into monetary difficulties in 1876, and gave a bill of sale for £100 upon his effects of every description. He was allowed to take away his wife's belongings after possession was given up, and the charge was that he also removed other goods. He was found guilty and sentenced to four months' imprisonment with hard labour. Efforts are being made to obtain a remission of sentence on the ground that no felonious intent was exhibited, and that the prisoner believed he was justified in what he did.

A new and improved chiming apparatus, designed by Mr. G. Kingman, of Lansdown-road, Bath, has just been completed and erected by him in the tower of the parish church, Keynsham, near Bristol. By its means one person is enabled to chime the whole peal of eight bells.

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F. S. S. (Write the secretary, Mr. W. H. White, 9, Conduit-street, W., who will give all information.)—STUDENT. (1. Hull's "Building and Ornamental Stones," Macmillan and Co.; 2. "Handbook of Building Construction," Rivington's.) — GWARE WHEAG. (Yes; Mr. H. C. Bevis' book. See advertisement pages.)—ANXIOUS. (Mr. Banister Fletcher's book, published by E. and F. N. Spon, 48, Charing-cross.)—B. B. and F. Co. (10, Bolton-street, Mayfair, W.)—H. H. P. of W. (Write to Dr. Lory Marsh, Secretary Sanitary Institute of Great Britain, 12, Spring-gardens, S.W.)

Correspondence.

CITY OF LONDON SCHOOL COMPETITION.

To the Editor of the BUILDING NEWS.

SIR,—It is at all times an agreeable task to instruct the uninitiated, provided they are temperate, and understand when they're addressed, and so to the point. People should not do things rashly; and, in this particular case, it would have been wise had your correspondent taken the trouble to inform himself that the plans which appeared in yours of the 2nd show the arrangements of the building, not the plan of the site; he would then have discovered that the eastern flank would not approach its lofty neighbour by 53ft. I quote him: "The adjoining hotel towers above that side to such a height that all those class-rooms would be in utter darkness." What a discovery! But, possibly, this arrangement, too, may be wrong, so please allow me to say my say. Many think (of which I am one) that sunlight is as essential to animal, as to plant and vegetable life, and as my building was to face southwards, one flank would be due east, and, as the sun rises in that quarter, the windows of the class-rooms would cut his rays transversely, and the class-rooms would appropriate a certain proportion of warmth in early morning. Then, school begins at 9 o'clock, by which hour, taking the yearly average, the sun being half-way on his road to the meridian, the incidence of his beams would be oblique to the windows, and, at each succeeding minute would become more so, and as the groups of desks are shown some little distance from the window, the pupils would not be inconvenienced by his shimmer, whilst at 12 o'clock, the time of first break in the day's work, he would be shining directly into the playgrounds, cheering and invigorating the boys.

Now, one word for the deep sigh which disturbs his belt as to non-compliance with conditions, and I may, perhaps, assuage his melancholy. Of the six designs selected for final adjudication, those eventually place d first and second *were the only two which fully complied.* Shall I publish the list? Perhaps better not.—I am, &c.,

T. E. KNIGHTLEY.

106, Cannon-street, E.C., Jan. 14th.

HULL BOROUGH ASYLUM COMPETITION.

SIR,—I think it is only fair that the names of the six competitors who were selected for further consideration should be published. They are:—"Argus," Smith and Broderick, Hull (first premium); "Experientia," Giles, Gough, and Bell, London (second premium); "Lucidus Ordo," Bohn and Jacobs, Hull (third premium); "Experto Crede," Botterill, Hull; "Sunshine All Day," Pritchett, Darlington; "Halfpenny Stamp," Musgrave, Hull.—I am, &c.,

ONE WHO KNOWS.

A NEW DOUBLE-ACTION SOIL-PIPE VENTILATOR.

SIR,—I have just seen a description in your issue of the 9th inst. of a new soil-pipe ventilator, introduced by Messrs. R. Boyle and Son, and shall be glad if some of your numerous readers will enlighten my ignorance on one or two points about it which I do not understand.

1st. With respect to the air-pump arrangement at the top: My impression is that it has been conclusively proved, by experiments made at Kew and elsewhere, that all such ingenious and apparently valuable aids to the extraction of air are practically useless, or even positive hindrances to it, it having been found that the extracting power of a pipe with an open or trumpet-shaped mouth was much greater, under all circumstances, than that of one fitted with any of the so-called "extracting" apparatus. If the result of these experiments be correct, what is the advantage of the "air-pump" at the top of this ventilator?

2nd. Why should the up-cast pipe be taken inside the house, as shown by Fig. 1? If the air-pump is of any practical use, there can be no object in the assistance given to the current by the rarefaction of the air in the up-cast pipe, caused by the greater warmth of the inside of the house. By the arrangement shown, the sewer gas is carefully taken *through the house;* so imagine the result of the slightest leak or defective joint in the up-cast pipe.

3rd. Would the 2in. ventilating pipe, shown by Fig. 7, be of much use in getting rid of the sewer gas generated in the sewer, which must be at least 4in. in diameter? Should it not be made of the same diameter as the sewer itself?

In conclusion, my humble opinion is, that the generally-adopted system of making the soil-pipe act also as the ventilating shaft, shown by Fig. 2, is much simpler, and more likely to prove effective than this new system; as, if the air-inlet pipe be taken a few feet up the wall, experience has proved that a sufficient supply of air and consequent force to thoroughly clear the soil-pipe of gas is readily obtained.—I am, &c.,

G.

MORE DESTRUCTION AT EXETER.

SIR,—Attention has several times been directed in these columns to the persistency with which the Exeter people seem determined to stamp out the individuality and character of their ancient High-street. A few weeks ago you noticed the destruction of a curious old house at the corner of that thoroughfare and Goldsmith-street; and I have now to record the demolition of the characteristic chapel belonging to the old school known as St. John's Hospital,—a good building, whose façade runs parallel with the street

at the higher or eastern end of Exeter's main artery. St. John's Hospital was founded in 1225 for the support of 5 priests, 9 boys, and 12 almsmen; but later, in Charles I. reign, it was converted into a free school, and as such has since remained. The buildings inclose a quadrangle, in the centre of which is a quaint statue; but the accommodation generally not being deemed sufficient for modern requirements, new schools are now in progress upon a site outside the city, from the designs of Mr. William Batterfield. The site of the old school-chapel is to be devoted, it is believed, to a new post-office; and in the meanwhile, during the present week the old building has been taken down by a staff of labourers under the direction of Mr. Batterfield's clerk of works, Mr. Newton. The old oak ceiling and other fittings have been removed, the roof taken off, and the building altogether dismantled. It is said that such of the old materials that can be utilised will be re-used in the new school-chapel. The quaint old church of All Hallows, in the Exeter High-street, has just had its chancel exterior "restored" by a coat of "rough-cast" stucco, and its east end finished by a slight deal match-board barge-board, painted to represent stone. Exeter boasts about 30 resident architects and a diocesan surveyor; the latter also carries on business as a stonemason.—I am, &c.,

Jan. 12. AN EXONIAN.

ALTARS.

SIR,—I was much interested in reading Major Heales' elaborate article on "Church Altars," published in your journal of Dec. 26, 1879. This subject, as the Major truly says, "has not hitherto been so fully treated." He just notices the general destruction of stone altars in the 16th century. In Peter Cunningham's "Handbook of London," under the article "Westminster Abbey," appears the following extracts:—

"In July last, 1643, some Souldiers of Westborne and Caewood's Companies (perhaps because there were no houses in Westminster) were quartered in the Abbye Church, where (as the rest of our Moderne Reformers) they brake down the Rail about the Altar, and burnt it, in the place where it stood: They brake down the Organ and pawned the pipes at severall Ale-houses for pots of Ale: They put on some of the singing men's surplesses, and in contempt of that Canonicall Habite, ran up and down the Church, he that wore the Surplesse was the Hare, the rest were the Hounds.—They set Formes about the Communion Table, there they eat, and there they drink Ale, and Tobacco:—the whole time of their abode there they made it their common table on which they usually dined and supp'd, &c."

(Many other profanations, too gross to be repeated, follow.) Mercurius Rusticus, 1646, p. 217:—

"In Henry the 7th's Chapel Sir Robert Harlow brake down the Altar stone which stood before that goodly monument of Henry the 7: the stone was Touchstone all of one piece, a Rarity not to be matched that we know of in any part of the world: there it stood for many yeares, not for use, but only for Ornament: yet it did not escape the frenzy of this man's ignorant zeal, for he brake it into shivers." (Mercurius Rusticus, 1646, p. 217.)

I would merely add, to those who are interested in following up this subject, a recommendation to read the admirable contribution of Mr. Burges respecting the tomb of Henry VII., in Sir G. G. Scott's "Gleanings from Westminster Abbey."—I am, &c., W. F. POTTER.

COMPETITIONS.

SIR,—It is to many somewhat curious to observe the sudden powder-puffs of irritability and perplexity that convulse periodically the professors of architecture.

So it was with the quantity question, the commission question (originating, I believe, from some letters of mine in a provincial paper), &c., and so it is now with the competition question, else it is only eclipsed by the Christmas holidays.

I have a suggestion to make, if you will let me, even at the risk of another explosion, and it is this: that all competitions should be open, with the invariable condition that the successful competitor make oath that all the drawings submitted by him were *bonâ fide* work of his own hand, and that never, directly nor indirectly, personally nor vicariously, had he used any influence with the committee or others connected with the competition, and that his motto was unknown to all but himself.

This condition would, besides securing the guarantee that the competitors were all honourable men and not ashamed and afraid of their work, redouble the interest in all competitions, if merely from the fact of the actual labour of the men themselves being presented—seldom if ever the case at present.

In this way also it becomes in the only true sense a limited competition, for it only excludes those who have too much work on hand already, and therefore could not conscientiously attend to it if they got it, and the Captain Rooks of the profession, who are incapable of any work at all, except that of finding Mr. Pigeon, and whose precious time is wholly occupied in dodging about and soliciting orders, like a commercial traveller. One at least of these untrained gentlemen, an F.R.I.B.A., too, by the way, I know to be so ignorant of what he professes as to be incapable of making the simplest sketch or even presentable copy of any architectural subject, let alone to design, yet he makes a good living out of the "plunder," as I have heard him call it, and even has "collared" a competition.

Nor is the above condition too much for the public to exact from the profession, for independently of the pleasure and artistic delight derived from his work, like all true artists, there would be more real merit in absolute failure in such a contest, than in the most complete success under the present state of things.

I would only add at present that it would be well for clients generally if they protected themselves under some such condition before employing an architect, even though known as an acquaintance.—Yours truly,

ANTEDILUVIAN.

Manchester, Jan. 7th, 1880.

THE TREATMENT OF TERRA-COTTA.

SIR,—I have read with great interest your remarks from time to time during the past year upon the use of terra-cotta, and feel sure all must agree with you that this material is rapidly advancing in favour over a very wide field. Indeed, it seems to be stepping forward with sufficient speed to leave some of its producers behind in one or two important points, especially so in the matter of good enrichments. It may be that the sudden demand for architectural ornament in terra-cotta has taken some of the makers by surprise; if so, it is only fair to say that they, in turn, have taken the public by surprise in the extraordinary lack of skill they exhibit, making objects, which they consider to be ornamental, really detrimental to a building. Now, many people, like myself, thought for a long time that this was to be attributed to certain difficulties in firing, and, that well relieved, sharp, and sparkling ornament could never be obtained in terra-cotta. This, experience teaches me, is a mistake, and, perhaps a few words from a modeller on this point may not be out of season, while the subject is being generally discussed in your columns. In your interesting article of December 19th, you say: "We do not mean to assert that it is a fair or safe axiom to assert that style must be subordinate to material; but, in the case of terra-cotta, there are many points which must be carefully weighed when the style of the building is under consideration." That I take to be a bit of sound advice, given not a moment too soon. But, so far as ornamental details are concerned, I believe we shall have to do now exactly what ornamentalists of all ages have had to do, that is, to make the style of modelling entirely subordinate to the material. We might group all the styles of architectural ornament known to man as granite styles, marble styles, and stone styles. The flat surface elaborations of Egypt and Assyria were not there by choice; they were compelled by the hardness of the material in which the men wrought. If leaves were represented upon a capital, the line of the architecture had to be advanced to form a background; relief was out of the question. But from such an origin, and in a marble-country, the Greeks managed to evolve a marble style culminating in the Corinthian capital—a development utterly impossible in granite. And few people will suppose that the glory of Early English ornament, and the rich, deeply-cut mouldings of that time, could have had birth in anything harder than stone; and the same may be said of all the Gothic styles. Material has always governed style. It will do so now, and it cannot well be otherwise. Well, then it comes to be considered what style of treatment should be adopted in producing good architectural ornament in terra-cotta. At present the majority of producers, when left to themselves, seem undecided whether to imitate cast iron or embossed leather, and frequently succeed in blending the worst features of both, though there is no need whatever to imitate either. If you have a careful burner, I am convinced that almost any design that could be produced in marble can be burnt in the clay. I was not always of this opinion, but decidedly hold it to be true now. Here is one instance in brief. About 18 months ago I received instructions from a firm in the north—Messrs. Dunn and Hanson—to prepare a number of models for the new College of St. Bede, at Manchester, with a very careful stipulation that the work should be crisp and well relieved. I at once suggested that it might not be an altogether unnecessary precaution to ascertain how such designs were likely to be treated by the burners. The reply was that Messrs. Doulton and Co. had "undertaken to burn anything." And the result proved that Messrs. Doulton had got over all difficulties of that kind; not only in the models of others, but in good models of their own. This is only one instance; I could give others, with other burners, but this is enough to prove that "the difficulty of firing" will no longer excuse bad modelling. Now there are a few features in the material itself, which should not be lost sight of. There is a certain "deadness" about terra-cotta which does not exist in marble or stone. It will not hold light and shade so well, and it will not secrete smoke and dust as stone and marble will. When a good piece of stone carving is "weathered," the relief given by the carver receives additional value from the soil carried in the atmosphere. But the pores of terra-cotta are too close to absorb this, and the work is washed clean with every storm. For this reason I think the modeller should lose no opportunity of catching every ray of light he can upon the surface of his work; and to do this probably no method could be better than the Greek or the Byzantine V-cut. One glance at a good Greek Acanthus leaf will show what is meant; and the soft Roman treatment of the same will explain what to avoid. Of course this system of manipulation can be applied to conventional, or to natural foliages. Again, the Greek principle of keeping the edges and general outlines of the work sharp and unbroken, and the design as free as possible from overwrapping and confused lines, will always give that decisive drawing almost imperative in a material like this. I need not remind my friends who are carvers or modellers, that in large spaces of ornament we frequently use three grades of projection, pretty equally distributed throughout the design, whatever it may be. Say we are working up a design of bold flowers, leaves and tendrils. We, perhaps, make our flowers project 4in., the leaves 2in., and a few ground-leaves and tendrils ½in. Well, in this case I would model the middle and lower grades in the solid. But the flowers I would make separate, undercut them well and cast back and front; they will conjoin solidly with the other parts in burning, and with little extra trouble or cost we get a good show of relief. I have frequently adopted the same method with bird and animal forms intermixed with foliage. Knowing the value of your space—great as the temptation is—I dare not trespass further. But, the ice being broken, perhaps others will step out and give us their experience. The introduction of the material being comparatively a new departure, an exchange of opinions cannot help but be of advantage to us all.—Yours, &c.,

Birmingham. JOHN RODDIS.

TERRA-COTTA.

SIR,—I have read in your last issue two letters under the heading of "Terra-Cotta," one from a gentleman who signed himself "Architect," and also one from Mr. Pulham.

As the letter signed "Architect" mentions my works at Penybont, Ruabon, and also says a few words about its terra-cotta, I trust you will allow me to mention a few facts which may be interesting to your readers.

"Architect" says the clay at these works is capable of enduring as great a heat as fire-clay without becoming either twisted or discoloured.

I will confirm this, and add that the Penybont clay does not need any mixing, nor require to be burnt in muffled kilns, as the more the fire plays on it and the greater the heat, the better the quality and colour, which is a deep red throughout, and therefore does not require to be washed over with any artificial colouring, &c.

I am a manufacturer of many years' standing, in fire-clay as well as in red, and my experience is that, when both are burnt together, the fire-clay is fired a good warm tint before the Penybont red clay has had sufficient fire to bring out either its colour or good quality.

This red terra-cotta is fired so hard, and is of such a smooth and close-grained surface, as to be perfectly impervious to moisture; consequently frost, which plays such havoc with terra-cotta in general, has no effect on it whatever.

Blue bricks are also made from a stronger clay of the same bed, and these, by being fired to an intense heat, become thoroughly vitrified and blue throughout; not coloured by any chemical means, but simply by the peculiar properties of the clay.

Respecting dipping or staining of terra-cotta, I think all practical men will agree with me when I say it is only resorted to when the natural firing colour of the bodies is a failure in effect.

I do not agree with Mr. Pulham as to the advisability of using terra-cotta in larger blocks, although I admit it can be done with care and time; yet, in these days of steam and electricity, when time is such a question of importance, the profession generally will have to be more reasonable in its estimate of the time it takes in its manufacture before that can be done.

Speaking as a manufacturer, I think such sizes of blocks as Mr. Waterhouse has adopted are most suitable to the requirements of the day and the material. My own experience in carrying out his work tends to show that the terra-cotta comes out with truer lines than would ever be obtainable if larger blocks were used.

Apologising for trespassing so much on your valuable space.—I am, &c.

J. C. EDWARDS.

Trefynant Fire-clay Works, Ruabon.
Jan. 7th, 1880.

CHIPS.

The business of Thomas Robinson and Son, wood-cutting machine makers and engineers, Rochdale, has been transferred to a company under the title of Thomas Robinson and Son, Limited. This step is taken in consequence of the desire to give some direct interest to the principal managers, travellers, and clerks.

The Stockton-on-Tees board of guardians on Tuesday week resolved to spend £5,000 in providing new offices and a board-room.

The contract for the construction of a new wet dock at Maryport, Cumberland, has been let to Messrs Doherty and Co., of Dublin, and the work is to be completed within two years.

"J. L." writes, asking whether it should not be the duty of the district surveyor to see that the house cisterns are fixed so as to admit of easy examination? He mentions that he lives in one of a row of five houses, the cistern of which can only be reached by means of a 20ft. ladder, and that this is not unusual in new buildings in the metroplis.

The trustees of King Henry VIII.'s charity have just restored the upper part of the quaint chapel, built over the East Gate, and under which the road from Leamington passes. They have also inclosed with glass the whole of the previously open market in the market-square.

The Corporation of Dorchester have decided to adopt the precipitation system of dealing with the town sewage, the idea of a sewage farm having been abandoned on account of its costliness. The borough surveyor is preparing a scheme in order to meet the requirements of the Rivers Pollution Prevention Act, and this will, when completed, be submitted to the Local Government Board for their approval.

The Berks magistrates, at the Quarter Sessions held on Monday week, considered a report by Mr. Morris, county surveyor, on the desirability of replacing a wooden bridge at Aldermaston either by one of wood, which would probably cost £700; of brick, in four arches and three piers, at about £800; or an iron building, of one span, at £900. It was decided to erect in the latter material, and Mr. Morris was directed to prepare detailed plans, and procure tenders.

Mr. Howard Helmick, Mr. John R. Reid, and Mr. John White have been elected members of the Incorporated Society of British Artists.

Intercommunication.

QUESTIONS.

[6007.]—**Charge for Quantities.**—An architect employed me to take off and prepare a draft bill of quantities from the plans of a house, the lowest, and accepted, tender for which was upwards of £2,000. He now offers me three-quarters per cent. commission for my trouble, and says that it is the usual commission; but this being the first job of the kind that I have done, I shall be obliged if some more experienced reader will inform me what are the usual charges for a draft bill of quantities of a house of this class?—K. L.

[6008.]—**Bursting of Water-Pipes.**—A discussion having arisen between some friends as to the time when a lead pipe bursts in time of frost, I shall be glad if one of your correspondents will answer the following query: When does the pipe burst—at the time of the freezing of the water, or when the that wakes place?—C. D.

[6009.]—**Test for Bricks.**—I am preparing a contract for a building which will have to carry great weight, and wish to use a thoroughly hard stock brick in order to reduce the piers to small dimensions. A contractor's idea of the "best hard, well-burned, square, grey stock," as usually specified, is any brick which will hold together without being supported at both ends, and it becomes necessary to insert in the specification some definite test for hardness. Can any of your readers give me the results of experiments showing what pressure a really sound, hard stock should be capable of withstanding?—Z.

[6010.]—**Frozen Water-Pipe.**—Can any of your numerous readers inform me what precautions it is necessary to take in laying water-pipes, in those parts of America in which the frost continues for several weeks consecutively, to prevent the water freezing.—INQUIRER.

[6011.]—**Ceylon Local Service.**—Could any reader kindly inform me how I can obtain any information of whatever kind as to examinations and the way of proceeding to get into the Ceylon local service or colonial office of works?—BEGINNER.

[6012.]—**Length of Time Houses are Supposed to Last.**—I should feel obliged to any correspondent who would favour me with a reply to the following:—How many years is it generally supposed a new dwelling-house, substantially built, ought to last without requiring to be rebuilt? Also any general information on the point will be most acceptable.—CIVIS.

[6013.]—**Cast Iron Story Posts.**—Will some one kindly answer the following?—I wish to know the rule for ascertaining the strength of cast iron story posts of different sections, such as [I-beam] I. Also should be glad of any particulars relative to the same.—W.

REPLIES.

[5981.]—**Floors for Overhead Stables.**—Having only now read the question and two replies in the BUILDING NEWS of Dec. 26th, I will be glad, if not too late, to describe for "Subscriber" another, and, I think, the best mode to adopt in constructing floors for overhead stables. Each floor should be one slab (a monolith) of cement concrete, having iron ribs embedded in the correct position to give the greatest tensile strength to the slab, but being completely encased on every side by the concrete of the floors. The thickness of the floor and the weight and section of the iron ribs would be determined by the span, but the quantity, and therefore cost, of the iron would be very much less than the usual quantity and cost of the ordinary and bad system of heavy iron girders, which cut into pieces and reduce the strength of the concrete, and leave iron flanges exposed to the action of rust and fire. The monolithic concrete floor, with iron ribs, will be strongest, most fireproof, and dampproof, will have no lateral thrust to be counteracted, as in the case of brick arches and girders, and will also be cheaper. The surface can be finished with a coat of asphalte, paving bricks, or clinkers set in cement. I know of cement stable-floors that have resisted the wear of heavy Clydesdale horses for over 15 years without repairs or injury. It is important that the work should be executed by persons thoroughly conversant with the method of construction, and experienced in the selection, treatment, and manipulation of the materials.—CHARLES DRAKE.

[5984.]—**Orientation.**—A symbolic reason is assigned to the chancel being out of square with nave, having reference to the head of the Saviour leaning on one side; but it seems to me the probable cause was want of care in the setting out.—M.

[5985.]—**Mathematical Instruments.**—Long lines are best done with T square. The primary use of the parallel rule is for drawing oblique lines; but short parallel lines in any direction can be better done with P rule than T square or set square, as it can be moved with more quickness and certainty. The rule must be held with a light but firm touch on the bridge and centre of its length. It may require a little , but will be found a most useful instrument.—M.

[5987.]—**Ecclesiastical Publications.**—Britton's "Cathedrals and Antiquities" are probably such as "Tomby" seeks.—M.

[5990.]—**Antiquities in America.**—Dr. Zerffi, in his "Manual of the Historical Development of Art," recommends the following books on American antiquities: "The Pyramid Builders of the Mississippi," Squier and Davis's "Ancient Monuments of the Mexico Valley," and Lord Kingsborough's grand work on the "Antiquities of Mexico," 9 vols., folio. I may add that this last work contains upwards of 1,000 page plates, embracing all the remains of Mexican art, architecture, religion, &c. (1830—1848). I would recommend "W. H. B. (Hull)" to search through the Transactions of learned societies, wherein he may very probably find most valuable information on this subject.—C. F. W.

[5999.]—**Palladio.**—His architecture was first published at Venice, in the year 1570, by Dominico de' Franceschi—"al segno della Regina." This is by far the best edition, as subsequent impressions show worm-holes in the wood-blocks. If "F. T. B." be a Londoner, I shall be pleased to show him an *editio princeps* and several later ones. There are two, however, in the R.I.B.A., besides several translations into English.—H. S.

[5999.]—**Palladio.**—I cannot tell "F. T. B." the date of Palladio's first book of architecture; but, according to a good authority, the best edition is that published at Vicenza in four volumes in 1776.—G. H. G.

[5999.]—**Palladio.**—I have a copy of "Palladio," which "F. T. B." is welcome to see here at any time by appointment. It is described on the frontispiece as—"Andrea Palladio's First Book of Architecture, with all ye Plates exactly copied from ye first Italian Edition printed in Venice Anno Dom. MDLXX. London: Printed for B. Cole, Engraver, ye corner of King's Head Court, near Fetter Lane, Holborn, and John Wilcox, opposite ye New Church in ye Strand"; and on the title-page as—"Andrea Palladio's Architecture, in Four Books, containing a Dissertation on the Five Orders, and ye most Necessary Observations relating to all Kinds of Building, as also the different Constructions of Public and Private Houses, Highways, Bridges, Market-places, Xystes, and Temples, with their Plans, Sections, and Elevations. The whole containing 226 Folio Copper Plates, carefully Revised and Redelineated by Edward Hoppus, Surveyor to ye Corporation of the London Assurance, and embellished with a Large Variety of Chimney-pieces collected from the works of Inigo Jones, and others. London: Printed for Benjamin Cole, Engraver, the corner of King's Head Court, near Fetter Lane, Holbourn, and John Wilcox, opposite the New Church in the Strand. MDCCXXXVI. Price for small paper in sheets, £1 10s.; and the large paper, £2 2s."—A. S. TUCKER, J. W. Bird and Co., 147, Euston-road, N.W.

[6001.]—**Measuring Extras.**—The usual charge for measuring extras and omissions is 2½ per cent. on the extras and 1½ per cent. on omissions; but where a builder employs the surveyor, the charge is less. In the case mentioned, I consider that the surveyor might fairly charge six guineas, exclusive of expenses, if any.—H. L.

[6001.]—**Measuring Extras.**—I am of opinion that a fair percentage to charge a builder for measuring up extras and deductions is 2½ per cent. on works of the amount stated. As the deductions are to be measured as well as the "extras," I think they should be included. There is no standard or fixed scale, though the above is considered to be fair in measuring works in small buildings that entail a number of small measurements and calculations. The charge to be made for going through bill with architect should be charged for by time occupied. For measuring plain and large works, such as brickwork, a percentage of 2 and even 1½ per cent. would suffice.—G. H. G.

[6002.]—**Extras.**—If the contractor binds himself to accept the architect's decision in any dispute arising from this cause, he cannot legally claim for extras beyond the amount the architect determines, that is, if the sum so fixed be a reasonable one. I would recommend "Perplexed," if he can, to get the contractor to meet him and make terms. If this cannot be arranged to call in a surveyor to settle the difference. Were the extras ordered in writing?—G. H.

[6002.]—**Extras.**—Should the builder take proceedings, the case will probably be tried before one of the Masters of the Court of Queen's Bench, and if the amounts claimed by him are fair and reasonable, the decision will be in his favour, as lawyers do not appear to favour the arbitrary power given to the architect under some contracts. My advice to both parties is, Settle the matter in some way without law, as the costs frequently amount to twice as much as the sum in dispute.—H. L.

[6002.]—**Extras.**—The builder has the right to refuse your offer of "a certain sum in discharge," and to challenge your valuation of extras. The binding himself to accept your decision in all disputes as final and binding is foolishness on his part, and preposterously arbitrary on your part to expect any man to sign such a one-sided clause in a contract. Have you not clauses in your deed of contract to regulate extras and arbitrations in case of dispute of this kind? If not, it appears to me you are judge and jury both. No court of law will endorse such a power claimed by an architect, or any one. I have no doubt a judge would refer the matter to arbitration. Your wish that the builder may "take proceedings, so that he may be held up as an example and avoided," &c., is unmanly.—WILLIAM JACKSON, architect and surveyor, St. Neot's.

[6006.]—**Old Irish Cemetery Crosses.**—This matter merits the attention of those better up in Irish archæology than I. The old crosses I have examined from time to time in Ireland appear to be of limestone and granite respectively. The granite, as a rule, seems coarser than the English and Scotch granites. Indeed, a rather interesting discussion took place upon the merits of Irish granite and limestone, last autumn at Dublin, when some instructive information was elicited. The matter at point was what material was best for the base of the O'Connell statue, a national monument that for the last thirty-two years has been in hand, and which, taking past progress into consideration, it is sanguinely hoped will be completed before the close of the present century. One member of the committee pointed out that the Four Courts, erected only 100 years ago, of Irish granite, were a standing proof of how quickly that material became disintegrated. He remarked that whilst in old graveyards throughout that country the granite had signally failed to resist atmospheric influences, limestone stood as good to-day as it was when first worked. Mr. Brock, the well-known sculptor, endorsed this by quoting instances in which granite had failed, and another member followed up in much the same strain. The latter speaker, however, reminded those present that whilst Ireland possessed some of the best, it also contained very bad limestone as well. That raised at Skerries, for instance, was referred to warningly, whilst the Tullamore limestone was quoted as perhaps the best. Holy-cross Abbey, in Tipperary, built in 1100, of limestone, was mentioned as in a wonderfully good state of preservation. A purely white limestone, quarried on the north coast of Ireland (County Antrim) was also spoken approvingly of by this

speaker. Perhaps amongst the most interesting and remarkable of the Irish crosses are the odd Ogham stones, found in many parts, and some samples of which, if my memore serves me correctly, may be seen in the museum of the Royal Irish Academy. These remarkable pillar stones may seem to bear some affinity to the most ancient of similar stones found in Wales and Cornwall. Their inscriptions, which consist wholly of strokes, read from the bottom upwards. Recently an old cross, near Salisbury, was referred to as having a horse-shoe carved upon it, and the uncommonness of this device raised for it considerable interest. I may remark that in the wall of the old tower of Kiltinan Castle there is an Ogham stone, the figure carved in which holds a dagger in one hand and a horse shoe in the other. Does any affinity exist between Kiltinan and Sarum? It is a common supposition that the big stones at Stonehenge, close to the latter place, came from Ireland.—HARRY HEMS.

WATER SUPPLY AND SANITARY MATTERS.

FEATHERSTONE, NEAR WAKEFIELD.—The local board for the townships of Featherstone, Purston, Alleton, and Snydale, having a total population of 4,000, are now carrying out a scheme of sewerage in the populous part of the district. The plans were prepared by Mr. A. W. Cross, C.E., surveyor to the board, in conjunction with Mr. G. Hodgson, C.E., of Loughborough, as consulting engineer. The contract has been taken at about £6,000, by Messrs. Smith and Freeman, and will soon be completed. The same local board has just completed, under Mr. Cross's supervision, a system of gas-lighting, and the streets were lit, for the first time, on the 13th ult.

STOKE-UPON-TRENT. — On the occasion of the visit of Mr. S. J. Smith, to hold an inquiry for the Local Government Board, respecting the proposed drainage scheme for Stoke-upon-Trent, objections were raised to to the plans, owing to no provision having been made in them for dealing with the serious floods caused by the overflow of the Fonlea Brook. The inspector pointed out that he could not take this matter into cognisance, as the attention of his Department had not been drawn to the necessity for action in this direction. The representations then urged were, however, sufficient, to induce the Town Council of Stoke to cause investigation to be made into the reasons for these violent floods, &c. Several alternative plans were prepared by Mr. Bowden, the borough surveyor, with the view of remedying the evil. Before deciding upon the scheme to be adopted, it was resolved to call upon Messrs. Scott and Redgrave, of Broadway Chambers, Westminster, for a report upon the subject. After an examination of those parts of the town injured by the floods, and the various obstructions in the course of the brook, and in the channel of the Trent, these gentlemen have reported in favour of alterations to the existing bridges, the construction of a culvert for storm-water, and the removal of the weir in the river, near the Glebe Mills. At the last meeting of the Town Council the report was adopted, omitting, however, the alterations to the Trent, and a deputation was appointed to wait upon the directors of the North Staffordshire Railway Company, who would be jointly interested in some of the proposed works.

TWICKENHAM.—The new drainage and outfall works for this parish were formally started last week. They have been in course of construction since 1872, and are based upon the "separate" system, the town being divided into several drainage areas, each of which is discharged, by a distinct outfall, into the main or trunk sewer, the latter extending from the outfall works to the station yard, and being constructed as a 3ft. barrel tunnel, from 30ft. to 35ft. below the surface. The outfall was necessarily placed inland, instead of on the riverside front, so that the whole of the sewers have had to be laid in a contrary direction to the falls and contour levels of the district. With the exception of the main sewer, the whole of the sewers are in stoneware pipes (of Doulton's manufacture), ranging from 9in. to 18in. in diameter, each main or branch being laid in straight lines with inspection-points at each shaft of deviation. The sewage is treated by precipitation, the effluent being afterwards treated by filtration and by aëration, in a thin stream passing over prepared surfaces. The machinery has been constructed by Messrs. Hayward, Tyler, and Co., and the whole of the works have been carried out from the designs, and under the supervision of Mr. Ramsay, surveyor and engineer to the Twickenham Local Board.

SOWERBY BRIDGE. — The Sewage Committee met on Thursday, the 8th inst., to consider the plans of the outfall works, the estimates, and the engineer's report. These were submitted by Messrs. Utley and Gray, and after careful consideration by the committee, the following resolution was moved by Mr. Joseph Greenwood, and seconded by Mr Henry Siddal, and carried unanimously—"That the plans and sections of the outfall works, and also the report on the sewage system and the treatment thereof, submitted by Messrs. Utley and Gray, be approved, and that all necessary plans and documents required by the Local Government Board, be supplied, and that an application be made to borrow the sum of £15,143 for the carrying out of the works."

Our Office Table.

THE parish-church of Holy Trinity, at Milton Damerel, is situated in a remote country district in North Devon. Exactly at midnight last New Year's Eve an ominous sound was heard in the village, together with the momentary clashing of bells. Further investigation showed that the church tower had suddenly fallen, and that, in its fall, two of the bells had clashed together, and thus, just on the stroke of twelve—as the old year was dying out — it rang its own funeral knell. The tower, which without any previous warning fell (happily without injuring anyone), is now a complete ruin.

ARTISTS who have contributed to the British Fine Art Section of the Sydney International Exhibition will be pleased to hear that all the works of art arrived safely at their destination. The new galleries, which, owing to the importance of the collections, it was found necessary to build, were opened to the public on Nov. 10, 1879, with great success. Five galleries are hung with the oil paintings, water-colours, and architectural drawings sent by Great Britain; the contributions from France occupy two galleries; those from Belgium, Austria, and Germany three galleries.

A GOOD argument in favour of the wisdom of placing the direction of gas and water undertakings in the hands of the local governing authorities is furnished by the action of the East London Water Company, who, from some extraordinary whim, for which no explanation is offered, have refused to supply water to two large blocks of workmen's houses in Commercial-road, East, which have been erected by the Improved Industrial Dwellings Company. For this neglect fifty-six summonses were taken out against the company, and have been heard at the Thames Police-court. As the company failed to plead any reasonable excuse for this conduct, the presiding magistate ordered the company to pay a fine of £10 in each case with regard to the dwellings in the north block of building, and, with respect to the south block, where a partial supply had been laid on, the summonses were directed to stand over, to see if the company gave a sufficient supply to both sets of buildings from the present date.

AN interesting gathering took place at the "Morden Arms" Tavern, Rochester, on Saturday week, when a large number of the workmen of Mr. J. G. Naylor, builder and contractor, Rochester, met under the presidency of Mr. D. Overhead, one of the foremen, who had worked for Mr. Naylor for 36 years, for the purpose of presenting their employer with a testimonial of their esteem on his attaining his 60th year. The testimonial took the form of a handsome gold watch, which had been subscribed for by the workmen. In making the presentation to Mr. Naylor, Mr. Overhead said he was deputed to do so by 130 of the workmen, several of whom had been in his employ for periods extending from 20 to 35 years, as some slight acknowledgment of his great kindness to one and all during the time they had been in his employ. At the same time they ventured to hope that his son, who was about to be taken into partnership with him, would follow in his footsteps. Mr. Naylor made a suitable reply in acknowledging the presentation made him, assuring them that he should ever look back upon it as one of the happiest and most pleasant mementoes of his life.

THE Goldsmiths' Company have for some years past exhibited, either at the Architectural Museum, Westminster, or at the South Kensington Museum, the competition designs submitted for their annual prizes; but, strange to say, this year there has been no exhibition at all, at least we are so informed after making many inquiries at South Kensington, and at the Goldsmiths' Hall. The officials at the former institution did not even know whether the designs were there or not, and it was only after a prolonged search for ourselves that we found the drawings had never been sent there! Surely the Company have not abolished the custom; if so, the sooner they re-establish it the better, both in fairness to the competitors who look for art criticism out of doors, as well as for the advantage of the art the company are supposed to be interested in promoting. We understand that the usual prize of £50, offered for an article in gold or silver, was awarded to Mr. W. Herbert Singer, of Frome, for a design for a clock; that the £50 prize for a model was given to Mr. H. Harvey, of King's-road, for a model of an altar dish; that the £25 prize for execution and workmanship fell to Mr. J. Halgate, Chelsea, for a design for a mirror-frame. The other £25 prizes were won by Mr. W. Marshall, Chelsea, for a model of a card-tray; by Mr. T. Edwards, Islington, for silver tankard; by Mr. A. W. Austin, for repoussé work, and by Mr. Deere, also of Islington, for chasing. We may also mention that Mr. Hugh Stannus, of Kennington-park-road, has had an extra prize of £10 awarded to him for a design for two tankards, and Mr. C. Smith, of the New Town-hall, Wakefield, receives another prize for a model of cup.

ONE of the largest works at present going on in Devon—the construction of a breakwater at Cattewater Harbour, Plymouth—is being carried out under the superintendence of Mr. James Mounstephen, of Torquay. The total length of the breakwater is to be 915 feet, of which 715 feet above water is now completed, the work having been in hand a year and nine months. The width is 50 feet on the top and 70 feet at the basement, whilst the foundations have been laid for a length of 770ft. The side walls are composed of massive blocks of concrete. The foundations are first laid about 20 feet under water by divers with bags of concrete, thus making a level surface to take the large concrete blocks, varying in weight from nine to fourteen tons. These blocks, rising one above the other, form the main walls to a height of between three and four feet above low-watermark, and above this the walls are continued by other blocks of concrete being built upon them of a weight of 200 tons, and, in some instances, of 300 and even 400 tons. The top of the parapet, on the seaward side of the breakwater, is nine feet above high-watermark. The total height of this, the outer wall, from the foundation is about 44 feet, and of the inner wall about 40 feet. The thickness of the outer wall at the foundation is 19 feet, and of the inner, or quay wall, 13 feet. The space between these very massive walls is filled up with pieces of limestone rock, taken from Mount Batten, close to the works. It is expected that the breakwater will be completed in nine months. The estimated total cost is about £25,000.

A VACANT place in American æsthetic literature has been well filled by the publication of *The American Art Review*, the first two monthly parts of which are before us. The illustrations throughout are chiefly woodcuts, engraved and printed with that peculiar delicacy and finish which has long been characteristic of American wood-engraving, while the printing of the letter-press is equally good. The principal attraction, however, in the work, is found in the series of original painter-etchings by American artists, each etching being the direct production of the artist himself, without the intervention of the engraver. In the first part, for instance, is a most charming portrait of Murillo, by Paul Rajon, whose skill as an etcher has already become well known by his portraits of Darwin, John Stuart Mill, Carlyle, and other great men. His head of Murillo is full of tone and character. The other etchings in the same part are, "The Path to the Shore," by R. Swain Gifford, and a vigorous "Landscape with Sheep," etched by Jas. D. Smillie, after Charles Jacque, from the Belmont Gallery. Among the illustrations are a series of architectural designs, submitted in competition for the Washington Monument. The designs are interesting in themselves, and the article descriptive of the subject, by Mr. Henry Van Brunt, renders them more so; but as examples of architectural design, they can never rank as first-rate productions. The second part of the *Review* contains like the first three etchings, and, on the whole, they are, perhaps, better, or at any rate, we prefer them, more especially, Mr. Henry Farrer's landscape, called "December," with which the number opens. The other etchings, are "St. Francis Xavier Raising the Dead," by William Unger, after Rubens, and an effective

piece of "Landscape with Cattle," by Peter Moran, after Van Marcke, from the collection of Mr. Henry C. Gibson, of Philadelphia, a city which is second in the Union only to New York for rich private collections. An interesting article on "Henri Deux Ware and its Technical Processes," with a readable personal reminiscence of that well-known American painter, Wm. Morris Hunt, is included in this number. Mr. Ipsens' design for the wrapper-cover is a very good one, and we wish the *Review* a prosperous career.

A MEETING, adjourned from that held on July 29, 1879, at the offices of the Royal Commissioners for the Exhibition of 1851, of gentlemen interested in ecclesiastical art, reported in the BUILDING NEWS of Aug. 1, 1879, took place on Wednesday evening at the office of the Ecclesiastical Art Exhibition, 267, Strand, Mr. J. P. Seddon in the chair. The resolutions passed at the previous meeting were confirmed, and it was unanimously decided to erect a series of temporary ecclesiastical buildings, on a very eligible site secured in Westminster, for the purposes of the exhibition to be held in May and June next. All communications from intending exhibitors and others, should be addressed to the secretary, Mr. John Bray, 267, Strand, where plans of the proposed structures, prepared by Mr. J. P. Seddon, will be on view after the 26th inst.

CHIPS.

In a Chip last week, the name of Mr. G. E. Hawes was omitted as having supplied all the fittings for the Oswestry Schools, built by Mr. Yates, of Shifnell, from plans prepared by W. O. Chambers, Esq., architect, of Lowestoft.

The Gas Company of Gainsborough have offered to sell their works to the local board of the town for £42,000 the unusual reservation being made on the part of the board that they may throw up the bargain within a twelvemonth.

CINDER-SIFTING ASH CLOSETS.
Superior to Earth Closets. For Gentlemen's Houses, Cottages, Schools, &c.
NO DRIED EARTH REQUIRED.
The Sanitary Appliance Co (Ltd.), Salford.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Institution of Surveyors. Paper by W. L. Huskinson on "The Present Depression in English Agriculture: its Real and Assumed Causes," 8 p.m.

WEDNESDAY.—British Archæological Association. Papers by W. H. Cope on "Ancient Jade Instruments," and by W. de Grey Birch, F.R.S.L., on "Ancient and Unpublished Documents," 8 p.m.
Society of Arts. "Domestic Poisons," by Henry Carre, 8 p.m.

THURSDAY.—Royal Institution. H. Heathcote Statham on "Modern Architecture Since the Renaissance," 3 p.m.
Royal Academy. Professor Barry's lectures on Architecture. No. III. "Architecture Governed by Technical Principles.
Civil and Mechanical Engineers' Society. A. T. Walmsley, A.I.C.E., on "The Bridges of the Thames at London" (second paper), 7 p.m.
Society of Arts. Paper by Professor Perry on "The Teaching of Technical Physics," 8 p.m.

SATURDAY.—Museum of Hygiene. University College. Dr. Corfield on "Ventilation, Lighting, and Air," 3 p.m.

Lamplough's Pyretic Saline is refreshing, most agreeable, and the preventive of FEVERS, BILIOUSNESS, SMALL POX, SKIN DISEASES, and many other spring and summer ailments. Sold by chemists throughout the world, and the Maker, 113, Holborn Hill. *Use no substitute.*—[ADVT.]

Holloway's Pills protect the weak from sickness and save the diseased from danger; they rectify disordered action so thoroughly, they regulate and cleanse the system so completely, that when taken early they are fully competent to check the malady, or at least to subjugate its worst symptoms and renew health.

Trade News.

WAGES MOVEMENTS.

CASTLEFORD.—The workpeople employed at the potteries in Castleford, near Leeds, have received 28 days' notice of a reduction of 1s. 6d. in the £. A strike is anticipated.

EDINBURGH.—At a general meeting of the slaters of Edinburgh and Leith, held last week, it was stated that a circular without a signature was sent to all the employers advising a reduction of 1d. per hour in wages; but only one employer, Mr. Graham, had, it was stated, acted on it, and it was then agreed to withdraw his men. It was held that wages were at present at as low a rate as the state of trade warranted.

THE EARTHENWARE TRADE.—In consequence of the rise in the value of raw materials, the earthenware manufacturers of the Staffordshire potteries have decided to advance the selling prices of earthenware 10 per cent.

BATH STONE.
SUMMER DRIED
STOKE GROUND
AND
CORSHAM DOWN
supplied in any quantities on the shortest notice.
PICTOR & SONS, Box, Wilts. [ADVT.]

Doulting Freestone and Ham Hill Stone of best quality. Prices, delivered at any part of the United Kingdom, given on application to
CHARLES TRASK,
Norton-sub-Hamdon, Ilminster, Somerset.
Agent: Mr. E. CRICKMAY, 4, Agar-street, London, W.C. —[ADVT.]

Penrhyn and Dinorwic Slates supplied direct from the Quarries. Prices, free in trucks at Bangor, or delivered at any Railway Station, may be had upon application to
R. NEWTON & CO.,
Slate Merchants, Castle-square, Carnarvon.

McLACHLAN & SONS, 35, St. James's-street, S.W. Builders, Decorators, and House Painters.
Designs and Estimates.
General Repairs and Alterations Executed.
Experienced Workmen always in readiness, and sent to any part of the country.—[ADVT.]

TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender—it adds to the value of the information.

BARTON-ON-HUMBER.—For a new sewer in Fleetgate, for the Local Board :—
Pickard, H. (accepted) £294 0 0
[£50 below the 10 next lowest tender.]

CARDIFF.—For erecting and completing four 10-horse stables at the Cardiff Tramway Depot, for the Provincial Tramways Company (Limited). Messrs. Davis and Emanuel, architects. Quantities supplied by Mr. H. P. Foster :—

Jones, Bros., Cardiff	£935	0	0
Lock, F. S., Cardiff	920	0	0
Price, R., Cardiff	906	0	0
Linton, J., Newport	850	0	0
Brock and Bruce, Bristol	826	0	0
Krauss, Bristol (accepted)	792	0	0

DERBY.—For the extension of the Railway Servants' Orphanage, Derby. Mr. E. Fryer, architect. Quantities supplied :—

Wagg, G.	£2,660	0	0
Hewitt, G.	2,290	0	0
Thompson, J. W.	2,289	0	0
Marriott, J. B.	2,115	0	0
Smith, A.	2,149	0	0
Morley, G.	2,140	0	0
Walkerdine, W.	2,100	0	0
Bakewll, T.	2,070	0	0
Parker, J.	1,989	0	0
Pemberton, G. (accepted)... ...	1,950	0	0

DERBY.—For shops, Derwent-street, Derby. Mr. E. Fryer, architect, Derby. Quantities supplied :—
Walkerdine (accepted) £2,100 0 0

DERBYSHIRE.—For No. 10 contract of the drainage works, for the Local Board of Newbold :—
Froggatt and Hague (accepted) ... £108 0 0

HOLLOWAY.—For alterations at "Prince Albert," Hollingsworth-street, Holloway, for Mr. Grist. Mr. H. I. Newton, architect, 27, Gt. George-street, Westminster :—

Shurmur, W.	£333	0	0
Anley, J.	300	0	0
Lamble, S.	283	0	0
Godden, S.	277	0	0
For new counter :—			
Warne, J.	£110	0	0
Hellings, W.	105	19	0
Heath, T...	97	0	0

HOLBORN.—For sundry alterations to "The Little Coach and Horses." Messrs. Tarring and Wilkinson, architects, 69, Basinghall-street, E.C. :—
Alterations and general repairs :—
Bywater, G. and H. £508 0 0
Langridge and Sons (accepted) ... 490 0 0
Beer engines :—
Warne, J. (accepted) £45 0 0

LEWISHAM.—For a new sewer in Honor Oak-road, for the Lewisham District Board of Works :—
Hood (accepted) £245 0 0
[About 20 tenders received, the lowest being that accepted.]

MARYPORT.—For the construction of a new wet dock :—
Doherty and Co., Dublin* ... £90,000 0 0
* Accepted.

MILTON-NEXT-SITTINGBOURNE.—For restoring the workhouse buildings, recently destroyed by fire, for the Milton Board of Guardians :—

Foster and Tanton, Milton	£258	5	0
Beaumont, Milton	233	10	3
Seager, Borden (accepted)	219	0	0

READING.—For new premises, King's Road-corner, for Mr. John Adnams. Messrs. Brown and Albury, architects :—
Kingerlee (accepted) £1,580 0 0

READING.—For new premises, High-street, for Mr. E. Jackson. Messrs. Brown and Albury, architects :—
Kingerlee (accepted) £1,400 0 0

READING.—For the maintenance of the Forbury Pleasure-grounds, the grounds of the Abbey Ruins, and the public trees in the borough of Reading, for a period of three years, for the Town Council :—

	Per Annum.		
Cheason, J., Caversham	£300	0	0
Phippen, G., London-rd., Reading	180	0	0
Everest, C., London-road	170	0	0
Holder, J., London-road (accepted)	170	0	0

SALFORD.—For the construction of the Lower Broughton line of tramways, from Blackfriars-street to Broughton Spout, for the Salford Town Council :—
Evans and Lewin (accepted) ... £5,854 8 11

SALFORD.—For the construction of tramways in Bolton-road, for the Town Council of Salford :—
Evans and Lewin (accepted) ... £4,036 1 2

THE SILICATE PAINT COMPANY,
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"CHARLTON PAINT WORKS," CHARLTON [BY WOOLWICH], KENT,
PATENTEES AND SOLE MANUFACTURERS OF THE
"CHARLTON" NON-POISONOUS PAINTS AND COLOURS,
For HOUSE and SHIP PAINTING, PAPER STAINING, &c.
The extensive works of the Company, on the Banks of the Thames, have been greatly enlarged and remodelled under new management, and in future the
QUALITY OF ALL GOODS WILL BE GUARANTEED.
Sanitary Science, impatient of the deleterious substances hitherto in use, called loudly for Non-Poisonous Paints and Colours, and the inauguration of these Works is the response to that demand,
NO POISONOUS INGREDIENTS BEING USED IN THEIR MANUFACTURE.
The Company's products are now largely used at home and abroad by Government Establishments, Dockyards, Arsenals, Railway and Shipping Companies, Public Institutions, School Boards, Hospitals, &c., and wherever the laws of health and economy are studied. Their comparatively low price allows of the Silicate Paints and Colours being used for the commonest as well as for the highest class of decorative work.
New Descriptive Lists and Pattern Cards are now ready, and may be had, gratis, on application as above, or to the Company's Offices and Depots,
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THE BUILDING NEWS.

LONDON, FRIDAY, JANUARY 23, 1880.

THE POSITION OF THE WATER-CISTERN.

IN looking over our questions in the "Intercommunication" column, and the inquiries we receive from correspondents upon every imaginable subject connected with professional practice, we very frequently encounter matters to which it is extremely difficult to give a satisfactory answer at all, and impossible to do so in the narrow limits within which we have found it imperative to restrict the replies of our readers. Sometimes a chance question may involve almost a new field of architectural research, or might form a fit subject to engage the attention of a court of law; at others, we find a short paragraph, to answer which fully would be a suitable undertaking for, say, the Professor of Architecture, in a course of lectures at the Royal Academy; and often enough we get a glimpse of a grievance which the Royal Institute of British Architects would feel great hesitation in meddling with. But there is a class of questions, which relate to subjects of importance, hitherto neglected or but little considered, which cannot fail to afford matter for reflection to all thoughtful minds, and which occasionally appear to furnish an excellent theme for an article. To this type of queries belongs one we noticed last week among our "chips," and which was contained in the letter of a correspondent who desired to know "whether it should not be the duty of the district surveyor to see that the house-cisterns are fixed so as to admit of easy examination?"

As far as the immediate answer to such a query is concerned, it is needless that we should state that the already overtaxed district surveyor has plenty to do without seeing after the placing of the cistern, though this and a few other matters of scarcely secondary importance well deserve the attention of some properly-constituted authority. The district surveyor has quite enough upon his hands in seeing that the Building Act is duly observed, and it would be hopeless to expect him to look after the plumbing—the trade of all others, perhaps, which requires the most careful inspection, and the most minute examination during the progress of the work. The fixing of the cistern and the closet apparatus; the arrangements for the supply of water to each; and the connection of the waste-pipe and the soil-pipe with the drains, are all points for which someone surely should be responsible. At present, however, it is no one's business to attend to this, and therefore it is almost invariably carelessly done; the work is knowingly or wilfully scamped, and sickness and death are too often the results of the plumber's delinquencies: the first intimation which the unhappy householder receives that the sanitary arrangements of his house are altogether wrong being the loss of some loved member of his family by typhoid or some other form of enteric fever; those most insidious and malignant of all the purely preventible diseases.

But, to revert to the cistern: the first point which we would urge is that its very existence is from the outset a gross and fatal blunder, a false step which should never have been tolerated—a "survival," perhaps, of the very worst kind. The state of things which makes water-cisterns in houses possible is among the most grievous evils of our modern luxury and civilisation, and we cannot inveigh too strongly against such an abuse. It is not our object, however, in the present article to show that the domestic cistern is wholly unnecessary and wrong in principle, and that by a constant water-supply, which we ought long ago to have possessed, it can be entirely dispensed with; we will reluctantly accept it as a nuisance and a mistake, and endeavour to glance at some of the facts concerning it, which are almost invariably neglected and which can scarcely fail to be productive of more or less serious consequences to the health and comfort of the household.

In nine houses out of ten the cistern is a sort of afterthought, and its place is left to chance; the architect no more thinks of where the cistern is to be put than he considers it his duty to plan the carpets or choose the furniture, and so the builder's man finds a corner in the roof for it, or puts it above the staircase-landing, or over the water-closet, or wherever else he may think such a troublesome and unsightly contrivance will be most out of the way. Of course, this refers to houses of the better class, for among the poor, and even in dwellings up to the value of £40 to £50 per annum, the cistern is almost without exception situated outside the building, often enough accessible only, as our correspondent remarks, by means of a pretty long ladder, which has, moreover, sometimes to be placed at a most awkward and dangerous angle to avoid a lean-to roof beneath. In a suggestive article in the November number of *Macmillan*, which has recently come under our observation, Mr. Torrens, M.P., in treating of the water-supply of London, described the actual condition of such an out-of-doors cistern in a locality near the Seven Dials. It seems, he says, "a poor woman, who had known better days, of vigorous age and strong constitution, sickened and died; and the wonder may be not that she died when she did, but that she survived a couple of years, as the tank which supplied her only beverage was found to contain two inches of mud, the decomposing bodies of fourteen rats, a bar of soap, two candles, and many dead beetles." Even in the Mansion House itself, as an instance of what occurs in indoor cisterns in the houses of the wealthy, the civic cistern "was found to contain three-quarters of an inch of fungi-scrub at the top, and three-eighths of an inch of mud at the bottom"; while "in a bottle of water on the Lord Mayor's table could be seen hundreds of nematoid worms."

We think that, on the whole, fewer excuses can be found for the exterior position of the cistern than for that within the house. It has replaced the ancient water-butt, filled with the drainage from the roofs, and it is too often found, either in places which are wholly inaccessible to the occupier, or, still worse, in situations where it can scarcely escape contamination of the most dangerous kind—on the roof, we mean, of the privy to which it furnishes the water-supply. From cisterns thus situated, probably nearly one-third of the inhabitants of London obtain their only stock of drinking-water; and when we reflect on the liability of water to absorb germs and ferments without actual contact, and to become putrid under certain conditions in a few hours; when we remember also the untimely fate of the old lady in Mr. Torrens' story, we can hardly escape a shudder. The outdoor cistern is speedily rendered useless, moreover, by the winter frost, and the wretched owner has to beg all his water from his more fortunate neighbour, or to trust to the chance liberality of the water company in providing a standpipe in the street. Though these exposed cisterns generally have a cover of some sort or other to begin with, it soon rots, or is removed, or lost, and the dust and dirt and filth of all kinds find their way freely into the tank. This renders the growth of rank, green confervæ only an affair of time, and then we arrive at the picturesque condition of the cistern, to be found in most small houses, or which a glance from the window of the railway-carriage on any of our high-level lines in London, cannot fail to reveal to us.

We have still to deal with the in-door cistern, which was really the principal subject we had in view when we set out. Few houses of any magnitude possess less than three cisterns, and in many instances this number may be doubled. As the cistern has to command as many floors as possible, the most common arrangement is to place the principal reservoir at the highest point to which the company will undertake to deliver the water; too often this level is even exceeded, to the great inconvenience of the household, but this is a question about which we need not now trouble ourselves. The waste from the high cistern forms one mode of supply to another on a lower floor. In the scullery, or back-kitchen, sometimes in the front area, is a large cistern which furnishes all the water for cooking purposes, and this fills also a small cast-iron tank to feed the boiler. The boiler-supply is usually placed in a cupboard, or on a ledge near the jambs of the kitchen fireplace, and from a considerable experience we can affirm that rarely indeed do we come across one which is not half-full of drowned blackbeetles, in every stage of decay. The kitchen kettle is generally replenished from the boiler, and thus the tea, and the hot water, and many other things besides, occasionally get a rather disagreeable twang. It will perhaps scarcely be credited, but it is not the less a fact, and gives us a good illustration of the utter apathy and carelessness which prevail in such matters, that it is no uncommon thing in houses, even of the better class, to find the same cistern used to supply the water-closets and the drinking-water. Moreover, the pipe to the closet is sometimes so arranged, that under certain circumstances which might easily arise, the water in the closet-pan would be sucked back into the cistern. The mere possibility of such a state of things is not pleasant to contemplate, and affords the most powerful argument for the provision in every case of a separate cistern for the closets.

Points which must not be lost sight of in the position of the cisterns are the supply for the bath, the housemaid's sink, and the hot-water circulating cistern. For these a considerable volume of water at a high level is necessary, and with a little care they may be so arranged as to give goods results in a combined scheme.

In modern houses the water-closet and its position has in every case to be arranged by the architect; but in old houses, to which this addition and the water-supply required for it have been made after the house was completed many irregularities occur, and all sanitary precautions are frequently set at nought. It is in the houses of the very best and most expensive kind that enteric diseases are most fatal, and that the worst abuses prevail.

It remains for us to indicate the means which should be adopted to make the best of what Mr. Torrens calls, "the old, foolish, and filthy system of laying in a daily stock" of drinking-water. A part of the attic story, if possible, should be set aside a cistern room. The multiplication of cisterns all over the house, under no sort of control, is an error to be avoided. The floor should be suitably strengthened, not by a chance beam due to the sagacity of the carpenter, and should be furnished with a lead tray turned up three inches all round the edge with a proper waste. This room should necessarily be situated vertically over the kitchen, and should hold the water-cisterns and the hot water-cistern, both of them raised only a few inches above the floor-level, so as to be readily examined

and cleansed. The room should have a good window and plenty of ventilation, and it is of great advantage to place round it a coil of pipes from the hot-water system, or a flue from the hot-air chamber, to keep out the winter frost. The hot-water tank will, however, generally suffice for this purpose. There should be covers to each cistern, and the tanks for drinking-water should be entirely distinct from that used to supply the closets. The room should be kept locked, and should be under the master's own control, or in the care of a trusted servant. The cisterns should be emptied and cleaned out at regular intervals of not more than three months, and should, at any rate for the drinking-water, be made of slate.

It is a rather instructive study to examine the change which have taken place in recent times in cistern construction. A hundred and fifty years ago the massive cast-lead cistern only was employed. When lead came to be rolled or milled in lesser thicknesses, it became possible to provide a wooden vessel, lined with sheet-lead, at a smaller cost, and the common form of lead-lined cistern came into fashion. An excellent example of a leaden cistern of the old type is preserved in the Structural museum at South Kensington; it is rather elaborately decorated, bears the initials of the owner or maker, and is dated 1732. Next we had a cistern of sawn slate, grooved by machinery, put together with red-lead, and secured by iron bolts: this had a precursor in the old tank formed of stone slabs. Latterly, in all cheap work, the galvanised iron tank is coming into favour; and the 4ft. × 4ft. × 4ft. ship's tank, containing 400 gallons, and made to sell at £4, will never, perhaps, be surpassed in point of economy.

The material of which the cistern is made is, after all, a matter of comparatively trifling importance; the situation in which it is placed is, on the other hand, as we hope we have shown, deserving of careful consideration. Few people, when arranging a pantry or larder, would think of placing it in uninterrupted communication with a privy or closet; and yet it is by no means uncommon, as we have seen, to find all the water for the drinking purposes of the household stored immediately over the closet-seat. We trust, in conclusion, that our remarks may have the effect of proving to architects that some little forethought is necessary in choosing the position of the water-cistern.

SANITARY v. "ARTISTIC" ARCHITECTURE.

IT is a matter open to doubt whether the votaries of the style of house-building known as "Queen Anne," have ever seriously taken into consideration the requirements of sanitary construction. That style was ushered in as a common-sense domestic mode of construction, and certainly from the examples that have come under our notice, we are bound to acknowledge its superiority in many respects over that costly and unsatisfactory species of Gothic in which some residences have been and are still built. What with the pointed window-openings and mullioned casements that defied the adoption of any sensible mode of fastening; the stop-chamferings and pierced woodwork, and the fancy furniture that offered facilities for the accumulation of dirt, and the endurance of the maximum amount of discomfort and increased the labour of cleaning, it was unanimously felt that Gothic, as understood by some of its adherents, was not a sanitary or convenient style, however much it favoured costly decoration and furniture. Cabinets and sideboards enriched with painted tiles and stop-chamfers, pinnacles and pendants looked pretty enough, but they never seemed to fit the pointed arched recesses made for them, tables and chairs in many cases had an unhomely bought-for-show air about them, and the furniture of drawing and dining rooms began to look more like miniature collections of ecclesiastical work only fit to be looked at, not touched. With the revival of the Domestic style of the 17th century, this was luckily changed: square windows and doors that fit the rooms, and comfortable square-framed furniture, whose only fault is that it is sometimes rather heavy and dull for our dark chambers, superseded the flimsy Gothic taste, and so far it cannot be denied we have improved by the new fashion; but there are a few points about which the style of domestic building which seems to be increasing in favour among a large number of architects is deficient, and we have no doubt that it was with reference to these deficiencies that Dr. Richardson the other day spoke in disparagement of the prevailing style of fashionable house-building. In forgetting the changes in these matters, the followers of this school have lost the good opinion of utilitarians among us, and have to a degree at least also forfeited the esteem of many who were led to believe in the principles and promises upon which the revivers of the style came before the public. One of the admitted principles of sanitary house-building is that of cubical space in the rooms, and this space is mainly dependent upon height of stories. In many recent houses, built to imitate the good old style of brick architecture at the beginning of the 18th century, the architects have failed to bear in mind the different conditions under which they work, that sanitary science was scarcely known, that gas had not made its appearance as an illuminating power, that towns were scantily populated, and light and air more abundant in the days of Queen Anne. Many of the houses built in this manner affect a lowness in the rooms, as a certain height is considered to destroy the old-fashioned look of snugness and comfort. Imagine the effect of depression a room would have 36ft. by 20ft., and about 11ft. high, yet this is actually the height of a room on a new estate in which the Queen Anne architect has it all his own way. It would not do to make the stories loftier outside, for it would at once take away that quaintness which is a great recommendation in the style. It is nothing unless it looks quaint; add a foot to the height of the rooms and the house begins to assume a 19th-century appearance, which is the very thing that the designer tells us would destroy the illusion. Then of course it is desirable that the upper bedroom should be lighted by dormers in the roof. As an economical expedient there is nothing to say against it: the only question is whether dormitories do not suffer by being kept low; such economics are purchased dearly. Dr. Richardson complains of the smallness of windows, but we think he errs here; houses built in this style need not be badly off for light. There are no mullions nor transoms, stained and quarried glass required, as in Gothic windows; the plain sash frames are used; indeed, the common-sense window has been all along regarded as one of the admitted conveniences of the style. An objection has, however, been urged, not altogether with fairness, against the employment of small panes and unnecessarily thick bars. It is in its essence a utilitarian objection; but one the followers of this kind of domestic architecture are called upon to answer, or at least to challenge, if they are to remain firm to their principles. It is fair only to say that we find a considerable variation in the treatment of this feature. In some mansions at Queen Anne's-Gate, Holland-park and elsewhere, the windows are divided with bars of sensible size, not so thin as to look like a gap, nor so thick as to exclude much light. In a few houses at Chelsea, Cadogan-square, and the West-end, we find the lower sashes filled with one sheet of plate glass, and the upper with smaller panes—a mode of treatment that has both common-sense and economy in its favour, and against which there can be no possible objection made. In other cases a rather tender feeling for the romantic has carried away the architect's sense of fitness, and we have windows to important rooms filled in with small panes not more than 6 to 9in. square, and of a proportion that shocks the cultivated taste. Of course there is a precedent found for such windows in some old quaint inn or wayside cottage in Kent or Norfolk. Such a dereliction of sanitary duty cannot escape the notice of practical hygienists like Dr. Richardson. It is plainly not in accord with the great sanitary dictum that light is an element of health, and it is impossible, however conservative in art we may be, to revert to an old system of window-making, simply because of its antiquated appearance. Of course we expect to hear many artistic reasons given, and we by no means cast these aside as having nothing to do with health-giving agencies. Is not a large glass window with no bars dreary and monotonous to the weary patient who has to sit in the room day after day? Do not the sash-bars, with their playful flicker of shadow and relief against the sky, tend to make the expanse of light and glass a trifle less monotonous? Outside also the dull gloominess of plate-glass windows is distasteful; and how few buildings do not look brighter and more homely for their white painted sash-bars and frames? These are questions for the sanitarian, we think, that should not be shelved in a perfect scheme of architecture, however they appear to clash with the more apparent and direct advantages arrived at. It is not correct also to attack the size of windows in houses of the recent style; they are not usually small, however much some of the panes may be. The practice of inserting lead lights is a common one; but for sitting-rooms it is best confined to the upper part of the windows, though even here they should be constructed in opening frames, so as not to interfere with ventilating arrangements.

There is another feature: the overhanging window, chargeable as one of the instances of the so-called "architectural perversity" now prevailing. It certainly may be introduced by way of variety, but it has less that is sanctionable from a sanitary point of view. It blocks out light and air. The same objection applies to overhanging stories generally. They find favour among architects who adopt the picturesque and earlier phases of Jacobean, but who forget the sunshine and light shut out from the windows below the stories. We cannot understand the term "beetle-browed mansions" applied to this sort of building, unless it is intended for the overhanging gables and stories occasionally resorted to. The fireplace is another detail of domestic architecture that may call for remark. If large open chimney-corners and projecting jambs constitute sanitary improvements, many of our new houses can claim being models. The sanitarian would deny this conclusion. While a large fireplace looks comfortable, it is questionable whether it is not a costly mode of warming, at least, the deep recesses now made in houses, after the 17th century farmhouse, are contrary in principle to the new methods of heating, as the heat derived from radiation must be considerably reduced, if not lost, in the extreme corners of apartments built on this model. Still, even in warming, Englishmen look to appearance as well; they prefer to see a bright fire between andirons laid on the tile hearth, than the most economic ventilating stove or hot-air system ever invented. It is a question, however, worth the thought of our architects, who consult

picturesque accessories, whether they can justifiably reintroduce the old English style of warming in the teeth of modern experience. We might say something also on wall-decoration, and the fashion of lining the walls of apartments with tapestry and imitation textiles, the custom of hanging draperies in revival of the old decoration; we might question the reintroductions upon sanitary grounds, but we rather think it is better to leave their solution to time. Sanitation and fashion are at present on hostile terms, and the architect would do more, probably, by endeavouring to reconcile their claims, than by consulting the demands of either.

BUILDING CONTRACTS.—II.

THE architect's responsibility in relation to his duty under a contract is a point of considerable moment. Contracts are daily drawn up, and builders sign them without a thought of the liability on the one side, or the binding nature of the clauses on the other. They are looked upon as mere forms, and are put on one side till any difference arises and the validity of the document is called in question. The architect may be put into the most unfortunate relation with the builder; his independence as the agent of one of the principals to the contract may be regarded with some suspicion, while his client may entertain doubts as to the competence or integrity of his professional adviser. These relations render it of the greatest consequence that a properly-prepared legal contract be executed after the drawings and specifications are furnished, and that the necessary stipulations and provisions be incorporated in it. It often occurs that special circumstances render some express clauses or amplification necessary, or a modification of those conditions generally inserted. An omission of such would render the contract little better than useless. It is usual in a building contract to insert a clause appointing the architect as arbitrator in cases of disagreement, and many matters turn on it, such as what additions, if any, ought to be made to the amount of contract by reason of delay in carrying out the works, or by reason of any direction involving increased cost, as to the construction to be put on the specification and drawings, or any other matter involved in the contract. This clause should be explicit. We propose now to consider a few of the ordinary cases that arise, and first as to the mode of dealing with extras and omitted work. We have hinted that the fairest way of dealing with omitted work is to value it at the price upon which the estimate of the contractor is based. It is not always possible nor fair to make the schedule of prices apply to both extras and omissions. For instance, a builder often enters into an arrangement with his brick-burner or timber merchant before he submits his tender, by which arrangement he can tender low: sometimes he buys a quantity of bricks or other materials at a low price sufficient for his purpose, or he prices his concrete at a certain rate in his bill of quantities. If we suppose that in the course of carrying out the building considerable additions are ordered, the builder would probably have to pay 20 to 25 per cent. more for the materials required, and it would be obviously unfair to bind him to the prices upon which he made his tender. In this way, then, "extras" may involve more expense than omitted work of a like quantity, and a useful clause may be introduced to the effect that all additional work is to be valued at fair measure and value prices. Sometimes one material is substituted for another, such as concrete for brickwork, the effect of which alteration of intention may put the builder to considerable expense who has already entered into an agreement with the brick manufacturer. We may also add, in bills of quantities a stipulation to the following effect is frequently introduced, viz: that should there be more or less measure than given, there will be respectively an addition to or deduction from the contract, and that all measurements are to be made in the same manner as the quantities have been taken, the additions or deductions being priced at the same rate. It is not unusual for a charge of day-work to be made, though this, in most contracts, is prohibited; it may be remarked, nevertheless, that some work cannot be valued by measurement, as that consisting of labour of a miscellaneous and disjointed kind, and in a completely-prepared contract some provision should be made for this. Many differences have arisen turning upon the Arbitration clause, and several cases will be found reported in the BUILDING NEWS in our "Legal Intelligence." Thus, in the case of Wood and Son v. the Bedwelty School Board, it was contended by the plantiffs that the architect had shown bias, and an appeal was made to restrain architect from acting. The appeal was, however, dismissed with costs. Another and more more important case, Stevenson v. Watson, was reported in this journal (March 14, 1879), and came before the Common Pleas Division. The plaintiff, a builder, claimed a net balance for additions of £1,616, and the defendant (the architect) certified only for an excess over the estimate of £251. The plantiff further urged that the defendant did not use due care and skill in ascertaining what was really due. The defendant demurred on the ground that the statement showed the defendant to be in the position of arbitrator who had acted and declared his decision, and that as no *mala fides* was suggested, no action against him was maintainable. It must be mentioned that the defendant prepared bills of quantities which contained stipulations to the effect that any variation of measure should be made in the same manner as the quantities had been taken, and priced at the same rate; and it was further stipulated that all disputes that might arise were to be settled by the defendant. Lord Coleridge, in commenting, on the case, observed: "The contract only required that disputes between the contracting parties should be settled by the defendant, and he was in no way bound to enter into any reasons for any decisions he arrived at, having regard to the relations that existed between him and the plaintiff." Mr. Justice Denman concurred, and thought the only duty of the defendant was to perform what he had done honestly, and there was no suggestion in the claim of any *mala fides*. "The nature of his duties was strictly analogous to those of an arbitrator, and not as had been suggested, to those of a mere appraiser. Ordinary acquaintance with building contracts showed that an architect could not be regarded as a mere caster-up of figures, and ought not, therefore, to be held liable for negligence when a mistake in figures or measurements occurred." The demurrer was allowed. We have quoted this case, as it raises the question of the liability of architects under a contract. It especially goes to show that the architect, in his duty as arbitrator, is not bound to afford explanation of his certificate, which requires the exercise of judgment and opinion. It cannot be too strongly impressed on the mind of the young architect that in his dealing as the agent of one principal to the contract, he should exercise extreme caution, as any surreptitious transaction between himself and the other principal is looked upon as a fraud. For example, when an architect is by the contract to determine the amount due to the builder, and the architect assures the employer that the cost of the building shall not exceed a certain sum, it has been decided in law (Kemp v. Rose), that the architect does not possess the unbiassed mind necessary for the discharge of his duty, or one that will make his decision just and conclusive, and the builder can claim a sum beyond that allowed; in short, if it can be proved that the architect has shown *mala fides* or bias, his decision can be disputed. We have alluded to a case in which a similar plea was made. Further it has been held that the builder can bring an action for sums due to him, or for damages, if it can be proved that the certificates have been withheld fraudulently; the builder may also recover his charges if architect has not been discreet and impartial in granting certificates.

Frequently a question is raised touching the completion of a building. During the progress of a building which has to be completed by a specified date, the employer often makes certain alterations and additions, that of course entail increased labour and time. In the majority of instances the fairness of the employer or his architect prevents, by allowing more time, any injustice being inflicted on the contractor in respect of penalty for exceeding his time; but the law is clear in such a case, that if the additions are contracted for subject to the original condition as to completion, the contractor is bound to complete the work and is liable for the penalties, however impossible it may be to finish within the time contemplated. We, therefore, hint, on behalf of the contractor's interest, that he should not agree to perform extra work under the same condition, but that he should enter into another agreement for the extra work. If he does this, he is exempt from penalty, for it often happens that the additional work is mixed up with the original contract in such a manner that the latter cannot be finished before the other. Much misapprehension exists upon this question among builders, and a hint is necessary to put them on their guard. A case often happens like the following: A builder neglects to complete work by the contract date, and the employer or his architect orders other workmen to finish, and charges contractor with the cost according to the terms of contract. The latter endeavours to make a counter-claim, and puts in for extras. In a case recently tried, and reported in this journal, a claim for non-completion of contract was made. The defendant put in for extra work, and also stated in his defence that specifications had been altered by erasures since signing it; the verdict was given however, for plaintiff.

An action for negligence and breach of contract was taken against a contractor by an employer, who alleged, after the building was finished, that the material was inferior and the workmanship not according to specification. It was argued for the defendant that the final certificate was conclusive, and that the agreement provided that the certificate of architect, showing the final balance, should be conclusive evidence of the building having been completed. It was also shown that reasonable care and skill had been taken by the architect in superintending the execution of contract and in giving final certificate, nor had the architect's honesty been impugned. The jury, directed by the judge, ordered a verdict for the defendants (see Methley School Board, v. Gough and Pattinson, BUILDING NEWS, Vol. XXXVI., p. 186). This case has interest to the architect in two ways, as showing what he may expect from a dissatisfied committee or employer, and how needful it is to exercise discretion before giving a final certificate, and to do so only after a careful inspection of the building.

NILE GLEANINGS.

A NEW volume on Egyptian antiquities seems certainly to call for an apology after the publication of treatises as those by such learned Egyptologists as Wilkinson and Brugsch. It is not surprising, therefore,

that the author of "Nile Gleanings," Mr. Villiers Stuart, of Dromana, should open with a few remarks informing his readers that his labours do not go over the same ground as that covered by former explorers; the more is this assurance required by readers who do not care about reading through a formidable number of pages upon archæological facts of so remote an age as that of Egypt. Mr. Villiers Stuart's assertion, however, must be accepted, that there is much that still remains to be discovered, and that "there is plenty left to glean" from the mass of dross left by careless explorers; and it is from this conviction that the author places before us a new work. It must be admitted also that many travellers who have published books on Egypt have had not any, or but a very scanty, knowledge of hieroglyphics, a fact which has closed many fields against them. Mr. Stuart opens with a pleasant account of his voyage out to Cairo, enlivened by a few amusing incidents; but we skip over this part of the author's work to Chapter II., where the diary of adventure begins. In speaking of the incised figures on the monuments, the author says, "I doubt whether in engraving figures on the monuments the idea of art for its own sake entered into an Egyptian's head at all. The object of their paintings and bas-reliefs was not to produce masterpieces, but to record the great deeds of their kings and chiefs, and the pious and benevolent deeds of their priests and citizens; in fact they regarded painting and sculpture as only another means of writing, and they only took just as much pains with the details as was necessary to make their meaning clear"; a statement that hardly needed making, except for the correction of those who talk about the conventional frescoes and sculptures of the Egyptians. In the paintings or portaits, the author observes, the "faces alone were done by the best men": this is supported by the observation that the portraits are "exquisitely executed so far as the features go, while the body and limbs are done with contemptuous carelessness." The artist copied nature, and did not, like the Greek artist, idealise. The author disagrees with the charge of conventionality often brought against the whole figure-drawing. As regards the faces the charge is not true; and he proves this remark by reference to the "Duel of Rameses II." and sculptures at Deir-el-Barhari and several others, the faces in which are pronounced to be all portraits. In the hieroglyphics the characteristic features and expression of birds and other animals are rendered, and we quite believe that the practice of hieroglyphic drawing must have made the Egyptian artist skilful in draughtsmanship. In the drawing of the horse the artist failed; but not so that of the donkey—a curious fact for which it would be difficult to account. The chapter on monuments of the Third Dynasty is an interesting narrative of discoveries; large views of the tombs of Princess Atot and of Meidoumofre-Maat illustrate the remarks on this very early period, and the hieroglyphics and frescoes minutely described in the succeeding chapters will be read with interest. The author in describing the drawings of animals during the early period, which in form, size, and appearance have during 50 centuries retained the same marks of the species, commends this "proof of unchangeableness" to Mr. Darwin. An interesting bas-relief from a tomb of the Fourth Dynasty, and another from a tomb of the Fifth Dynasty are illustrated, both exhibiting considerable spirit and careful incision. The author's account of his explorations at Tel-el-Amarna is very interesting; he here describes a rock-carved temple that had been buried in sand, and only recently discovered, a memento of a king of foreign blood, Khou-en-Aten by name, and who reigned about a century before Rameses the Great. The symbol of his creed—a globe with rays terminating in hands—is certainly curious, and the sculpture of king, queen, with princesses, and a little prince, executed in intaglio, are illustrated in Plate V. The columns in this temple are only partially disengaged from the rock, showing that it was never finished, and the author notices Indian-ink outlines for sculptures on a wall never carved. One remarkable thing he says about the emblems "is their resemblance to Masonic symbols." Broken pottery, remains of a funeral banquet, the flower-stems of which were still bound round a stick, and other articles not less than 3,000 years old were found. Another fine tomb was explored, the details of which show it to have been a handsome and elaborately sculptured rock tomb. The columns are beautifully proportioned and highly finished; the stone beams above them covered with hieroglyphics. The author goes into a long argument to show the non-identity of Amunoph the Fourth and Khou-en-Aten, a question of not much moment now; but it is enough to know that the dynasty was an important one, that it lasted a long time, and that the tombs and bas-reliefs at Tel-el-Amarna testify to the prosperity of this period of Theban history. A weird story is told of the author's expedition to crocodile caverns, in his examination of one with the aid of guides; the perilous entrance, the suffocating air, and the ghastly sight presented make one almost shudder. Many of these subterranean chambers and galleries have been wantonly ransacked for treasures; the monuments and rocks are being destroyed for the limestone, and the bones of mummied reptiles and human beings for superphosphate manure. The tombs of the 13th century at Siout have been particularly subjected to this kind of mutilation. The sketches of scenery, native customs, and social festivities, are graphically written, and our author's impressions of Arabs and Turks will long be read with interest. An interview with a Turkish governor indicates the feeling in some parts. In conversation with our author, the old Turk hinted his national antipathies, declaring that he did not love England, but that he hated Russia. The Nubian monuments are made the subject of a chapter. In it are described some finely-executed intaglios in a grotto commemorating the victories of Rameses, and an interesting stele with a long inscription, which our author laments is now being used as a grindstone. The memorial chapel of the Thothmes family at Amada must be an interesting temple. It is described as differing from all the temples of that period in the primitive simplicity of its construction. "The portico is supported by plain square pillars except one row of polygonal form." It is supposed to have been rebuilt by the kings of the 18th dynasty, in the original style of the 12th dynasty tombs of Beni-Hassan. Mr. Stuart represents fac-similes of various personages. We may mention the painted figure of Rameses, the contemporary of Moses, the expression of whose face is certainly Jewish; a figure of the same in a chariot fighting with lion; a striking picture of Anubis tending a mummy, in all of which the colours have been carefully depicted, chocolate, yellow, and blue being predominant. Plate XXXIII. represents two obelisks, the most ancient known, erected by a king of the Eleventh Dynasty. They were discovered, broken into pieces, in the sand, by the author. The inscription on one reads "The Crowned Horus, Sovereign of the mountain lands, Perfected of God, Son of the Sun, granted life for evermore"; that on the other, "Noub-Kafer-ra, Perfect of God, made for himself good and splendid temples." The obelisks are a trifle over four diameters high, and are asserted to be at least one thousand years older than the one now standing on the Thames Embankment. The author observes, "It is a remarkable fact that no negro or even Nubian face occurs amongst the thousands of faces sculptured on tombs and temples previous to the 18th dynasty," a statement from which the author infers that the Egyptians had some connection with Europe, or that the latter was partly colonised from Egypt; in substantiation of which theory it is observed that the most primitive forms of roots from which many European words are derived are found in the ancient Egyptian.

In a chapter headed "Historic Notes," the author attempts to trace the origin of the ancient Egyptians. He says, "There seems no doubt that the Egyptian races were of the same origin as the Europeans—both came from Asia; there is reason to believe that they found their way into Egypt from Arabia by way of the Straits of Bab-el-Mandeb, and then through Abyssinia. The reasons for believing them to be of the same race as that which peopled Europe are: first, their features; second, the analogies of their language. In the latter we find many words almost identical, in the Indo-Germanic languages; for instance, *mut* is the ancient Egyptian for mother." In the German we have *mutter*, in the Latin *mater*, and in the Greek *meter*; but we cannot devote more space to follow the author in his interesting list of other words, showing a trifling variation in the root as found in Egyptian. It is sufficient to point to the conclusion of the author that Europe was colonised from Egypt, or else that both European and Egyptian sprang from the same Asiatic country. Other links are the forms of Etruscan and ancient Greek pottery, which are reproductions of Egyptian forms; the forms of ancient architecture, as the Pelasgic tombs, which are very slightly touched upon, though they bear unmistakable evidences of Egyptian origin; and the fact, almost established, that the Etruscans sprang from the Pelasgi, which seems to strengthen this view. The other claim to identity we have mentioned—that of feature—is strikingly exemplified in plate LI., where the author presents two faithful portraits of the two most ancient statues in the world found in a tomb of the Third Dynasty, and considerably older than the Pyramids. They have decidedly European features. Our author says of them: "The young man, with his little moustache and straight nose, if dressed in European costume, might be met in London to-morrow without incurring any remark, and the lady, if fashionably attired, would only attract attention as being remarkably good-looking." Their eyes are in rock crystal. These statues represent Prince Rahotep and Princess Nofre-te. The author pooh-poohs the idea that civilisation began in the North, because the earliest monuments are found there, and he points to the African animals found in the hieroglyphics to prove a southern origin. One stepping-stone between Egypt and Greece was Cyprus, says Mr. Stuart, and the antiquities of that island suggest, it is thought, "kinship with Egypt on the one hand, and with Greece and Etruria on the other." But we have skipped over a large part of the volume that will be read with interest, and alight on one or two discoveries made at Thebes—one a tomb with sculpture resembling that found at Tel-el-Amarno, and representing Amunoph 4th and his Queen, and Khou-en-Aten and his Queen—and another, a papyrus with inscription of prayer, a *fac simile* of which is given, with a translation by Dr. Birch.

We have thus given the gist of the author's discoveries and opinions. The various expeditions made and treasures obtained, interspersed as they are with amusing incidents and exploits, cannot fail of pleasing as well as instructing. The volume is essentially a narrative of adventure written in the form of a diary, and contains a variety of incidental

information upon the scenery, customs, men, and manners of the country visited. The author's book throws some light upon Egyptian ethnology and mythology, as gathered from bas-reliefs and the tombs; his conclusions formed as to Egyptian chronology, and the effect of which is to reduce the remoteness of dates as given by Manetho and Mariette Bey, may be disputed by some chronologists: they have, nevertheless, something to be said in their favour, and they tally with Sethi's account. The length of some of the dynasties, as those between the twelfth and sixth, must always remain a vexed point. Mr. Stuart places the foundation of the Empire by Menes at 4,200 years before Christ, and the birth of Moses at 1,570 years, six years after the accession of Rameses. Plate LIII. is a copy of the royal ovals in the table of Abydos, the accuracy of which the author confirms. A "Classic Cruise" the journey home, viâ Greece, is made the occasion of a few remarks respecting Dr. Schliemann's treasures, and also of the hint that the tourist may find a more interesting route back than that by Marseilles or Southampton. The plates are not the least interesting portion of the author's narrative; they are from his own drawings and photographs; those coloured are of course restored representations, though we are assured that no colour has been added without authority. It may be necessary to add that Mr. Stuart is a disciple of Brugsch Bey, whose work we recently reviewed in these pages, and from him much information is derived. Though the author has traversed an old track, he has avoided retracing the footsteps of others; and where he has done so he has infused a freshness and interest in his theme that will make "Nile Gleanings," a readable companion to other works, and a narrative of adventure that will be of use to future explorers. The hieroglyphic tables of kings and the notes are valuable. The work is admirably printed, and bound with taste.

ARCHITECTURAL ASSOCIATION.

THE fortnightly meeting of the association was held on Friday evening, the President, Mr. S. F. Clarkson, in the chair. The following new members were elected:—Messrs. Archibald E. Dixon, J. Dixon Butler, E. Alan Jackson, W. T. Walker, and J. Windsor.

At a preliminary meeting of members only it was unanimously decided to make the formal addition to the title of the association, rendered necessary to give it legal status, as announced at the last meeting.

SOLE BAY AND ITS CHURCHES.

Mr. BASIL CHAMPNEYS read a paper descriptive of a fine group of churches on a little known part of the coast of North-east Suffolk. In opening, the lecturer expressed his indebtedness to the research and skill of Gardner, a resident in the locality, who a century and a quarter ago undertook the history of the district. This work seemed to contain every document which one could have hoped to find after the most painful research, and many which must long since have become irrecoverable. The judgment of the writer of this compilation was remarkably accurate where he relied on a personal diagnosis of period and style in buildings. In any archæological or sketching expedition he would advise a thorough search in a particular neighbourhood, overlooking not even the humblest remnant of antiquity, for it might happen to be the very key to the architectural treatment of the locality. The system of travelling over a large tract of country and picking out the plums might be more satisfactory to the senses, and more grandiose; but it did not develop a twentieth part of the right sort of observation, or result in the same accuracy of knowledge. To a restricted study all sorts of minute resemblances, developments, departures, made themselves apparent, and afforded a sense of a living and growing art, working by experience of consecutive effort. Often the very absence of such artistic connection in a neighbourhood furnished a valuable archæological fact, the disruption of associations suggesting a rivalry of orders or of guilds. Before proceeding to archæological matters, the writer sketched the general aspect of the district to be described, showing that the five or six ruined churches all lay within sight of Southwold cliffs, in close proximity to the mouth of a little stream that has many times changed its course through the lowlying country, and that the low cliffs as well as these marshes have been gradually erased from the map of Suffolk by the encroachment of the sea. The Dutch appearance of landscape, villages, and inhabitants was pointed out. Having outlined the scene, an historical sketch of *Dunwich* was given, its early prosperity as a bishop's see and fishing-town being shown. Its ruin commenced before the reign of Edward II., by the silting up of the little river and haven, and was hastened by the opening of a new harbour at Blythburgh, with a quay at Walberswick, no less than by the gradual inroads of the sea. In order to check the decadence of Dunwich, Edward II., and subsequently Richard II., adopted measures of protection, ordering people under penalty to land fish at no other port, and to pay customs dues here; but the ruin progressed, and not the less fast because in the Wars of the Roses Dunwich had the misfortune to take the losing side. The tables of ratal assessment under successive sovereigns showed a steady decrease in rateable value, until from ranking first on the east coast, it sank into decay. Coming to the city as it is, the gaunt ruin most prominent on the little cliff would prove to be a church, consisting of a nave and chancel, with an arcade, which once opened into a north aisle, now destroyed. The whole is unroofed, the arcade is kept standing by brick buttresses; the tower is fairly complete, but for the loss of some of its angle pinnacles and the tracery of its windows. This was the Church of All Saints, which had the good fortune to be furtherest inland of the many churches and chapels of ease at Dunwich. As it is, it risks even such ruinous existence as it retains. The sea has eaten away the cliff to within some 50ft., and has swallowed a large portion of the churchyard and them that dwell therein. West of the church is a large inclosure, the walls of which show here and there evidences of mediæval workmanship. On this west side of the walls is a large, simple, and effectively-designed double gateway, of the 15th century, once the main entrance to the grounds of the Grey Friars. In the centre of the inclosure are some fragments of the conventual buildings, which, by a later conversion into a town-hall, have lost nearly all evidence of date and design. A portion of the traceried head of a window alone remains to assign this to the 15th century, and to establish its connection in date and character with the ancient gateway. Returning to the church, it must have been originally founded in the 12th century, some remains of this date being built up into the south wall. In the latter part of the 13th century it was enlarged by the addition of a north aisle, now completely destroyed, but of which the arcade, with single octagonal columns and plainly moulded capitals, fixes the date. The arches are chamfered in two orders, and squinched above the cap. The chancel is probably of the 12th century foundation, and was remodelled at the time the north aisle was added, and possibly a trifle later. The earlier part of the 15th century contributed the tower, and converted the south wall of the church into its own style, and probably added the porch, now destroyed. Having given some proof of the former importance of this port, of which these scanty ruins were almost the only traces now visible, the author proceeded to describe the neighbouring village of *Walberswick*, which was called into a sudden importance by the diversion of the river from Dunwich. The old church, which was a small thatched structure, was then deemed insufficient, and was pulled down in 1473, although the foundations were not completely obliterated till 1728, and the present fine edifice built a short distance off. The new church was not completed till 1493, and had a very short lease of life. A series of interesting documents had been preserved relating to the contracts for building the new church, and showed the price of work in the 15th century, the most curious being the following contract for building the steeple, a feature which still remained tolerably perfect:—

YE COMENAUNT FOR BUYLDYINGE WALBUREWYK STEPEL.

This Bille endentyd Witnessith that on the Tewesday next after ye Feste of Seynt Matthie Apostle; the fourte yeer of King Henry the Sexte, a comenaunt was maked bytweyn Thomas Bangot, Thomas Wolfard, William Ambrynghall, and Thomas Pellyng, of the Town of Walbureswyck, on the one Partye: and Richard Ruffell, of Donewich, and Adam Powle, of Blythburgh, Masons, on the other Partye. That is Seyne. That the fornseid Richard and Adam schal mak or do make a *Stepel* joyned to the Cherche of Walbureswyck fornseid; with foure bertraas, and one vice and tirwelfe foote wyde, and sexe foote thikke, the walles, the wallyngs, the tabellyng, and the Orbying sewtly, after the Stepil of Dunstale, well and treuly and competently, a Dore in the West, also good, as the dore in the Stepel of Halesworth, and a Wyndowe of foure Dayes above the Dore, sewtly after the Wyndowe of thre Days of Halesworth. And thre Wyndowes atte Nethir Soler, and eche Wyndowe of two Days and foure Wyndowes atte anerer Soler, the Wyndowe of thre Dayes sewtly after Halesworth. The fornseid Richard and Adam schal werke or doo werke on the stepel fornseid, two termes in the Yeer, saf the ferste yeer yeerly, in the Tyme of werkyng, of settyng and leying; that is to sey, bitwixen the Feste of the Annouceyacion of Our Ladye and Seynt Mychel Archaunggel. But if it bee not other Maner consintyd on bothe Partyes, and the fornseid Thomas Bangot, Thomas, William and Thomas, schal finde alle maner of mateer to the stepel afornseid, that is so sey, Frestoon, Lyme, and Calyait, Wat, and Sand, and alle maner Thingge that redith to stagyng and wyndyng and schouellin, and alle maner vessel that is needfull to the stepel fornseid. And an Hows to werke inne to ete and drynke and to lygge inne, and to make mete inne, and that he hadde by the place of werkyng. The fornseid Richard and Adam schal take of the fornseid Thomas Bangot, Thomas, William and Thomas, for the Yarde Werkyng 40 Scheelynggs of laughfull money of Ingland, and a cade of fulle Herynge eche Yeer in Tyme of werkyng, and each of hem a gowne of lenon ones, in the Tyme of werkyng; so that they scholden be gode men and trewe to the werk fornseid.

The mode adopted by the townsmen of Walberswick of directing the general building to be like the steeple at Dunstable, and the details of west door and window like examples at Halesworth, with the exception of four instead of three lights in the window, was calculated to save the designer much trouble in preparing specification. From the documents it seemed that the total cost of this fine tower was only some £60. So early as 1585 the poverty of the church made it necessary to sell the great bell. A series of other documents showed the injuries to the church inflicted by the Commonwealth, in which it appeared that just before Will Dowsing's arrival, in the year 1646, the inhabitants paid a man 6s. to break down crosses and stones; but this did not save them, for Dowsing came, ordered many other works of demolition to be done, and saddled the inhabitants with the charges. By the time of William III. the town had so far diminished that it was considered necessary to reduce the size of the church, which was done by walling in the south aisle of the nave, and to this day that was all of the church which was not in utter ruin. The principal agent in the ruin of Walberswick was the Reformation, which made fasting optional, and thus reduced the fishing trade to beggarly proportions. A fire destroyed great part of the town in 1749, and a calamitous lawsuit with the lord of the manor further impoverished the inhabitants. The four churches of Walberswick, Southwold, Covehithe, and Blythburgh bore a striking resemblance to each other, but of the four Southwold only remained to tell, except to archæologists, the tale of its former prosperity. In all these churches was to be found the same plan, as far as can be ascertained, the same number of bays and of clerestory windows. Of the four, Covehithe seemed the earliest, as its mouldings had not fully emerged from the Middle Pointed character; otherwise the main lines of all were very similar: A nave and chancel under one continuous roof, without a chancel arch, aisles on both sides extending half-way down the chancel, a continuous clerestory from the extreme east to the extreme west of the church, a western tower and a south-west porch, with a staircase-turret at its junction with the aisle. Evidences of lofty and elaborate rood-screens, of richly-traceried pulpits, of stalls and sittings might be found in all. All were faced in flint and stonework, the ornamented treatment of which was in many cases rarely beautiful. Another feature which might be assumed to have been common to all these churches, though in some cases ruin had destroyed the traces of it, was the treatment of the buttresses. These terminated neither with gable ends, tablings, nor pinnacles, but in a flat pilaster of low relief. In a first view of Walberswick it might be supposed that these pilasters, which had not in their general effect much appearance of a Gothic character, were introduced at the time of the remodelling under William III., were it not that Southwold Church, which underwent no such change, also exhibited similar features. A visit to Blythburgh explained these, and showed them to have been the bases

of figures, many of which were in that church preserved. Except in this group of churches, and at Bramford, near Ipswich, he did not remember to have come across an exactly similar treatment. Another special feature common to the buttresses of these churches was the treatment of the tabling. At the top of tabling was a range of small battlements, which served to give great piquancy and refinement to those features. Again, each church, through all its changes and ruin, had preserved its ancient pulpit. Of these there were at least three good specimens of the Elizabethan period, similar in type, but various in design, the main features of which were fairly well preserved. Passing on to the next village, that of *Blythburgh*, the lecturer remarked that its vicissitudes had not been so great as the other places; it was never of great importance, and it still possessed a small quay and a river trade. Its former prosperity was proved by the magnificent church which the 15th century erected. This building was one of the most remarkable in the Eastern Counties, and, unlike those already described, was still used in its entirety. It could not be said to have been maintained, for little or nothing seemed to have been done to it since the day that it was left by the original builders, while Protestantism, damp, churchwardenism, decay, lightning, and wanton mischief had played with it the most terrible havoc. The stained glass, of which traces were almost everywhere apparent, had been mostly destroyed, and with it, in many cases, the tracery, which had been replaced by large expanses of lath-and-plaster; the screens had been mutilated and white-washed, the stalls shifted; all the sacrarium fittings removed, the wall paintings obliterated, and much of the Gothic seating replaced by modern pews. In spite of all this, possibly as the beneficial result of extreme neglect which had had no motive for removing what it had failed to value, it retained remnants more in number than any other church which he knew of its ancient fittings. Of the screens which spanned the entire church and closed in tower-arch, some purlins of each remained; also a portion of the original lectern, patched and supplemented; the pulpit was of later date, about James I., but a remarkable one of its kind; an alms-box, which had been recently decorated by an amateur in execrable taste; the stalls, probably the richest and boldest in idea of any in the country; a large number of the nave seats; the decoration of the greater part of the nave ceiling, of a very simple character, mostly dull red on a white ground, and consisting almost entirely of the monogram I H S repeated some hundreds of times and interspersed with stencilled flowers; and lastly, the parts of a wooden figure, representing an old man in the costume of the 15th century, with hinged limbs, whose function it was till a few years back to strike on a bell when the priest entered the chancel. A similar Jack-o'-th'-Clock is still in use at Southwold Church. Of all these features, the stalls were probably the most remarkable. They were in long lengths, returned at the west end to face the priests towards the altar, and were divided between their small buttresses into a number of niches, each containing an attached figure of a portly saint or king, which but for a few casual mutilations were still fairly complete, and mostly recognisable. Externally, the most remarkable feature of the church was the traceried parapet, and the same pilasters (in this case crowned by their figures) as in Walberswick Church; the priest's door in the south aisle was placed in the centre of a buttress, which in this case was made to "fly" in order to clear the door-head. The tower, though scarcely earlier in date than the 15th century, belonged to a more severe type than the remainder of the church. It seemed likely that the building of the church, apart from that of the tower, occupied at least the greater part of the second and third quarters of the 15th century. The chancel seemed, according to bequests made to it, to have been re-erected after 1442, and it was still unfinished in 1473. *Reydon*, another of this remarkable group of churches, was interesting as the mother church of Southwold, and as the sole representative of the primitive type of church (though itself scarcely earlier than the 15th century) which preceded the great outburst of magnificent building. The tower bore some affinity to that of Blythburgh, and half of the nave was still thatched. Its peculiar features were the simple but delicate niches which appeared in the eastern jamb of nearly all the windows and the peculiar arrangement of the rood-staircase, which started from the nave side of the chancel arch, and discharged in the western side of the space between the arch and the wall. The church of *Southwold* was the only one of the group to which due honour had been attempted. Here there was at least no neglect to be regretted; on the contrary, they had to deplore some undue zeal in the restoration it had undergone. Notwithstanding this, the spaciousness and dignity of its proportions were such as to redeem any deficiencies. Judging from the bequests, the bulk of the church seemed to have been completed about 1460, though the fine porch must have been a few years later. The feature in which the edifice stood pre-eminent was the rood-screen. In general type this did not greatly differ from many examples in this part of England, but in detail it gave evidence of the exuberant fancy and richness of workmanship of the middle ages. Each tiny buttress, probably some 2in. wide, was still richly adorned with such lacework of tracery as you might search for in jewellery rather than in architecture, and this tracery had been decorated with the utmost care and skill in gold and colours. The process seems to have been this—when the joinery was complete, the flat surfaces were overlaid with a thin incrustation of fine plaster in cement, which was then stamped into the traceried forms, and decorated by hand. The care and skill spent on a detail so delicate, as only to be apparent on close inspection, was beyond all praise. The process was well worth considering, with a view to reproduction. We were still far from having exhausted, or even appreciated, the resources of mediæval art. *Covehithe* seemed to have been built on a similar plan to the other churches mentioned, but at a slightly earlier date; it preserved the remains of a small crypt beneath the altar, which, no doubt, once existed in the other churches, but was not now discoverable. In reducing this church to the very minute dimensions now required by the village, a different line had been adopted from that taken at Walberswick; a small church was built quite within the ruins of the old one, and into this the ancient font and pulpit, all that remained complete of the ancient grandeur, were brought. In conclusion, Mr. Champneys said: I would ask you to consider what a dream of glorious magnificence these ruins and the records in connection with them bring before the mind; the bold and splendid proportions of the fabric, the richness of glorified colour in the windows and on the walls; the delicacy of detail carried as far as the utmost refinement of the jeweller's art; the rich vestments and splendid ceremonial. As the sea-wind whistles through the ruined aisles and shakes the masses of ivy on the walls, it sounds like a dirge of the magnificence which, to the devotion of the past, was a necessary condition of worship; of an age which, much as it has been the fashion in the past years to decry it, produced the most magnificent of all the monuments of Christian art in the length and breadth of the Catholic World.

A vote of thanks was awarded to the lecturer on the motion of Mr. Florence, and the President in putting it to the meeting referred to Mr. Aston Webb's lecture, before the Association, on "Suffolk Churches" (reported in BUILDING NEWS, for July 1, 1877, p. 536, Vol. XXXII.), in which extensive reference was made to Southwold Church, and to the recent visit to the district of the British Archæological Association (see BUILDING NEWS for August 22, 1879, pp. 223-6, last Vol.; Mr. R. M. Phipson's paper, on "Southwold Church," was published in our issue of the following week, p. 247).

DETECTING FAULTY DRAINAGE.

LIEUT.-COL. LONSDALE HALE, in the *Times*, reminds the public of the great value of ether as an agent in detecting leaks in drains and the shortcomings of bricklayers and plumbers. The last case in which he tried it will serve to illustrate the method of using it, as also its value. At the house in question the highest inlet to the drains is a water-closet on the first floor. From the closet the soil-pipe runs down the outside of the house into a courtyard, and passes underground to a cesspool 45ft. distant in a field. The overflow-drain from the cesspool discharges into a ditch 50 yards distant. On the ditch side of the cesspool, and 9ft. from it, the overflow-drain receives a second drain running outside the house, and carrying off, at the time of his first visit, among other affluents, the drainage of the scullery-floor. From the scullery-floor pipe to the junction with the overflow-drain is a distance of 45ft. The scullery-floor pipe was also protected (?) by a bell trap. It being obvious that the scullery-pipe was acting as a ventilator to the drains outside, the connection between the scullery and the outside was, at his suggestion, broken, and the wall "made good."(?) Last week, when again at the house, Col. Hale poured a pint of ether down the closet, with a fair rush of water to carry it on. The ether at once become perceptible in the yard, through leaks and holes in the vertical pipe, but for some little time it gave no evidence of its presence elsewhere. After the lapse of about half an hour, the ether, having journeyed down through the cesspool to the junction mentioned, and having turned up the second drain, gradually entered the scullery through the part of the wall supposed to have been "made good," but which, either from the action of frost or from bad workmanship, was defective, and permeable by gas. Twelve hours later the ether was distinctly perceptible to the workman uncovering the second drain, and even 24 hours afterwards it gave evidence of its presence at the outlet into the ditch. In another instance the basement of a house speedily was "etherised," and the vapour ascended to the owner's dressing-room upstairs. It is well, in using ether, to take precautions with regard to lights and fires, and, moreover, the operator must be on his guard against being literally put on a false scent by touching or spilling the liquid. The cost of the ether is four shillings a pint.

ART IN THE CONSERVATORY AND GREENHOUSE.

[WITH LITHOGRAPHIC ILLUSTRATIONS.]

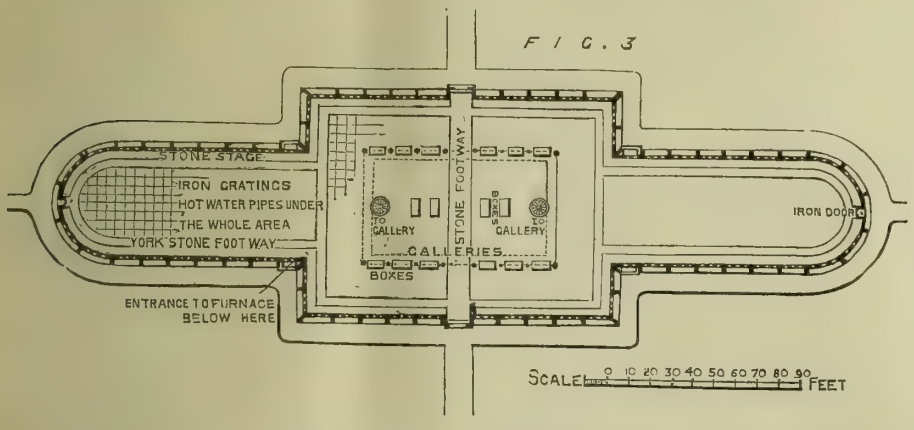
(*Concluded from p.* 66.)

VINERIES are the most usual form of fruit-house, and are made of various forms. Three houses are necessary if grapes are wanted all the year round, and if it be intended to grow the fruit in the greatest perfection: One house for the earliest crop, one for the summer crop, and another for the autumn and winter crop. In large establishments this division is still further carried out, various kinds of grape being grown in different houses, and under varied treatment. The best form for a vinery is the span roof, provided it be properly ventilated at the apex, to let out the superabundant heat that accumulates there. If early grapes are intended, then the border must be entirely inside, but for a general crop, in order to give the vine a large pasture the walls are built on arches as already described, additional borders being provided outside or in some cases the vine may be brought through the wall, its root being planted entirely outside. The best aspect of such a vinery should be east and west. It will then have the benefit of the sunlight from the morning to the evening. Frequently circumstances allow but little choice in the aspect of glass buildings, but for the most part and especially for lean-to houses the south-eastern aspect is decidedly preferable to any other, whether they are intended for growing fruits or flowering plants. The sun's rays in the morning are more strengthening and exhilarating to plants than at any other period of the day, and the rays of the evening's sun, which may be lost if the building face the S.E., are of very little importance compared with the cheering beams of early morning, and it has been found, generally speaking, that plants are more prostrated by the influence of the afternoon's sun, when it is most powerful and oppressive, than at any other time. Vineries are frequently built against a wall either as lean-to or half-span buildings; they are generally built so for early vineries, as they are warmer than span-roof houses. For early vineries the proper amount of pipes is about 1ft. of 4in. pipe to 20 cubic feet of air, the proportion for late vineries being 1ft. to from 25 to 30 cubic feet.

PINERIES are similar to forcing-houses, but the beds are deeper in soil, and the lower part of the roof lights is made to slide so that the plants may be lifted out at pleasure, which is often a great convenience when the house is full. The hot-water pipes are of course in all the foregoing strictly speaking working houses, heated by boilers over furnaces fed with coke or small

coal fires, but in ornamental buildings or those connected with the dwelling-house, the heating may be advantageously effected by the use of gas and air, provided, of course, that the furnace be entirely external to the conservatory. Mineral oil stoves are sometimes used for small glass-houses, but not, I think, with much success. Half measures generally are little better than failures. The sections which I have given in my diagrams, Nos. 1 and 2, are simply and entirely devoid of all attempt at anything beyond practical utility, they only present the necessary elements of such buildings; my other pen-and-ink perspective drawings, with plans, show how they may be made more in keeping with a simple artistic idea. Other architects have not failed to grasp the necessity of rendering their designs for similar structures with appropriate architectural treatment; but the instances are by no means numerous, though I should be sorry to ignore anything which has already been done in that way. One of the earliest large buildings which still remain among the most important yet erected in England, is the celebrated and well-knowm palm-stove in the Royal Botanic Gardens at Kew. It was built some thirty years ago, from the designs and under the direction of Mr. Decimus Burton, F.R.S.

FIG. 3



Mr. Burton, the architect, has most kindly lent me a copy of all the working drawings of this building, and I am thus enabled to show a general plan by Fig. 3, with a general cross section through the centre of the building by Fig. 4, and some details of the construction by Figs. 5 and 6. It will be seen that the entire length of the structure is 362ft.; the centre is 100ft. wide and 66ft. in height; the wings 50ft. wide and 30ft. high; wrought-iron was used for the ribs of the roof, in lengths of about 12ft. long, which were welded together to form the required lengths, and then bent to the proper curve of the rib. Cast-iron sockets receive the ribs; these sockets are sunk into granite blocks, upon a foundation of concrete. The cast-iron columns and the standards over them are hollow, and conduct the water from the gutter cornice of the upper roof into rain-water tanks, under the stone tables all round the entire interior, and these troughs are arranged here so that the water may be warmed by the temperature of the building before it is used for watering the plants, a necessity I have already pointed out. Fig. 5 shows a section of the main gutter cornice, and it illustrates the provision intended to carry off the condensed water of the interior, which, owing to the great quantity of iron surface, in cold weather is very considerable. I last visited this building during one of the sharp frosts of the very severe weather which prevailed during the early part of last December, when a perfect rush of water was falling from the continuous gallery which runs round the central area of the house. The Board of Works had, at that time, not completed the intended alteration by which provision was to be made for the carrying off of this condensed water by means of a pipe from the above-mentioned gallery, where it collects in great quantities. An opening had merely been pierced in the gallery floors to receive the pipe, which was not then fixed, and hence, probably, the rush of water to which I refer. The building is heated, it seems to me, in the most perfect manner; no less than 19,510ft. of hot-water 4in. piping being carried over the entire ground area of the building. This work was designed about three years since by Mr. E. G. Rivers, C.E., and executed by Messrs. Simpson and Co., of Pimlico.* Six large tubular boilers are arranged in the base-ment, three at either end; two boilers being simply provided as a reserve in case of repairs in the others being necessary, and each boiler heats 4,877ft. of piping. Originally the architect arranged a series of underground flues, communicating with a smoke-tower, which was 96ft. high, at a distance of 500ft., but these arrangements have now been superseded by the flues from the furnaces being carried up within the wings of the building and the water supply is derived from tanks in Richmond Park, filled by engines near the temperate house in the Kew Gardens Pleasure Gounds. The glazing of Kew Palm House is in every way a success, as I am informed by Mr. J. Smith, the able curator of the gardens, to whom I am indebted for many hints. Plants growing in stove and other houses often, as is well known, suffer from the scorching influence of the solar rays, and great expense is frequently incurred in fixing blinds to cut off this destructive calorific influence. From the great size of a large building such as the Palm House at Kew, it would be almost impracticable to adopt any system of shades or blinds which would be effective, and it was therefore thought possible by the use of tinted glass, which should not itself be objectionable in appearance, that the most scorching of the heat rays might be arrested. Mr. R. Hunt made the suggestion, associated by Sir William Hooker and Dr. Lindley. The glass eventually used after a long series of experiments is that which we now see employed in the Palm Stove, and several other buildings at Kew. I have brought some specimens to show you. The glass, as you will observe, is of a light green colour, which is obtained by oxide of copper, and the glass is made so transparent that scarcely any light is intercepted. This glass is manufactured entirely free from the oxide of manganese, which is commonly used in making all ordinary sheet glass. The absence of manganese must be insisted on, and for this reason: that glass, into the composition of which manganese enters, will lose its green shade, and be certain to assume a pink tint after long exposure to much sunlight, and any tint of a pink colour would completely destroy the peculiar properties for which this glass is chosen. Messrs. Chance, of Birmingham, are the manufacturers, and I cannot do better than recommend it for more general use for fern, palm, and other similar buildings. It will be seen, however, by a visit to Kew Gardens, that where the glass has not been carefully manufactured, or by other makers, that the green has entirely left the glass, the pink tint which I have described having taken its place. The cost, at present, of this tinted glass is, I believe, about twice as much as ordinary 21oz. British sheet. The appearance of the green glass is very effective, especially when seen from the interior of large buildings. In ordinary conservatories, I am inclined to think it might be adopted with much advantage, although some horticulturists object to its use, and especially I would introduce it in the lower panes of vertical lights, say on the south side, or anywhere where the glass is near the roots and pots. Much damage is often done by the burning up of roots by radiation from the side lights, and, therefore, it may be remarked, vertical lights generally should be lessened as much as possible. Stippling is now resorted to to avoid this scorching, but the method is a troublesome and by no means good-looking procedure. The whitewash with which the glass is clouded soon becomes begrimed with dirt and soot. Clouded glass, I believe, is sold, but, like the Kew green glass, cannot be used entirely in general conservatories with advantage, because in early spring most people want flowering plants, for which as much light as possible is required. I think, however, that a combined use of both plain and Kew glass might, even in ordinary circumstances, be made with increased success, and more extensively than at present, and so avoid stippling. With regard to the glasshouses of the French we have little or nothing to learn beyond the fine propagating house at La Muette. The appearance of most French conservatories is spoiled by the method employed for shading, which is bad, expensive, and awkward. Laths painted dark green and connected together by means of a string and hooks, are adjusted as blinds on the top of the houses reached by gangways running along the top of the roofs. The French, however, have one mode of glazing which seems worthy of adoption, as it presents a neater and rather more satisfactory effect than laps as we use them. The sheets of glass, instead of being allowed to lap, are made with a butt joint, a small quantity of putty being rubbed into the joints when the glass does not exactly meet evenly. Strips of lead paper, about ½in. wide, are then fastened on to the outside over each joint by the use of a solution of indiarubber or marine glue. A good effect is produced by this silvery slip of lead paper, and repairs are easily effected, while the glazing is almost hermetical. It has, however, one objection for stoves and other houses where the temperature is a high one, and much moisture is given off, on account of the condensed water having no means of escape, excepting by drips, and at the bottom. By curving the upper and lower edges of each sheet of glass in the top glazing (see Fig. 10), the water is brought from the sides of the pane into the centre, and, if properly fixed, much of the

FIG. 4

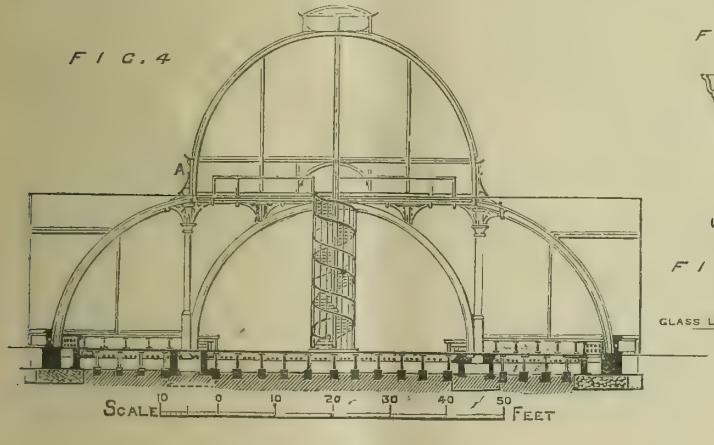


FIG. 5

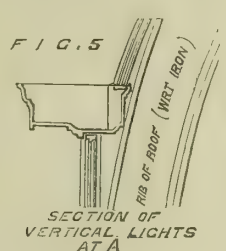
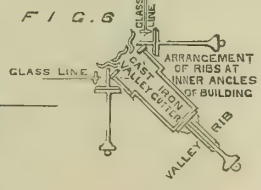


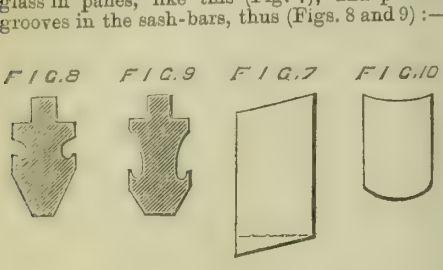
FIG. 6



* An illustration of the new boilers was given in the *Gardener's Chronicle*, Nov. 17, 1877.

condensation water inside will find its way from the under side of one sheet on to the outside of the next sheet of glass below it; and this is the method I have adopted in my own conservatory with success. In houses where a high temperature is kept up, such as in stoves, forcing-houses, &c., a good method to carry off the condensation water, which, in these cases, during cold weather, is considerable, is to cut the roofing glass in panes, like this (Fig. 7), and provide grooves in the sash-bars, thus (Figs. 8 and 9):—

FIG.8 FIG.9 FIG.7 FIG.10



the object being to drain the water to the edge of the pane, when it runs off into the groove of the sash-bars at A, to be caught in a gutter below. Several patent systems of glazing have been largely used with much advantage, chiefly Helliwell's and Rendle's; but for houses where architectural considerations are of any importance, the want of constructional lines on the exterior can but be an objection to the use of these methods; that is to say, if the two systems are used, as shown by their patentees. There can, however, be no doubt that both modes are practically admirable, more particularly for large iron roofs, such as the Victoria Station shed, or at the Westminster Aquarium, where they have been successfully employed. When ordinary or curved laps, such as I have described, are used the lap should be as small as possible, say 3-16ths or ¼in.; just sufficient to keep out the wet, and not allow dirt or water to collect, lest the latter should freeze, and result in cracked or broken glass. Curvilinear houses have many advantages, and may either be constructed with iron or bent wood, and glazed with either straight or curved glass. For ordinary purposes wood is preferable, to my mind, and if used with care a very good effect may be produced by the use of straight glass. Some of the designs exhibited on the walls illustrate the style of thing both in domes and curved roofs which one would recommend. For opening ventilating lights there are several methods. One of the best that I have seen is that used by the well-known horticultural builders of Loughborough, whose work for accuracy of detail architecturally, and whose experience as horticultural engineers, has a reputation of very high standing, and for good workmanship this firm is to be recommended. Their mode of opening the lights, which are all hung on hinge butts, is based on the principle of the old quadrant, and nothing is more simple and effective after all. A sunflower enrichment decorates the enclosing shields of the lever with good effect. Mr. Elsley, of Great Portland Street, who by the bye is a very good man to go to for brass rim locks and other Queen Anne door furniture, has an admirable lever for opening vertical lights, and I speak from experience when I say they are light in construction and work well. It is to be feared with all these constructional particulars that I have wearied you and laid myself open to the charge of having said but little about the more direct bearing of art upon conservatory building. My aim, however, has been to furnish a few of the leading practical details, and it is only upon such data that a true artistic treatment of any structure can be effected. Pugin once said, with reference to the Crystal Palace, "Let Sir Joseph Paxton build his conservatories, and I will build my churches." Since then, however, if work has not decreased the profession has certainly multiplied, and few architects now could afford to decline work because it is not monumental in its character. Had Pugin lived now, I feel sure he would have been among the first to recommend his professional friends not to neglect so increasingly important a class of building as conservatories and glass-houses. There is this fact also certain, that he would have urged his true principles into the subject, and one has only to look at the small lean-to conservatory at the Grange, at Ramsgate, the residence Pugin built for himself, to see how thoroughly he knew how to bring his art to bear upon anything which he designed.* It is more than 30 years ago since that building was designed, a fact which at once causes the modern critic to look over many points which would be, perhaps, differently treated now. Pugin's was, of course, a florid Gothic style of building; now men's tastes have changed, and a more congenial domestic style has taken the place of the 14th century acutely-pointed arch and angular forms for our dwellings. The "Free Classic," or if you like to call it so, the "Queen Anne" style, cannot claim to be a pure style, neither is it of a high monumental order; but, as I said in starting, it lends itself better than any other style yet chosen for interior domestic finishings. The internal treatment of conservatories, like our houses, will tax the skill of the designer far more than the exteriors. Much may be done with curved ribs in the roof, either of wood or iron; but in glass-houses, treated chiefly as ornamental buildings, in which decorative plants are grown, the foliage of creepers will soon hide any elaborate architecural detail, so that what are primarily wanted are good leading lines, such as elliptical or half oval curves, upon which creeping plants may be trained, thus forming natural bowers which will be satisfactory and complete. The architecture must always have but one purpose, evident at once to all, viz., the setting-off of the plants and flowers; and these should be arranged in borders as much as possible where ornamental suitability is studied, and much may be done with hanging baskets and pots for trailing foliage. Leaded lights in tinted quarries may be used with good effect for the upper vertical lights and in gables, and an almost endless variety of effect may be obtained by introducing birds and fish, as well as fountains, for internal fittings. The colouring of the woodwork of the interiors of glass buildings is a point in which much taste may be displayed. For my own part, I prefer a light colour rather than a dark one for the roof and woodwork generally, always finishing the exterior simply with plain white. It is preferable, to my mind, to leave the red brickwork, both inside and out, neatly pointed with a struck joint of white mortar, and not washed with colour of any kind. Shelves and hanging boxes can also be more easily fixed than when the walls are plastered; besides which, the red brick helps to throw up the green foliage, and it also retains the heat better than a light-surfaced wall. This is an important point when the temperature of the conservatory during the cooler hours of the night is taken into consideration. For the finishing of the woodwork, I think nothing looks better than a light pea-green made with white, light Brunswick green, and a little celestial blue. In conclusion, I have only to remark that, with this class of building, like most others, a little thought and taste will often enable much to be made out of but very little material. Take, for instance, a lean-to adjoining a dining or drawing-room—it may be small, but small as is it will frequently give double value and interest to the room; or a floral porch to the chief or garden entrance will add greatly to the importance and comfort of the house; while in towns and limited areas a first-rate conservatory can often be managed on the top, either of the entrance portico or over the slip room flat in the rear. Several of these suggestions I have practically shown in the collection of drawings on the walls, to which I will refer you, if you have not already had more than enough of my text, "Art in the Conservatory and Green-house," and I hope that my paper will tend to bring horticulturists as well as architects to consider glass-houses, of whatever kind, as worthy of more thought from an artistic point of view than that hitherto devoted to the subject.

SUGGESTIONS FOR A NEW BILLINGSGATE MARKET.

IN a pamphlet form comes a suggestion by Mr. Frederick Todd, architect, of Essex-street, Strand, that will probably meet with a share of approval from a large class of people who know the cramped approaches and limited accommodation of the present fish market at Billingsgate. Mr. Todd's idea is to remove the market to a "contiguous, but more extensive and central position," an idea that has been entertained for many years past, though, as it grows in significance from year to year, it does not lose any of its force. The author has presented his suggestion in a practicable shape, and explains it with the aid of lithographic illustrations, prepared to a good scale. Let us briefly view Mr. Todd's suggestions here.

No one who knows Billingsgate will dispute the principles laid down by the author, nor that the present position of Billingsgate Market is particularly unfortunate on account of its cramped and confined situation. "Three sides of it cannot be approached by heavy vehicles, whilst the approaches on the north side (with the exception of Thames-street) are by very narrow streets and lanes, of steep gradients, perfectly inadequate for the immense and increasing traffic, and constantly blocked for hours together, to the great loss and annoyance of the carriers, and to the detriment of the goods." The Corporation, it appears, have laid out the large sum of £270,000, and yet it is acknowledged to be quite inadequate; the market itself is not half large enough, and the growth of the fish trade is becoming yearly more formidable and difficult of management, for we have it, on good authority, that as much as 600 tons of mackerel have been brought to the market by the Great Eastern Railway alone in the course of three days.

Mr. Todd proposes for the site of the new market a large area of waterside premises and vacant ground in the neighbourhood of Queenhithe, Upper Thames-street, now mainly held by one proprietor, who is also the freeholder. It is further suggested that as the Metropolitan District Railway comes within about 170ft. north of Upper Thames-street, and just north of this site, the intervening piece of land, measuring about 220ft. by 170ft., be acquired, in addition, by which means the site would abut on its northern side upon the District Railway, and adjoin the Mansion House Station. "Thus, a space for a market would be secured, reaching from Queen Victoria-street on the north, to the river-side, nearly 600ft. in length, by 230ft. in breadth, or nearly 3¼ acres in extent, and furnishing a site for a new market, unique for situation, standing perfectly isolated, and with entrances on all sides." A communication from the railway to basement under the market could then be obtained, and the fall of the ground from Queen Victoria-street to Upper Thames-street might be utilised to obtain two markets, an upper and a lower one, each on the level of those streets. The author shows that the lower market might be 493ft. long, by 193ft. broad, and 23ft. high, and the upper one, 535ft. by 193ft., with a height of 68ft., to apex of central roof. The design Mr. Todd has prepared shows the treatment of this parallelogram-shaped site. There is a basement for the unloading of goods, waggons, &c., from the railway, and the two markets, one above the other, forming a two-storied building in the Italian style, emphasised by an arched gateway, 20ft. wide, covering the line of Upper Thames-street, and by angle entrances crowned by pavilion roofs. There is a central and side avenues, with large wells or areas for light, in the floor of upper market, and flights of stairs from one floor to the other. The river and side elevations are characteristic and suitable in their style and detail, and Mr. Todd's design and drawings evince considerable merit and ingenuity, and are worked out with care.

The sections show a clerestory range of semi-circular lights for the central nave, with lantern along the side, or lower roofs, and ample side-lights in the walls. Lifts are provided in the scheme, so that the fish-trucks can be quickly unloaded, and the goods landed on either floor, and it is further hinted that a subway under Thames-street could communicate with the present market. We cannot enter into the several reasons urged by the author for a new market, the chief of which are, greater facilities by improved approaches and accommodation, and the reduction of the existing high price of fish in London. The difficulty of bringing sea-going vessels of large tonnage above bridge without delay is answered by the writer satisfactorily, and, we think the author has made out a fair case, and that the suggestion is worthy the attention of the Corporation, and that large portion of the public who regard a more central fish-market, and one more worthy of the metropolis, a desirable acquisition.

*See BUILDING NEWS, Nov. 7, 1879.

THE PRIORY OF MOUNT GRACE.

AMONGST the most interesting, but least known, remains in England, says the *Saturday Review*, is the little Carthusian priory of Mount Grace, seven miles east of Northallerton, in Yorkshire. The rule of St. Bruno attempted a sort of union of the solitary and the cœnobitic life. The brothers formed one community, contained within one enclosure, worshipped in the same church, meeting on high days in the same refectory, and sharing in the same cloister and conventual buildings; but instead of the common dormitory and day-room, each had his own little cottage, comprising a sitting, bed-room, and closets, with a little garden attached, to be cultivated with his own hands. Of this arrangement this little Yorkshire priory, of which the chivalrous and ill-fated Surrey was the founder, supplies a small but most interesting example, perfectly unique in England. Nowhere else can we see the two courts—the outer court to the south for the "conversi," or lay brethren, and for those who did not adopt the rule of the community in its full strictness, in which were also the apartments for the reception of guests; and the inner court to the north, separated from it by the church and prior's house, containing the residences of the brethren. This court was originally surrounded with a pentice cloister, the hooked corbels of the roof of which remains projecting from the walls, from which the "domunculæ" of the monks, five on each side, opened by small, square-headed doorways. On the right hand of each doorway is a small, square-headed hatch, for the admission of food from the general kitchen and other necessaries, the rule of the order prohibiting any one from entering a brother's cell, except from absolute necessity. These apertures do not go straight through the wall, but turn twice at a right angle,—like a straight-limbed Z.—so as effectually to prevent anyone from looking out or looking in. The same arrangement for securing absolute privacy is found in Carthusian houses generally—as at the Grande Chartreuse, at Pavia, at Florence, and at the convent of Miraflores, near Burgos. Of these houses, the mother house by Grenoble and that near Florence, are alone still occupied by the order, the Certosa of Pavia and Miraflores having been suppressed in very recent times. Here, at Mount Grace, the little houses in which the brothers passed their lives in perpetual silence, chiefly occupied in copying books, were of two stories. Each floor, 20ft. square, was divided by a wooden partition into a chamber and a closet, comprising the day room, with a fireplace below, and the sleeping-room above. One of the closets formed an oratory, the other contained the brother's scanty stock of tools and implements. A little walled-in garden lay in the rear of every dwelling. As the rule of the order required the strictest austerity of life, the most studied plainness prevails in every part of these little dwellings. The doors and windows are mere apertures in the walls. Towards the western part of the south side of the cloister wall, under the prior's house, are the lavatories and the general refectory, in which the brethren only met on festivals, ought to be adjacent, but this part is too much ruined to allow its place to be accurately determined. The church that divides the two courts displays a little more architectural skill. It consisted of a very short nave and a long aiseless choir, a central tower and broad shallow transepts, opening, not from the crossing, but from the nave. The straight joints show that the church and transepts are later additions, belonging to the second period of building [c. 1440-50]. The tower and the nave indicate by their style that they form part of Surrey's original work [c. 1400]. The chancel has entirely perished, with the exception of the north wall, but its foundations can be clearly traced. The best specimens of architecture in the church are the four tall, richly-moulded, and well-proportioned arches which support the tower. Singularly enough, the octagonal capitals do not fit the triple group of shafts which they surmount. Indeed, in every part of the church we notice perplexing marks of botching and alteration, to be looked for in a building resumed after some years' suspension, during which architectural taste, as well as the wishes of the builders, had changed. Access to the outer court is given by a gate-house at the north-west court. It was divided by two transverse arches and had very flat groining. Immediately adjacent to the gate-house is a very picturesque gabled house, built on the old buttressed walls. The square-headed windows, with stone mullions, and the gables capped with balls, look almost earlier than the date which is to be read on the projecting square porch, 1654. The fine ash-trees which grow in and about the courts add much to the effect of the picture. The situation is one of much beauty in a level green meadow, watered with a copious stream, at the foot of a high bank of wood covering the steep side of the long hill dividing Mount Grace from Osmotherley, on an elevated point of which is a little wayside chapel, bearing the date 1515. The ruins are kept in tolerable repair, but a good work might be done in removing the rubbish which encumbers the houses and conceals their arrangement. Such irreparable mischief has been done by ignorant restoration that we almost shrink from suggesting anything like repair. But the interest of the place would be greatly increased if the window-jambs and other pieces of cut stone found in the *débris* were simply replaced in their original positions, and the ruined walls built up of the old materials. But such a work should only be undertaken under most careful superintendence.

TIMBER DWELLING-HOUSES IN NOVA SCOTIA.*

THE following descriptive account of building wooden houses in Nova Scotia has been sent by a correspondent, and may be interesting to some our readers: —

The trenches for foundations are dug in the usual way, but 3ft. 6in. deep, to be under the frost, which here penetrates the earth to that extent. The walls are built 2ft. thick, of common rubble, to the height required. The wooden frame is then brought on the ground. This consists of a sill, 6in. by 8in., which is laid to the outside edge of the wall, and is halved and pinned at the angles. Corner and angle posts are then raised, spiked to to the sill, and supported till the plate, 4in. by 4in., is put on. Studding, 4in. by 3in., is then run up between sill and plate, securely spiked. These are spaced at 16in. centres, and form the walls of the house. Spaces are left for doors and windows. The joisting, 8in. by 2in., is then put in, which ties the frame together. The ground-floor joists are 20in. between centres, and are spiked to the wall sills, and partition sills. The first-floor joists are 16in. between centres, and are spiked to the studding, and also supported on an intertie, 6in. by 1½in., let into the studding, under the joists. The partitions are then put up in a similar manner to the walls with studding, 4in. by 2in., and heads and sills, 4in. by 4in. Braces, 4in. by 4in., are put in all angles to strengthen the frame. The rafters, 6in. by 3in., are spiked to plate, and curbs, 4in. by 4in., supported on partitions.

The frame is then finished, looking like a gigantic bird-cage. The whole outside is then covered with rough spruce boards, well nailed to studding, openings for windows and doors being left out. For greater warmth another tier of boards is nailed over the first, and thick tarred paper on top of that again to cover all the joints. The house is then, after the window-frames and the cornices and finish have been nailed on, ready for shingling. The style of framing here described is called balloon framing. The best shingles are of pine, averaging 6in. wide, 16in. long, and ⅜in. thick at the butts, tapering to nothing. These are nailed on at 4in. to the weather, the upper courses breaking joint over the lower. The shingles on the walls may be sawn, but on the roof must be split, so as not to retain the water.

The flat part of the roof, instead of being boarded, is floored with 1½in. grooved and tongued flooring, covered with three tier of tarred paper, and then coated with asphalte and gravel.

Meantime the chimney-flues are being run up inside with brick, the outside face as well as the inside being plastered with mortar.

Flashings are put on in the usual way, of lead and zinc.

After this the resemblance between a wooden and brick house commences. The inside walls and ceilings are lathed and plastered three coat work. The flooring, stairs, doors, windows, and whole interior finish is exactly similar to a brick house.

The outside woodwork is covered with three coats of paint, and the house is complete.

With care and paint a house may be made to look new for fifty years, and as the frame generally remains good, the shingling may be renewed every thirty or forty years, so that there is practically no limit to the lasting qualities of a wooden house.

Halifax, Nova Scotia. AND. DEWAR.

* The drawing sent to illustrate this description, is a house built by Mr. Dewar, architect, of Halifax, with gabled sides, verandah, and balconies, and to all appearance represents an ordinary brick villa of the ornate sort.

COMPETITIONS.

CARDIFF.—It was proposed last week that the 107 plans sent in in competition for the new free library, &c., should be exhibited in a disused chapel which stands on the proposed site. This, however, we believe, will not be done, as the place is cold and otherwise inconvenient. No other place but the Town-hall seems eligible for the proposed exhibition, and as the rooms in that building are all engaged until Feb. 3, it is scarcely probable that the competitive designs will be visible, even to the committee, till after that date. The Cardiff authorities should see that no undue delay takes place, considering the large number of architects by whom plans have been submitted. It is rather an interesting reflection in connection with competitions—to all, that is, but the competitors concerned—to remember that, putting the cost of preparing drawings, &c., at £40 per head for each competitor, and many have doubtless spent more, this competition has already cost the profession rather over half the amount (£8,000) which is to be laid out on the erection of the building!

SCHOOLS OF ART.

GLASGOW.—Last week the annual meeting of the members of the Glasgow School of Art and Haldane Academy, for the distribution of prizes, was held. The report stated that the number of students attending the school for the year was 924, as against 1,053 last year. The number who presented themselves for examination in art was 361, being 9 more than last year, of whom 177 passed. In science, 47 presented themselves, being 17 less than last year; 37 passed and 10 gained prizes. In the national competition, two students took Queen's prizes, being one more than last year. The report stated that an additional master had been placed in the school, and a more complete instruction in mechanical drawing would be given; and that the School Board had established evening-schools for drawing in three places in the city.

CHIPS.

The Board of Commissioners of Bray Township, on Monday, elected Mr. Bouchier as Clerk of Works. There were thirteen applicants for the appointment.

The Cheltenham magistrates, on Thursday in last week, heard two cases relating to breaches of the by-laws of the new Town Council. In the first case, Thomas Ratcliffe, a builder, was summoned for having broken up the footway of three houses in Swindon-street, and inserted gratings, without first obtaining leave. The case was proved by the Town Clerk, and it was adjourned for a fortnight, to give defendant time to fill up the spaces as required by the Town Council. In the second case, Frederick Stroud, solicitor, was fined in the nominal sum of 1s. and costs, for forming a new street of a less width than 36ft., and having suffered the same to continue unaltered, after receiving notice of the offence on the 5th August.

Stained-glass windows, by Mr. C. E. Kempe, of London, have just been placed in the old parish-church of St. Nicholas, Brighton.

The plans of Messrs. Harbottle and Crocker, architects, of Exeter, have been accepted for the proposed new town-hall and market at Okehampton; the estimated cost of erection is about £4,000.

Mr. George Watkins, of Monmouth, for many years a timber-merchant in the town, and late a member of the Town Council, died on Monday, aged 71.

The City Commissioners of Sewers have voted a quarter of a million, being equal to half the sum promised by the Metropolitan Board of Works, in aid of the Inner Circle Railway Completion Scheme.

The Fulham Board of Guardians decided at their last meeting to call in Mr. E. J. Hall, architect, to prepare for them a report and plan for extension of the infirmary accommodation.

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ILLUSTRATIONS.

A COURTYARD, BY CANALETTO. — DESIGN FOR A CABINET SIDEBOARD.—TWO CONSERVATORIES.—CHARLTON UNION SCHOOLS AND HOMES.—THE NEW CHURCH AT THE ORATORY, SOUTH KENSINGTON.

OUR LITHOGRAPHIC ILLUSTRATIONS.

A COURTYARD. BY BERNARDO CANALETTO.

BERNARDO CANAL, or CANALETTO (1724-1780) was a nephew of the celebrated Antonio Canal, of Venice, whose views were unequalled for intelligence of perspective and conduct of aërial tint. Bernardo followed his uncle's style, and for architectural views, in many respects, was equal to his master, whose excellence was chiefly in landscape. We are indebted to Mr. J. P. Heseltine, of Queen's-gate, for the loan of the original, from which our reproduction to-day is taken, and although it cannot give anything like the tone and softness of the sepia tinting conspicuous in Canaletto's drawing, the line lithograph now published illustrates sufficiently his manner and interesting treatment. As an architectural drawing, made more than a century ago, it cannot fail to be of interest, while the suggestive character of the architecture itself is of no little value.

"B.N." DESIGNING CLUB.—A CABINET SIDEBOARD.

OUR Designing Club sheet of illustrations this week shows the selected design, by "Edwin," for a Cabinet Sideboard, and we think the character of the work is simple and good. As the mouldings are given to a workable size, the drawing is equal to a working detail, and, as such, cannot fail to be of service.

TWO SMALL CONSERVATORIES.

LAST week we published the first portion of the paper on "Art in the Conservatory and Greenhouse," read on the 15th inst. by Mr. Maurice B. Adams, before the Leeds Architectural Association, and to day we complete the report on p. 96. The two drawings included in the accompanying lithographic plate have been selected from the series of designs referred to by the lecturer in his opening remarks, and are here given by way of illustrating some of the suggestions contained in the paper above referred to. The small Lean-to, from Chiswick, may be taken as an example of the sort of glasshouse or conservatory often required at the rear of suburban dwellings, where limited gardens are the rule, and where, for more reasons than that of expense, a simple treatment is necessary. The house, to which the illustrated lean-to adjoins, is one of a semi-detached pair of unpretending red-brick villas in the Queen Anne style, by Mr. Norman Shaw, R.A., letting at £60 per annum each, and this fact is named in order that the conditions which governed the designer of this conservatory, in preparing his plan, may be noted. Limited height in the front was ruled by the necessity of not obstructing more light than possible from the next house, and restricted depth was determined by the pantry-window, which shows on the view, while the lighting of the dining-room made it, above all things, necessary to keep the lean-to framing as unobstructive as possible. The building is about 14ft. by 9ft. on plan. The necessity of external doors corresponding somewhat in size to those in the dining-room suggested the gable, which is made somewhat large in outline, so as to bear comparison with the rather big dormer which connects the nursery on the first-floor with the balcony just seen on the left-hand of the sketch. The cornice inside corresponds with that of the exterior, and the upper part of the gable contains a carved oval light, with moulded hood on both sides. The two fan-lights under this are made to open, and so are the front-lights and ventilator in roof. The quarry glazing is by Shrigley and Hunt, of Lancaster, in greens and blues. The woodwork inside is finished in pale pea-green, and outside in dead white. The brass rim-lock and door fittings are by Elsley, of Great Portland-street, same as those throughout the house. The heating is by a gas-stove, reached from the outside, and three rows of hot-water pipes extend round two sides of the building, the floor of which is paved with 4in. red tiles, having natural flower-borders for palms, camellias, &c., on either side, and shelves range round at a higher level. The building was executed with purpose-made mouldings and fittings, &c., by Messrs. Messenger and Co., of Loughborough. The small octagonal conservatory, which we also illustrate, was designed by Mr. Adams for this firm, and it is constructed on the same system as that just described. The front lights open all round, and the lights in the lantern are arranged for ventilation. It is quite detached, in a country garden, and is heated by gas and hot water.

NEW SCHOOLS AND HOMES FOR THE CHORLTON UNION.

IN consequence of the overcrowded state of the workhouse, last year the guardians were impressed with the necessity for making some permanent additions, and after careful consideration, decided that the best mode of doing this would be by procuring separate and special accommodation for the children, numbering at that time 271 of school age, and about 70 infants, thus setting at liberty day and sleeping-rooms sufficient for the accommodation of more than 200 adult paupers in the workhouse. The several new buildings are detached and grouped so as to admit of a free circulation of air, and consist of six homes, three of which are situated to the right, and three to the left of the administrative block; the schools are placed to the front facing Nell-lane, with dwellings for schoolmaster and schoolmistress in the centre. Each home will provide 50 children with living and sleeping accommodation. On the ground-floor is provided a day-room 33ft. 6in. by 17ft., sitting-room for the official in charge, lavatory containing 10 washbowls and 2 baths, store-room, and w.c., and slop-closet. The first pair floor contains two dormitories 33ft. 6in. by 17ft., and 17ft. by 17ft., holding 24 beds, bedroom for official, w.c., slop-closet, and store-room. The second-pair floor contains two dormitories the same size as on first-pair floor, and holding 24 beds, and a bedroom to hold 2 beds in case of slight sickness or separating weakly children from the rest; w.c., slop-closet, and store-rooms. The administrative block of buildings is situated in the centre between the boys' and girls' homes, with accommodation for 3 work-rooms, dining-hall 70ft. by 38ft., cooking-kitchen, official's sitting-room, bread-store, larder, wash-house, laundry, and drying-closet, linen-room, boiler-house, engineer's-room, and boys plunge-bath. The whole of this block is one story high, and the portion occupied by the bath, wash-house, boiler-house, stores, and laundry, would be ventilated from the top with louvres, and have rough plate-glass roof lights in addition to the windows. The boys' school is situate to the right of the front block, the girls' school to the left; each are provided with a schoolroom 95ft. by 22ft., and two class-rooms, each 18ft. by 14ft., and 2 book-closets. The children are admitted to the schools by a porch entrance from the yard, and an additional entrance at each end of the building. The schools and class-rooms would be heated by the circulation of hot water. Provision is made in the centre portion of this block for a schoolmaster and schoolmistress' dwellings, separated by a central archway, forming the principal approach to the several buildings; each dwelling will have, on the ground-floor, a sitting-room, kitchen, and pantry, and on the first-pair floor, 3 bedrooms, bath-room, and w.c. The elevation to the front block of buildings are faced with stock bricks, the moulded work being in red terra-cotta; the window-sills, copings, &c., being stone; the other buildings being faced with light-coloured picked common bricks, set headers, all angles, arches, and the various strings being built with stock bricks neatly dressed off, the inside walls being faced with common bricks dressed off for limewashing, the lower portion, for 4ft. in height, being faced with white glazed brick and coloured border. The estimate, exclusive of fittings, amounts to £16,924. Mr. James Herd is the general contractor for the several works, and the following sub-contractors are engaged under him:—Mr. Charles Normanton for the brickwork, Messrs. Stephenson and Corcoran the masonry, Mr. James Barrow the slating, Mr. Henry Lightfoot for the plumbing, and Mr. Richard Higson for the plastering and painting, and Messrs. Mangnall and Littlewoods, of Manchester, are the architects.

NEW CHURCH OF THE ORATORY, AT BROMPTON.

WE give to-day a perspective view from north-east of the New Oratory Church, as it will appear when completed. The architect is Mr. Herbert A. K. Gribble, A.R.I.B.A., whose designs, under the motto, "D.O.M.," were selected by the Oratorian Fathers in competition, some time since, and are now in course of execution. We have previously published an interior view and other of Mr. Gribble's drawings, and also some of the other designs submitted in this competition.

CHIPS.

Two new wings are in course of addition to St. Mary's R.C. asylum and reformatory, at High Park, Drumcondra, and the work is fast approaching completion. The extension is three stories high, and is divided into two separate wings. It is 100ft. long, by 35ft. wide and 45ft. high, and is arranged as ironing-rooms, wash-rooms, dormitories, and infirmary. Additional accommodation is provided for 250 penitent women, at a total cost for erection of £9,000. Messrs. O'Neill and Byrne, of Dublin, are the architects.

A series of clay funeral urns, in tolerably good condition, and some human remains, were dug up in Mill-lane, Ringmer, last week, and have been deposited at the museum in Lewes castle.

A lectern, carved from old beams in the roof of the Old Heath Grammar-school, at Halifax, was last week put in the new building. It is in the Elizabethan style, and has been carved by Messrs. Walsh and Wilson, of Great Albion-street, Halifax, from the working drawings of Messrs. Leeming and Leeming, architects of the new school.

The local board of Sowerby Bridge, at their last meeting, resolved to adopt the scheme for sewage works prepared by Messrs. Utley and Gray, engineers. The estimated cost of the works is £15,150, and it is proposed to treat the sewage on a site of 2½ acres by precipitation and disinfection, the effluent water being pumped into the river Calder.

A temperance hotel is proposed to be built in the Queen's-road, Hastings, for a limited liability company. The plans show on the ground-floor a first-class restaurant in Queen's-road, a second-class café in Russell-street, and manager's office; underneath are kitchen, stores, and cellars. On the first floor is general coffee-room, ladies' coffee-room, reading, sitting, and bed-rooms. On the second floor are one sitting and four bed-rooms, and a double apartment; the third floor is similarly arranged; the fourth has eight bedrooms; and above will be servants' attics. The exterior will be of cement. Messrs. Cross and Wells, of Hastings, are the architects, and Mr. A D. Womersley will execute the work on a schedule of prices, the probable cost being about £5,300.

At the Kent Quarter Sessions last week, the county surveyor was voted a sum of £80 for extra services in examining main roads, required by the Highways and Locomotives Act, 1878.

The Cork Harbour Commissioners are about to form a causeway between Monkstown and Ring, by way of Ballybricken, in accordance with plans prepared by Mr. Andrews, C.E., of Haulbowline Works.

The completion of new carpet premises in High-street, Denbigh, was celebrated last week by a rearing supper to the workmen engaged in the erection. The building consists of a room 30ft. by 40ft., with sitting-room and dormitories above. Messrs. Clough and Lewis, of Denbigh, were the architects; and Mr. Griffiths, of Rhyl, was the builder.

The town-council of Holywell decided last week to erect a town-hall on the open space in front of the newly-built market-hall.

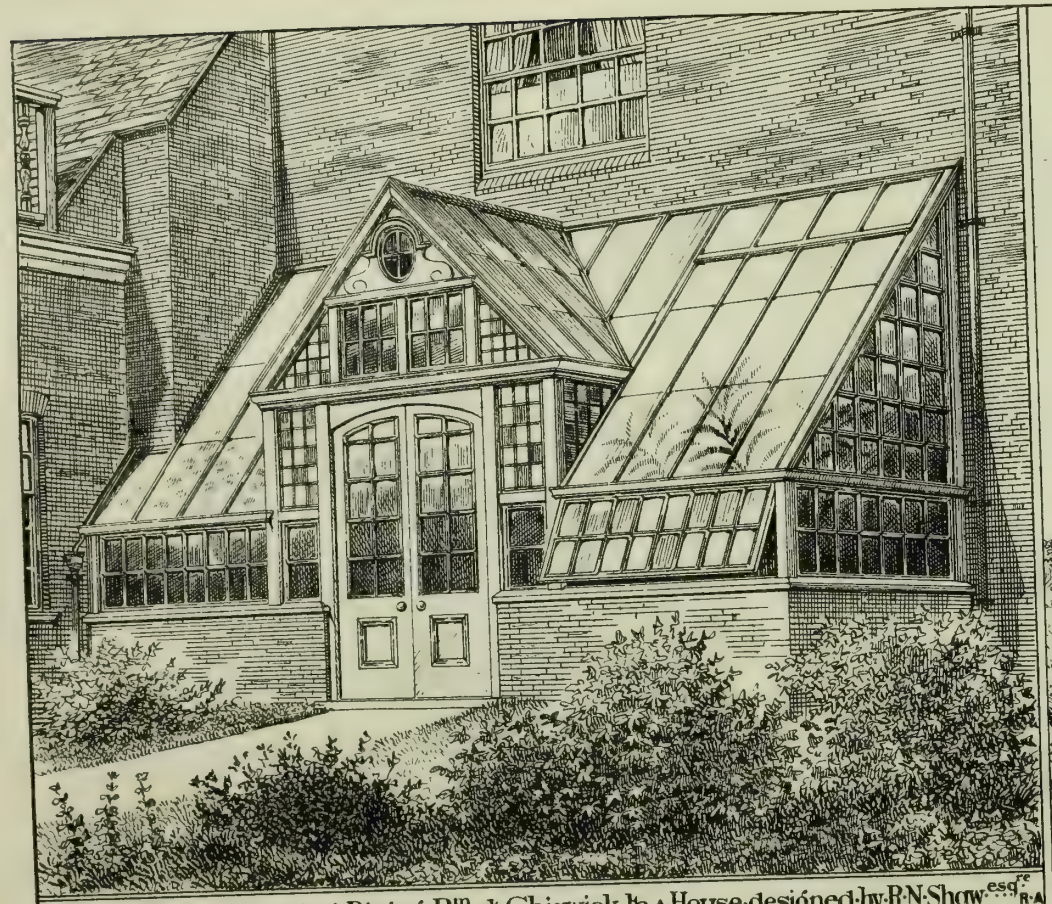
LIBRARY



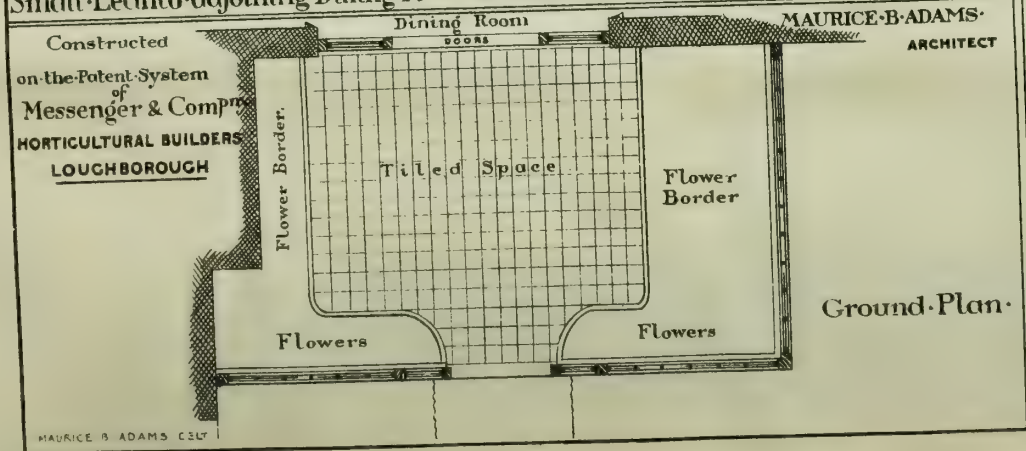
A·COURTYARD·BY·CANALETTO·FROM·THE·ROYAL·ACADEMY·EXHIBITION·OF·OLD·MASTERS·A·D·1879·

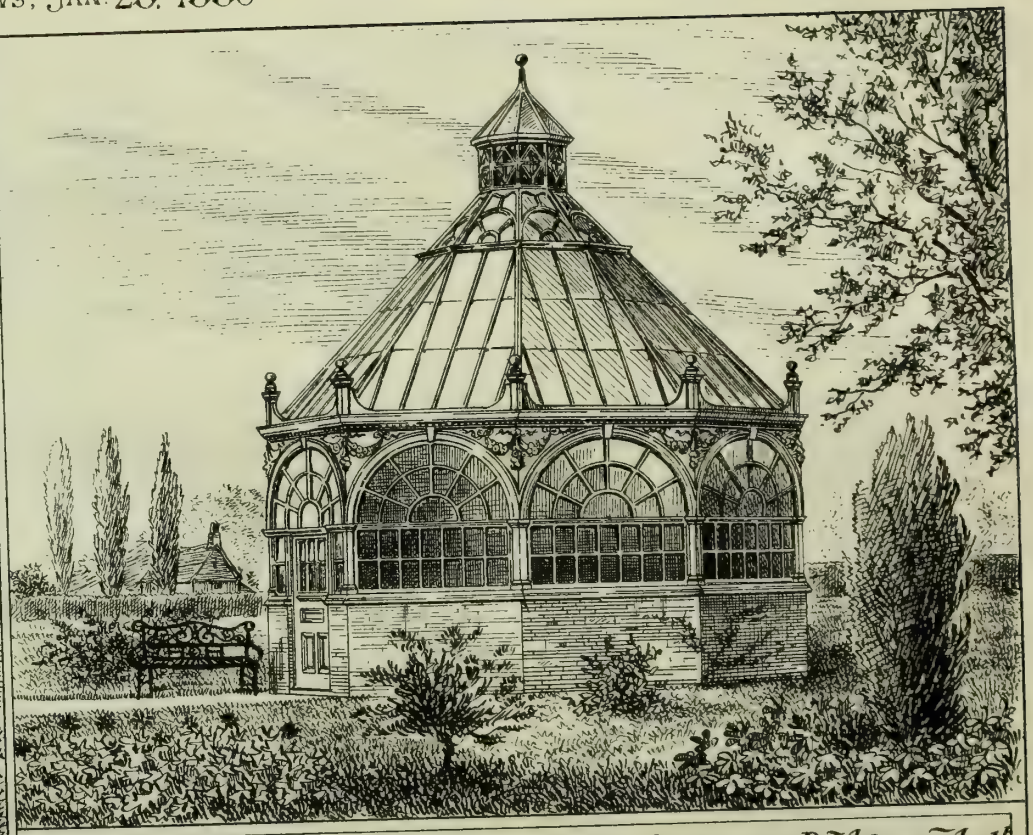
COPIED FOR PUBLICATION BY MAURICE B. ADAMS, A.R.I.B.A.



Small Leanto adjoining Dining Rm at Chiswick to a House designed by R.N. Shaw esq.re R.A





OCTAGONAL CONSERVATORY Maurice B. Adams Archt

CONSTRUCTED ON THE PATENT SYSTEM OF MESSENGER AND Co HORTICULTURAL BUILDERS

Loughborough

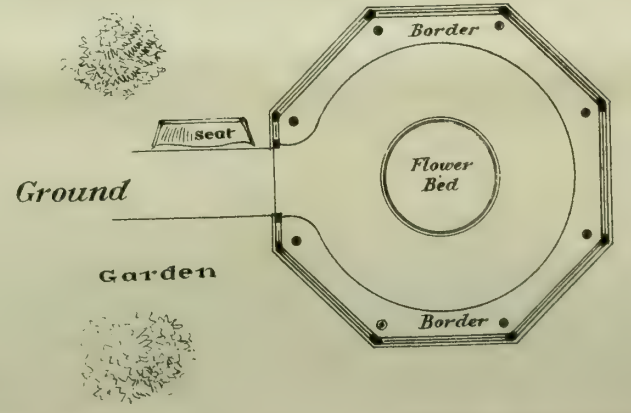
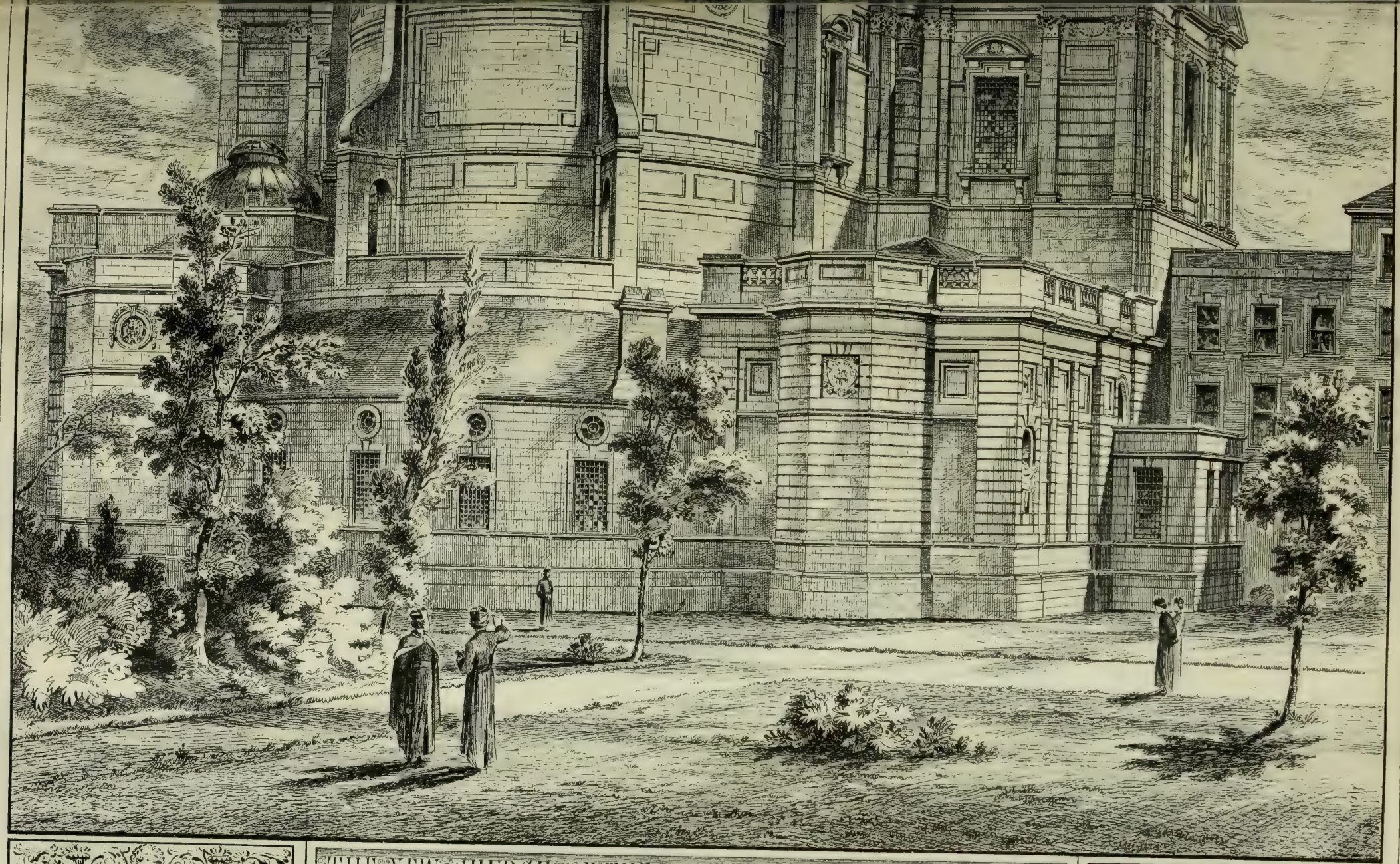


Photo Lithographed & Printed by James Akerman, 6 Queen Square W.C.


D. O. M



THE NEW CHURCH OF THE ORATORY SOUTH KENSINGTON

HERBERT A. GRIBBLE · M.R.I.B.A. · ARCHt. 10 Alexander Square S.W.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

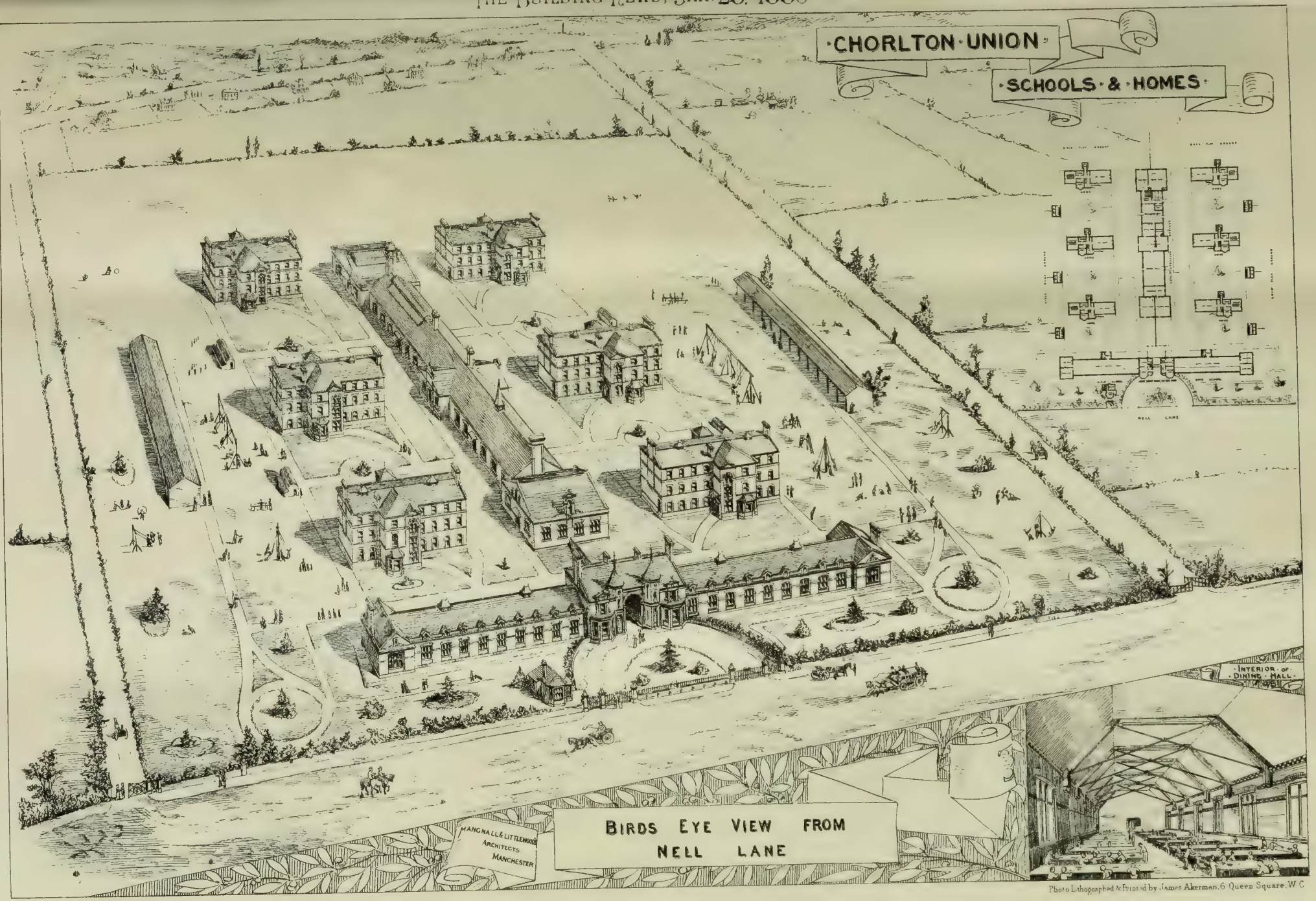


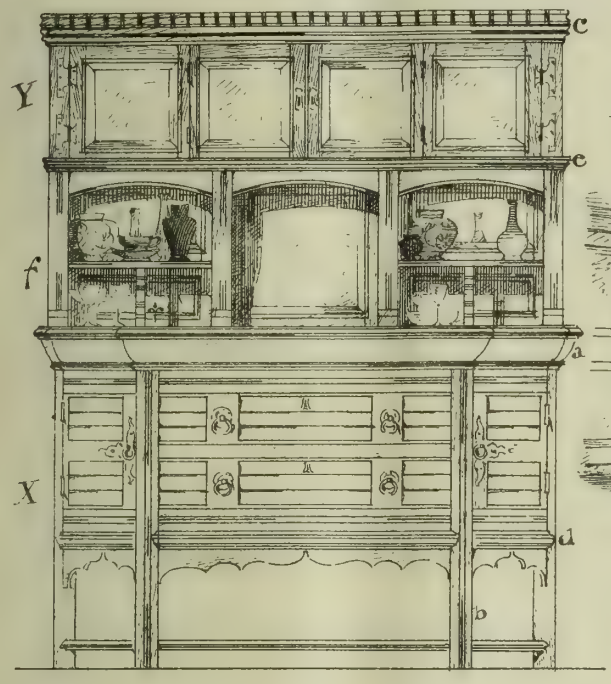
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BUILDING NEWS DESIGNING CLUB

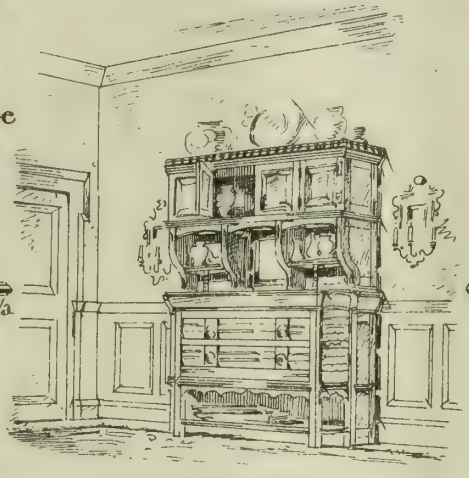
SELECTED DESIGN

A Cabinet-Sideboard

Scale of 0 1 2 3 4 5 feet



Front Elevation.

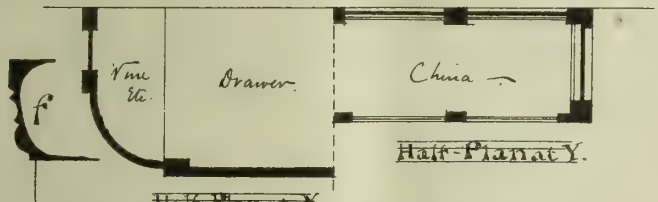


Sketch.

Edwin

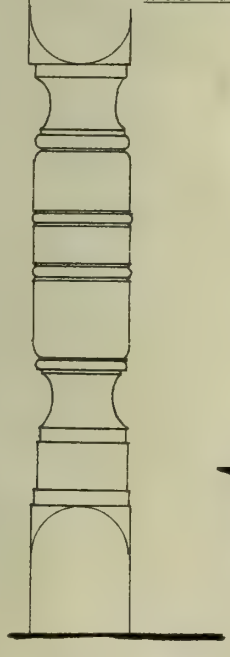


Side Elev.

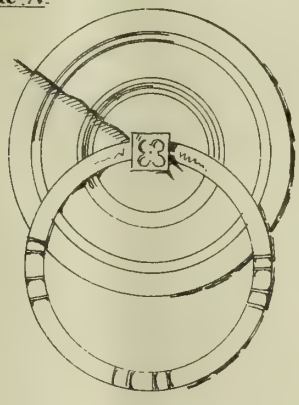


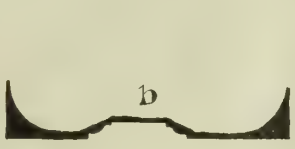
Half-Plan at Y.

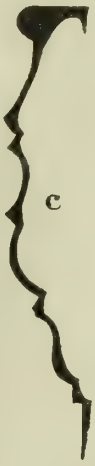
Half-Plan at X.



Baluster at f



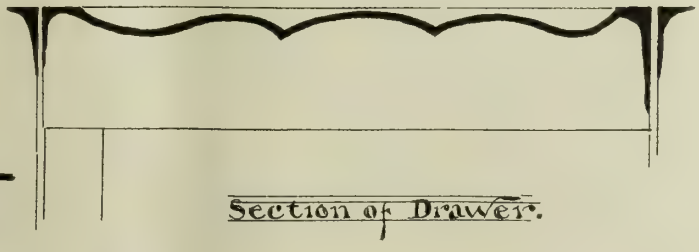












Section of Drawer.

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MODERN ARCHITECTURE SINCE THE RENAISSANCE.—II.

MR. H. HEATHCOTE STATHAM, F.R.I.B.A., delivered yesterday (Thursday) afternoon the second of a course of two lectures on this subject. It was illustrated by photographs, enlarged by the magic-lantern, plans and elevations to large size, and water-colour drawings. Last week, the lecturer reminded his numerous audience, he dealt exclusively with the Renaissance in Italy; he should now, after sketching the rise of the revival of Classic on the Continent, survey its progress in England, from the decline of Gothic to its revival in the present day, and, lastly, devote a few minutes to a consideration of its future. The course of the Renaissance differed in other European countries from that they had followed in Italy, in that whereas in the latter country the taste for Classic had not died out, in other lands it had a hard struggle for supremacy with Mediæval styles, giving rise to several new mixtures. First, taking the growth of the style in France, they would see that the earlier buildings were essentially Gothic in plan and construction, but were decorated with Classic features. In the Palace at Sens, for instance, the mullions were those of the older style, but pilasters borrowed from Rome were introduced, and the ornament was derived from Classic sources through the Italians. A typical example of the Early Renaissance chateaux was that of Chambord, to which an English parallel was "Burleigh House by Stamford Town." In the Tuilleries, built about 1544, might be seen a further development of the style, showing the extent to which rustication was carried, and the over-laboured character of the ornaments. The Louvre followed, about 1550, and was the work of a Bolonese architect, although a Frenchman was the nominal designer. Its Gothic variety and picturesqueness, and its over-loading with ornaments all of Classic origin, having been pointed out, the palace of the Luxembourg, built about 1609, was shown as an example of the quieter character, in which the orders were not used upon the façades of the building, which depended for effect upon grouping, lofty roofs, and pronounced channelling of courses. Jules Mansard, the architect of Versailles palace, had a distinctly bad effect upon the architecture of his day, for he it was who introduced the "terrace" mode of building, by which a row of houses appears as one long building. At Versailles he failed to avail himself of a grand opportunity. Among his best works was the dome of the Invalides, in Paris, where, contrary to the plans adopted by Michael Angelo and Wren, he designed a square church, which gave full effect to the fine cupola he set over it. Having sketched the development of florid ornament and the progress of Classicism in France, the lecturer briefly alluded to the Renaissance in Spain, where it had to contend not alone with Gothic influence, but also with the Moresque spirit, and in consequence some singular and not unpleasing combinations were evolved, of which Seville Cathedral was a good specimen. The Spanish phase of the style had been well phrased as a silversmith's art, the decorations appearing to have little to do with the structural composition and to resemble the flat and profuse ornamentation of the worker in metal magnified to suit a building. In Germany the Renaissance very slowly gained ground, and was at first derived from the French. It subsequently assumed a heavy character, and was characterised by a frequent use of curved lines. In the Netherlands the style rapidly developed, and was here, as elsewhere, largely influenced by the churches of the Jesuits, who brought with them a distinctively Roman mode. One of the best and most sensibly-treated of Renaissance buildings was the Town Hall of Antwerp, where the general arrangement was harmonious and quiet. In it the attic (a feature which the Palladian school in Italy had adopted from Roman triumphal arches, and had regarded as an essentially Greek feature) was opened out as a loggia, the windows throughout were mullioned, and the basement was massive and rusticated. Next he would look at the history of the Renaissance in England. The Elizabethan formed a transition from the Tudor, and gradually passed into the Jacobean, some "illogical" examples being shown in which pilasters were carried on pilasters, the supporting parts covered with carving, and other breaches of good taste were made. One of the earliest and best men of the Renaissance was the joiner's apprentice, Inigo Jones, who, by a nobleman's patronage, was enabled to visit Italy, became a member of the Court of Christian IV. of Denmark, and before he was fifty was appointed to the office of Surveyor-General of England. His Banqueting House at Whitehall was a fragment of a scheme for a grand symmetrical palace, and had it been carried out would have ranked first amongst those in Europe; his St. Paul's, Covent-garden, was an attempt to realise Vitruvius's description of the Tuscan style, and so in a sense was unique without being original; another of his buildings, Amesbury House, Wilts (an original drawing of which was shown, lent by the Royal Institute of British Architects), would be recognised as having set the key for many English mansions that immediately followed it. Of Wren, he would only draw attention to the effort he made to render churches fit for congregational use, by removing all obstructions to sight and hearing; of this endeavour St. Mary-le-Bow, St. Stephen's, Walbrook, and other City churches afforded good and instructive examples. Several proofs of how Wren sacrificed sound building to precedent were detailed, and the lecturer turned aside to show the growing influence of Dutch fashion, as shown in Hampton Court Palace. Blenheim and Castle Howard might be particularised, also the dull old house in the Haymarket, where Handel's operas were first performed. The drawings of the latter building had an interest other than historical as suggesting that the Queen Anne style was evolved from that previously in vogue, by the omission of the orders, the more free use of ornament, the substitution of brick for stone, and, above all, by a desire to get cheap buildings. Having alluded to Gibbs in connection with St. Martin's-in-the-Fields Church, Sir Wm. Chambers and Somerset House, Dance and the Mansion House, and his greater pupil, Sir John Soane, the work of John and Robert Adams, both in furniture and in buildings, was declared to be greatly overrated, and evidence of some of their "atrocies" was given. The revival of Greek followed the visit of Stuart and Revett to Athens, and the publication of their studies of the ancient temples. To this, after the reign of Wyatt, Willis, and Nash, the exhumation of Gothic followed, consequent on the publication of Rickman's "Attempt," and other investigations into Gothic architecture. A consequence of the Gothic revival was the establishment of the Camden Society, which sought to prevent architects from introducing anything original or fresh into their transcript of Gothic, and in the present day we had an anti-restoration movement. Into the pros and cons of restoration Mr. Statham entered, expressing himself against the extreme views advocated by the society. The fault of Victorian Gothic was the extreme use of ornament, which indeed was so freely employed that architects could not design their own detail. In conclusion, the lecturer suggested that in the future architects had several methods of which to avail themselves whereof the capabilities had not yet been fully developed. The artistic clothing of iron structures had still to be worked out. Of facing materials, terra-cotta gave a washable and hard surface; mosaics, as made by Rust, were cheaper than either glass or marble mosaics, and seemed equally as permanent and beautiful; there was Mexican onyx, a beautiful marble; there were concretes, which were so much less costly than bricks that a margin remained that could be expended in covering the face of the work with coats of black and white plaster, afterwards to be patterned in sgraffito. Thus much for little-developed materials; as to style, he believed the Greek column would again come into favour. He had shown that the builders of the Renaissance failed just where they endeavoured to repeat the past most carefully, and succeeded best where they were thrown on their own resources, and strove to meet a felt want without regard to precedent. We had eaten of the tree of knowledge, and could not, if we would, ignore the past; but our architecture would gain in proportion to the efforts its exponents made to utilise all the materials at command in supplying the needs of the present day. Further, if each individual in the community exhibited a preference for an architecture of culture instead of an architecture of copyism, something would be done to develop and improve the art.

ROYAL ACADEMY LECTURES ON ARCHITECTURE.—II.

IN his second Academy lecture, Professor Barry supported the proposition that architecture is a fine art, and also an art of utility. The charms of nature, he remarked, include infinite variety, motion, and change, while in this art were sought symmetry, stability, and permanence. Thus, while the painter and sculptor might refer to nature for her direct inspiration, the architect must be content to be guided by rules and principles which forbade direct imitation of natural forms. Architecture had, moreover, had the definite object of serving the needs of men over and above that of giving pleasure—indeed, if it were not useful, architecture had ceased to exist as an art at all. In arts depending directly on imitation of nature, it was difficult to see how any future advance could be made either by the painter or sculptor; architecture, while neither so free, spontaneous, or joyous, stood on a more solid basis, and with an indefinite future of promise. The connection between architecture and utility gave a practical answer to the doubts sometimes felt as to its influence in the future, for a conviction of this association of decoration with use showed the direct imitation of ancient models, whether Greek, Roman, Gothic, or Queen Anne, to be unreasonable, inartistic, and inappropriate, and hence "matter in the wrong place." While work must be based on the traditions of the past, actual copying of previously existing buildings was not art, but archæology. But it must also be borne in mind that without grace of proportion and beauty of ornament, utility would not give architecture, but only building. The greatest works of the present generation—those of scientific engineering—were of the latter class, the actual necessities of construction being alone regarded in their conception and execution, with a result of unmitigated ugliness. He admitted that the task of combining art and science in utilitarian structures was one of difficulty, both to the engineer and the architect, the real perplexity being that of cost. If the utilitarian purpose could be served by a small expenditure, while a more artistic structure would cost a relatively enormous amount, the latter was under a heavy disadvantage in pleading its cause. It was often said that it was as easy to make a good design inexpensive as costly, but such a doctrine was open to many exceptions. The use of iron-work instead of masonry, for example, was a case in point. It was recently proposed to widen London-bridge, one of the best specimens of bridge-architecture in the world, by iron arches added on either side of the existing structure of masonry, and it was urged that to build in masonry would be so costly and perilous to the present bridge that no alternative existed. Happily, the practical necessity of the alteration was not proved to the satisfaction of Parliament. In its day, the removal of London-bridge, with its houses and wayside chapel, might have been expected to have excited to frenzy any society for the preservation of ancient monuments, if such a fraternity had existed, and now that science had adopted iron or steel as the bridge-building material of the time, it was probable that the engineer who had to design a London Bridge would propose an iron structure. Such a conclusion, however regretable, was inevitable, as the primary purpose of a bridge was utility. Further considering how far ugliness was necessary in utilitarian architecture, the lecturer contrasted the two bridges by which the Menai Straits are spanned. The problem was the same in each case, viz., to carry a roadway across the Straits, at a great height, and with the least possible interference with the navigation. The one bridge was necessary for the turnpike road, the other had the more difficult task of supporting the great weight of a railway. For the first, Telford adopted the suspension principle, and the result was an object of interest, if not of actual beauty. In the latter the trabeated principle of iron beams laid on supports of masonry were adopted, and the Britannia Bridge was an eyesore for all time, but the chief causes of its unsightliness, the towering piers, and sectional form of tube, were due to an imperfect apprehension of the dictates of science and utility. The buttress, and especially the flying buttress, was the example of the adoption by architecture of a utilitarian feature, and of the incorporation of such a feature into a style. Where used in moderation, as by English mediæval builders, the flying but-

tress added in no slight degree to the picturesqueness of work, but where exaggerated, as around the apse of Notre Dame, in Paris, it confused the arrangement of the building and suggested weakness. The reason why the eye refused to be satisfied with the thin ironwork and bare columns of modern engineering was because it needed to be perfectly assured of the solidity and permanent character of a structure. But the depressing effect of the other extreme, that of disproportionate massiveness, was exemplified by the architectural remains of Egypt, and to a minor degree by the cathedrals of the Norman period. Another element of beauty was grandeur of size, but this must be accompanied by varied and appropriate detail to supply scale. An essential of true architecture was that it must have a real purpose, and not be a mere sham; it must devote its energies, not to constructing ornament, but to ornamenting construction. Mr. Barry concluded as follows:—Excepting in large structures, I should advise the student to be on his guard against needless irregularities of plan. In an artistic sense he has usually no greatness of dimensions or breadth of effect to throw away, and from the utilitarian point of view, irregularity means too often expense and want of comfort, from an excessive surface of external wall and complication of roof. In setting down his plan on paper, the young architect will save himself from much difficulty, if he will, from the first, bear in mind the arrangement of his roof, so that he will not draw any part of his plan without knowing, in his mind, how he intends to cover it. The same caution may be given as to thinking from the first of sanitary necessities, warming and ventilation, subjects to which architects have given too little attention. When once public opinion is fully convinced that improvements can be had, it will insist on their incorporation in our architecture; and, unless architects fully recognise this fact, it is inevitable that their province will be even more invaded than has hitherto been the case. Architecture, of course, is not all utility, and has in her higher character claims on the consideration of society at large. She is bound to assert her place in regard to the public buildings of the country. In this position she can tolerate no derogation from her position as one of the fine arts. It is her province to erect temples of worship and to dignify cities. In humbler works it is her privilege to carry a feeling for art into the homes of the thousands. In fine, she has to unite beauty with utility, and apply the result to the service of men. It should not surely be said of our art that all the good is over. We have the past for instruction, and not for blind imitation. The powers of man are not diminished since the days of the artistic giants of antiquity, while science has conferred upon us privileges of which they little dreamt. Architecture, therefore, pursuing her mission, and supported by Art on the one hand, and by Science on the other, may, if true to herself, still look hopefully forward.

DEMONSTRATIONS OF THE USES OF SANITARY APPLIANCES.—II.

VENTILATION AND LIGHTING.

THE second of the course of free lectures at the Museum of Hygiene, University College, was given on Saturday afternoon, by Professor Corfield, who explained the uses of the ventilating and lighting appliances exhibited in the museum. There was a large audience, chiefly of working men, who evidenced great interest in the lecture, frequently asking questions as to details, and the practical value of apparatus under notice. The lecturer opened with a few remarks on the rationale of ventilation, showing the necessity for frequent change of air in apartments. He would ask his hearers to consider air as fluid surrounding the room they desired to ventilate. Being cooler, and therefore heavier, than that within the apartment, it would describe a parabolic curve on entering a leak in the walls, and speedily fall to the lowest level, displacing an equal bulk of heated air, and becoming in its turn diffused through the mass as it heated. When people first thought about ventilation they supposed they only needed to let the heated air out, and made an opening at highest level for this purpose. They found, however, that the external air was so much heavier, that it fell into room in a cold shower. Openings were then made at the floor level to admit air, but the draught thereby produced was speedily regarded as insupportable. These inconveniences led to the invention of valves to regulate and, above all, to divert the in-currents of air. Some leading principles were that air could not be admitted through simple unprotected holes, that no apertures must be near the floor or near the head-level, and that where the current was deflected upwards the opening must not be close to the ceiling, for in that case the cold air would simply rebound upon the heads of the occupants of the room. A simple valve was Sherringham's, which was shown to consist of an oblong box, open to the outer air by a grating, and furnished within with a wooden shutter, which, by a counterpoise, could be set so as to turn the current of air upwards to any angle, till at 90° it was excluded. The perforated zinc face to this box was objectionable, as it speedily became clogged with dirt—a simple grating, fine enough to exclude birds, was all that was needed. A very old and simple sash-ventilator was that re-introduced by Dr. Hinckes-Bird; it consisted of a block of wood, bevelled at the upper edge, which just fitted the frame, this was placed under the lower sash, so that air was admitted between the upper and lower sashes. The plan had two objections: the first sentimental, that the window was seen to be open—an objection by no means sentimental only if the window were in the basement of a house and could be seen from without; the second practical, that blacks and dust entered with the fresh air. Both objections were met, while other disadvantages arose by adopting a method almost as old, and now called by Tobin's name, in which round holes were bored in the upper and lower sashes, and fitted with pill-boxes from which the tops and bottoms had been removed, these pill-boxes containing cotton wool tied in threads. The weakening of the sashes could be easily prevented, and as to the security, concerning which numerous questions were asked by the audience, this could be insured by several contrivances made by Tonks, of Birmingham, shown, by which the window would only be raised from within. Hinckes Bird recommended that the board be hinged in midddle to allow of easy removal, and also devised a modification of the idea in which an upright board was fixed before the lower bar of the sash, so that it was independent of the raising or lowering of the window. Currall's inlet ventilators were designed for use in doors or windows; the principle was that of a long slit protected by a grating outside, and covered within by a thin strip of metal, stamped with a pattern, which could be regulated by a cord or handle to deflect the in-current. A good feature was that the metal bar or strip could not be taken out and used, say, for breaking the window. Louvred openings formed an early and important mode of deflected ventilation. The Venetian blind formed an excellent and quickly adjusted mode of application. All the windows at the Middlesex hospital consisted of a series of glass plates, three or four to each pane, hung as louvres; Crossley's apparatus was also of glass louvres. It was advisable to avoid the use of metal frames, which were liable to rust, and so to be set fast—scarcely desirable, except, perhaps, in cowsheds and stables. In H. W. Cooper's ventilator, so commonly in use in City offices, this was avoided; it consisted of a glass disc, secured to the window-plate by an ivory pivot, and in both a series of oval holes were pierced, so that the admission of air could be nicely regulated. In fixing these, care should be taken not to place them near or directly above the heads of persons, as no upward deflection was given to the air as it entered; the disc might, indeed, for this reason, be kept at the highest level, as the current was not reflected upon the ceiling. The "hit-and-miss" ventilator was a modification of the same idea. Ball's siphonoid ventilator was a modification of Arnott's valve, intended to prevent blacks from finding their way into a room. An apparatus for mixing the air in a room had lately been introduced, in which a set of vanes were wound up by clockwork, and the weight being released, they revolved. The same principle of a punkah had also been applied to ladies' fans, a watch-spring being concealed in the handle. Messrs. Verity had introduced a series of valves worked by the fall of water from a cistern. It was remarked that the wheel shown at the Regent-street example was a needlessly large one, to which it was replied that a smaller one had failed to work; the lecturer observed that here was another instance of the case with which working part went wrong. Wintar's ventilator was claimed to act both as an inlet and outlet ventilator. It consisted of a cylinder with wire-gauze sides and ends, which could be set in a wall and pushed either in or out, or regulated according to requirements. Of outlet ventilators there were several, one of the oldest being that of Dr. Arnott. These, intended to be set in the flue, made an irregular clicking noise, very objectionable in a bedroom, and various forms of padding had been devised to remedy this. These valves should not be set in the chimney, but in a separate shaft in front of the other, as when they got out of order (and all movable appliances sooner or later became disarranged), or in certain states of the wind they were liable to become down-shafts. Messrs. Boyle had introduced an outlet ventilator, in which a series of very delicate talc plates were hung as valves; but these, as was shown by experiment, would open at a gust of wind in either direction. M'Haffie's balance-valve had three plates, and was so arranged that, while a light wind would pass through, a strong one would cause the valve to close. For ventilation beneath floors, dampcourses of stoneware, channelled from without to within, horizontally, had been introduced, and more recently, Ellison's conical ventilator. In the latter, which could also be used for drawing air directly into rooms, the small opening was turned outwards, in order that the air as it expanded should enter with less velocity, and thus without producing a draught. After passing into the room, the air from each hole did not continue to expand in cone-form, as had been sometimes stated, but slowly fell as a compact cylinder, the sides of which were taken up and diffused in the general body of air. The iron gratings on the outer faces of inlets were, he should have stated, usually protected from rust by being of galvanised metal; but Professor Barff's process of protecting the surface with a coat of oxide had recently been introduced, and promised to be largely used for sanitary appliances of all kinds liable to rust. He would next take up the question of cowls and their utility. All knew that cowls were supposed to extract air from rooms; but experiments, especially the series carried out at Kew a few years since, had shown that an up-current was produced in an open tube at least equally as great as in one furnished with a cowl, by the passage of air over it, by the reduction of the pressure on the column within; and where there was no draught across the tope of the tube a cowl would not move. By an experiment with cotton-wool placed in a glass tube, to which a miniature cowl was subsequently added, Dr. Corfield illustrated his remarks, and explained at length the reason why the wool rose as he blew across the tube. The real and only value of a cowl was to prevent down-draughts. On the safe principle that no sanitary appliance should be movable which was equally good when a fixture, cowls need not be made to revolve, and a series of cowls of various degrees of unsightliness were shown, including a fixed one with a flat cap and slitted sides, which has long been in everyday use in Belgium, the difference between which and one just patented, and also shown, the lecturer said he had not been able to discover. Some specimens of Tobin's vertical tubes, in which the fresh-air supply was deflected over trays of water and passed through muslin screens, having been described, the lecturer devoted the few remaining minutes at his disposal to oil-lighting apparatus, showing that the chief improvement upon Argand's lamp had taken the form of metal cones so placed above the wick as to facilitate the admixture of air with the vapour from the oil.

BUDDHIST ARCHITECTURE IN THE JELLALABAD VALLEY.*

(*Concluded from p.* 67.)

THE Turkish word "Tepé," which is applied to all mounds, natural or artificial, is so close to the Afghan word "tappa" that it suggests identity. At Jellalabad the late Sir Louis Cavagnari at once placed a working party of Afghans, people belonging to the villages around, at my disposal; on condition that all sculpture or coins found should belong to the Government. A Havilder

* By WILLIAM SIMPSON, F.R.G.S. A paper read before the Royal Institute of British Architects, Jan. 12, 1880 (see p. 82).

of the corps of Guides, named Kalah Khan, and who had at one time served in the Sappers, acted as overseer. About a mile from the camp, at the eastern end of the long line of heights on the south of Jellalabad, covered for many miles with remains, was an important group, with a prominent mound known as the Ahin Posh, or the "Iron Clothed Tope." The first operations at this tope were made at my request by Lieut. the Hon. G. F. Talbot, R.E. The result was the discovery of fragments of one course of Buddhist masonry, belonging to the circular part of the tope. The first day's operations showed that it was only the lowest course of the circular part which had been come upon, and consequently that all the upper portion of the monument had ceased to exist. This was disappointing so far, but to get the details of the base was a sufficient motive to go on with the excavation. I began a tunnel so as to penetrate to the centre of the tope, and commenced it at a point from the north-west. This was to avoid coming upon the central part of the square base—should any of it chance to exist. The stones were all water-worn boulders, the largest being about 2ft. in size; and embedded in mud, the whole forming a compact mass so firm that no supports were necessary while making the tunnel. The boulders were to a certain extent built in layers. In those topes formerly explored the tunnel had been begun rather high up, and a descent had to made; seeing the trouble that this would give the men in bringing out the *débris*, I determined on first finding the lowest course of boulders and making the original surface of the ground the floor of my tunnel. This turned out fortunately, for it led me at a distance of 40 or 50ft., direct on the central cell, which had been constructed on this level. There was no variety in the manner of building, and when at last it was reported that some slates were visible, I knew it was the cell which had been come upon. I remained in the tunnel while the stones were removed on each side and beyond the slates; and only after the space was cleared out, and the part containing the cell could be seen all round, I began to open it. It formed an oblong heap, quite rude externally, about 4ft. long and about 3ft. wide. On the top was a large slate, extending to nearly these dimensions, and about 1in. thick. On being raised it was found embedded in mud, and with another slate slightly larger in size under it. On raising this last, the cell was disclosed; it was a cube of 16in., formed of small slates about 6in. long, and ½in. thick, their edges, which formed the surface of the cell, were smoothly trimmed, but not polished. They were placed very regularly, forming a well-made receptable. The bottom was formed of another large slate. I had expected to have found a vase or jar of some kind containing the relics, these having been repeatedly found in topes; but there was no other inclosure than this cell, in which were about two handfuls of dark brown dust, probably part of the ashes in whose honour the monument had been erected. On the ashes lay a golden reliquary set with stones; this was about 4in long and an inch wide; it was octagonal in form, and had two bulbous projections, with holes for the cord by which it was worn round the neck. One end came off, and within was a small hard substance—which may have been a relic—there were also two gold coins in it; that being all it contained. Among the ashes I found eighteen gold coins, making a total of twenty. These were all about the same size, slightly less than an English sovereign, and weighed about two drachms each. Seventeen of these belonged to Indo-Scythian monarchs, and extended over three reigns, that of Khadphises, Kanerki, and Hverki. The other three were Roman coins belonging to Domitian, Trajan, and the Empress of Hadrian. The reign of the first of these Indo-Scythian monarchs is generally given as during the century before Christ. The Roman coins come down to the first quarter of the second century of our own era, and are of value as giving the limit of possible antiquity to the monument. While this tunnel was going on, the larger number of the working party were clearing out the base of the tope. The excavation had been begun on the west side, and I found that it originally had 14 pilasters. At the corners none of the base existed, except at the south-east corner, but towards the middle it still remained about 15ft. high, with portions of eight pilasters. I was able to make a section of the base mouldings, as well as of the base of the pilasters. In no instance were the capitals left, the pilasters being all destroyed to a point below that member. The tope had been originally constructed with stairs on the south and north, but at some later period similar stairs had been added on the east and west. On the west the pilasters had been covered up without destroying them, and as there were five Buddhist figures found sitting on the upper part of the base mouldings, the natural conclusion at first seemed to be, that it was an inclosure forming a shrine. Further explorations made it all clear. As was their manner, they built the outer facing of the stairs and filled up the whole space with boulders and mud, covering up the pilasters and figures within. The masonry was different from that of the rest of the tope, and the junction of the new work was irregular. I cleared out almost all round the square base; it was exactly 100ft. on each side. The corners had suffered most from dilapidation; the south-east corner was in the best condition. The tope was faced with the usual Buddhist masonry, and thickly coated with plaster. I feel sure that it had been decorated with colour, but cannot affirm that any of it existed, except on one of the figures found on the west side, where there were distinct remains of a bright yellow colour; evidence that this was the colour of the Buddhist robes in this part of the world. On the western side of the south stair were the remains in plaster of the legs of a small standing figure. I managed to clear out some portions of the rectangular ridge which surrounds the tope, and came on the remains of the entrance on the south side, suggesting that the principal gate was for the public, and not exclusively for the monks who dwelt on the spot. The approach is on a line with the axis of the tope, and it must, from the plan, have been a place of some architectural pretensions; a conclusion which was confirmed by the discovery of portions of colossal figures. The best preserved of these were two human feet *in situ*, each 23in. in length; formed very beautifully of mud, and covered with fine chunam. I regret exceedingly that these feet, owing to the material, could not be preserved. The position of the feet showed that the figure stood facing the worshippers as they advanced towards the shrine. The probability is that the court round the tope contained smaller topes, and shrines with figures in them, an arrangement which we see in the plans of Tahkt-i-Bahi and Jamal Garhi. There are the remains of a square tower, built at a late date, on the present summit of the tope, and modern walls of rude masonry, not Buddhist, have been constructed all round the old line of the court inclosing the tope. These later walls were no doubt the work of some Afghan chief who had made the place into a stronghold; very little remains. There was a very tempting mound at a village called Gundeh Chismeh, on the same ridge of heights, about a mile to the west of Ahin Posh, and to this I removed the working party. The tunnel to the centre, which was made on the same rule as the first one, resulted in finding nothing; yet it was fortunate that I explored this tope, for it revealed a feature otherwise overlooked. At this monument there exists a terrace, 4ft. wide, and 3½ft. above the ground floor, faced with small pilasters, which goes round the whole of the square base, following exactly the outline of its plan. It was subsequently found that a similar terrace existed at Ahin Posh. On my second visit to the Ishpola Tope, I naturally looked for this feature, and there is a space round the square base of it, quite wide enough for such a terrace. In the smaller topes at Ali Musjid the repetition of this terrace is visible, although too small to have served for any use. The question arises, for what purpose was this terrace used? I have not come across any effort to explain the circular ledge with its stairs, which belongs to all the Sanchi group of topes, and which may be considered as the counterpart of the floor of the square base of the Afghanistan examples, so that the question here put involves the object of this part of the monument as well, and is probably quite a new one. The Afghanistan topes seem to have had no railing round them, such as we find at Sanchi, Bharhut, and Amaravati, and it may be presumed that the lower terrace represents that feature, and its understood purpose was for the worshippers to circumambulate the shrine while doing their "poojah." This still leaves the large space of the square base unaccounted for, and its importance, from the large stairs leading up to it, shows that it was connected in some way with the ceremonies. If the size of these topes did not tell us, we might infer from the arrangement of the Chaitya temples of the rock-cut caves, that they were the high altars, or cathedral churches, of the Buddhist system; consequently, there would be some form of elaborate service performed at them. My notion is that the monks sat on the square base chanting from the books of ritual, accompanied with musical instruments of various kinds. The worshippers may have circumambulated the place first on the lower terrace, and then finished their poojah by doing the same on the platform above. Or they may have only ascended the stairs on each round, and worshipped the large figures facing them. The Buddhist ritual took a considerable time to perform it, and, being complicated, a reserved place had to be found for the officiating monks, where they would not be disturbed by the crowd, and in the square base of the Afghanistan topes, as well as the ledge of the Central India monuments, we find the desired arrangement. If this is correct the narrow ledge of the Sanchi Tope must have caused the monks to sit in a row all round, like the small figures on the lower moulding of the Ishpola Tope,—that arrangement of statues being most probably derived from the customary manner the monks had of placing themselves. Colonel Jenkins, of the Corps of Guides, made an attempt to open the Nagari Goondi Tope already mentioned, but that the advance to Gundamuck stopped the operations. A very little was done, but that little brought to light some very important points in relation to the topes of the Jellalabad valley. While Colonel Jenkins' party were at work on a tunnel to the centre, I, with a small party, explored the outside. The Ahin Posh Tope has been described as a heap of earth and stones; the Nagari Goondi seemed on the contrary to be a cairn of rounded boulders—the bed of the Kabul river, being close at hand, had afforded an easy supply of material. It was a large mound, and on finding the remains of the square base, measurements showed that it had been a larger tope than the Ahin Posh. The square base seemed to be about 120ft., and the circular part was close on 100ft. in diameter. I managed only to clear out a portion of one side, and found the plan of the stairs similar to that at Ahin Posh. It had the same pilasters on it and the mouldings were very much alike. One difference was noticeable: the plastered surface seemed more decayed, it was more weather-worn, and suggested a greater age than the plaster at Ahin Posh. The great interest in the Nagari Goondi results from some constructive peculiarities. It was faced with the usual Buddhist masonry, but on the top of the heap were a number of lines radiating from the centre of the tope; none of them seemed to extend exactly to the centre, and they disappeared again among the boulders towards the circumference. They were formed of Buddhist masonry, with a face formed only on one side. This is all that could be made out externally. Colonel Jenkins began his tunnel just over the base mouldings, and before reaching 20ft. he came upon a wall on the left, which seemed to be on a line direct to the centre. This appeared to be the continuation of one of the lines visible on the summit above, and the conclusion is that these spines or diaphragms were constructed all through the tope to give stability to the mass. A few feet further on another wall was found right across the line of the tunnel—perhaps the wall of the circular portion, begun and carried up inside the square base as a means of strength to the structure above. Neither in the tunnels of the Ahin Posh, nor at Gundeh Chismeh, was such a wall met with. I have made a restoration of the Ahin Posh tope, but that the effort has been rather to combine the features to be found on more than one tope still remaining in the Jellalabad Valley, than to represent the particular one named. I have used the plan of the Ahin Posh, and placed upon it the highest architectural development which the style seemed to have reached in that region. All the topes of the Jellalabad valley in which capitals were remaining were Corinthian, and they are introduced in the restoration. In none of the Topes, except that of Ishpola, do any domes exist. Masson gives a number of domes with a pointed arch, but I doubt its accuracy. The Ishpola tope is my authority for the round dome. The Barabat and the Khaista Topes give me sufficient examples for the space between the dome and the upper cornice. The

Jani and Barabat Topes had only one belt of pilasters, but in the Pheel Khana, Khaista, and Bimeran Topes, and in those about Kotpoor, the double belt existed, and these I take as illustrating the higher architectural development. In the upper belt in these instances there is in all of them an arch between each pilaster, but no arch in the lower belt. Above the upper cornice, which was in every case Greek in its details, was a heavier cornice, and with greater projection; this rested on stone brackets of an ogee form. Between the two belts is a space, but on none of the topes did I find any remains of its details. There is an ornament, a continuous wreath or roll of flowers; it has often been taken for a serpent, for it is represented as undulating like one—it is on the Amaravati rail, and is found on Buddhist remains as far north as Jellalabad. In a small sculpture of a tope in the Lahore Museum, from the Yuzufzai district, this appears prominently among the ornamentation. At the Ahin Posh the lower course of masonry of the cylindrical portion, all that remained, stopped short on the north side, and had a projection about 2ft. in length towards the stairs. This, perhaps, has been the lower part of a projecting base, on which rested a large figure. I also saw what I suppose had been a similar projection at the Ummer Kheyl Tope. It is equally reasonable to assume that there would be figures facing each of the four stairs. There were figures within each of the four gateways at the Sanchi Tope. These may have been the four Buddhas or the Devas of the four gates or quarters, as described by General Cunningham as having existed at the Bharhut Tope. The platform of the square base requires a rail, and I have introduced the well-known "Buddhist Railing" for this purpose. The Tee on the summit is from the Yuzufzai remains; the triple umbrella was the original number in India, and it is here retained. The pilasters in the upper belt of these topes is formed in reality of two parts. The lowest is a very short pilaster, with Corinthian capitals, over this is a long projecting stone bracket. Above this is a half-round attached pillar, with the bell-shaped Persepolitan capital, and surmounted by a block, which takes the place here of the two horses peculiar to that style. In the small topes at Ali Musjid, Braminic bulls are represented instead of horses; this, in itself, leaves no doubt that the bell-shaped capital came from the Euphrates Valley. The arch form which figures on this belt springs from the end of the stone bracket over the Corinthian capital. This arch is pointed only on its outer moulding. It is found in the Yuzufzai remains, where it appears in many forms, most generally of a decorative character, as the Greek pediment became. Its identity with the arch of wooden origin, so peculiar to the Buddhist rock-cut temples, need not be doubted. So we find that this upper belt in the Afghanistan topes is formed of three styles of architecture coming from distinct geographical regions. A strange form appears in the Yuzufzai sculptures, and also in the Afghanistan remains. It is often placed along with the arch just described, and seems to be interchangeable with it. It may be described as two sloping jambs with a lintel over them, and I take it to have been originally a door. So little of the walls of the monasteries are left, that the forms of such openings as doors or windows is rather uncertain. My notion is, that this is the pre-Buddhist construction of doors in the region of the Indus Valley, Afghanistan, and of the Himalayas, towards the Hindoo Koosh; that it was of course a wooden form, and implies a flat roof. The materials on which this suggestion is founded are of the scantiest, but it may lead to others to investigate, and if it could be established it would throw considerable light towards explaining the first sources of the architecture of Hindostan. At Hada I found in one of the topes explored by Masson, that one tope had been built so as enclose another; this process we know took place in Ceylon. Masson's excavation had in the lower part cleared out the first tope, and its form, like a matrix, was left. The small tope had been about 9ft. in diameter, and it seems to have been of a different shape from the later topes. It had some of its external masonry standing, but not the usual Buddhist kind. It was built of small squared fragments of a coarse, calcareous stone. The ruined condition of the remains suggests the possibility of a greater antiquity belonging to Hada. The Ahin Posh cannot be older than the second century, A.D., but it may have been two or three centuries later. The Nagara Goondi was probably older, probably much older. A copper coin of Apollodotus, with the tripod of Delphi on it, was found in the piece of the tunnel that was made. This king's date is given as 110 B.C. As this monument stood on the site of the ancient Nagarahara, it may have been the Stupa of the Tooth mentioned by Hiouen Thsang as in the interior of the town, and which he describes, even at the time of his visit, as being "antique," and that it was remarkable for "its elevation, its size, and its magnificence." The caves of Afghanistan are intimately associated with the Buddhist remains, and they are generally found together. The monasteries stood on elevated ground, and the caves are in the scarped rock beneath. They are simple recesses excavated in the rock; a form of 20ft. long, 12ft. high, and 10ft. wide, conveys a rough notion of their average size and proportions. One of the most important group of caves is at Darunta; the front of the perpendicular scarp overhangs the Kabul River, and a long tunnel had to be cut in the rock behind the caves as a means of communication. The people there call it "the bazaar." In Afghanistan, as far as my observation went, I only found one cave arranged on the vihara plan of Western India; this is one of the Pheel Khana group. All the others were on the separate-cell principle. The earliest Buddhist caves in India are separate cells, and this type must have been carried beyond the Indus by the first propaganda, and at an early period before the rock-cut viharis began. The resemblance of the Afghanistan caves to those near Buddha Gaya is not confined to the similarity of type, or to the size alone. The arched roof found in nearly all the Afghanistan caves is a marked point of identity. When the arch terminates the wall recedes an inch or two, leaving a drop-ledge, another peculiarity of the early Buddhist caves of India. In most of these Afghanistan caves there is a small recess, which seems to have been for the bed of the ascetic, and this leads to the suggestion that the cave itself had been fitted up as a shrine, to which devotees would come. The caves were all thickly plastered, and I have no doubt painted, for some fragments were found remaining in a small cave at Hada. There is a nomadic race, called "Koochis," who live with their flocks on the higher lands in the north during summer; they come down to the Jellalabad valley in the winter, and use these caves as their dwellings; the result has been the utter ruin of the interiors, every part has been covered by a thick black deposit from the smoke, so that all decorations or inscriptions are lost. At Hada there are a few small caves of a distinct character. These are square, with a dome in the centre of the roof, which is otherwise flat. One of these caves is scarcely over 6ft. square; 11½ft. and 13ft. are the size of two others. It was in the smallest of these caves, its smallness being such that the Koochis could not use it, and it thus escaped from the effects of smoke—that a fragment of painting was found with the colours as perfect as if only recently put on. On the small dome of this, as well as of the others, the remains of painting were visible, nearly all of them Buddhist heads with the circular nimbus. An excavation in one of these square caves brought to light a portion of a base under the dome, with figures in plaster on it. In conclusion, I would express the hope that further explorations will be made among the remains of Afghanistan. The existence of a style of art in India, coming from the valley of the Euphrates, and which most probably dates from the time of Darius, is now made clear. That the Greek architecture of Bactria came south and crossed the Indus, is another point also beyond a doubt. Afghanistan is the highway by which these styles came, and that is the region to seek for knowledge regarding them. There are vast regions beyond Afghanistan regarding which we are literally "know-nothings." When Afghanistan is archæologically ours, the student of Indian antiquities will be a long way on towards meeting the explorers of Nineveh and Babylon, and I hope that the day is not far distant when these two army corps may meet and shake hands, and compare notes, somewhere about Ispahan, Yezd, or Naishapur.

The Architectural Association will visit Bedford-park, Chiswick, to-morrow (Saturday) afternoon.

Building Intelligence.

BIRMINGHAM.—The new Board-schools in Hope-street, Birmingham, the last of the present series, were opened on Monday. The schools were built upon a different plan to any of those previously erected in connection with the Birmingham School Board, being arranged upon what is called the "class" system. They are three stories in height. It is intended at present to teach about 1,000 children in the schools; but if any necessity should arise, the accommodation can be largely increased. The buildings are of brick, with stone dressings sparingly introduced. There is a small tower and spire, which will be useful for ventilating purposes. The builder was Mr. W. H. Parton, of Balsall Heath, and Messrs. Martin and Chamberlain, were the architects.

CHURCH EXTENSION.—The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels, held its usual monthly meeting on Thursday week. Grants of money were made in aid of building new churches at Forest-gate, St. James's, in the parish of West Ham, Essex (£180); Nawton, St. Hilda, in the parish of Kirkdale, near York (£50); Lower Tranmere, St. Luke, near Birkenhead (£350), from the "R. M." fund; and Wealdstone, Holy Trinity, in the parish of Harrow Weald, near Stanmore, Middlesex (£100); Evesham Union Workhouse Chapel, Worcester (£30); rebuilding the church at Ardleigh St. Mary, near Colchester (£100); enlarging or otherwise improving the accommodation in the churches at Aymestry St. John, near Kingsland, Hereford (£50), and Bagnall St. Chad, near Stoke-on-Trent (£25). Grants were also made from the Special Mission Buildings Fund towards providing mission churches at East-hill, in the parish of Dartford, Kent (£35); Stathe, in the parish of Stoke St. Gregory, near Taunton (£15); Talybont, in the parish of Llanfihangel-Geneu'r-Glyn, near Borth, Cardigan (£25); and Woolwich, St. Michael, Kent (£30).

LEWISHAM.—The church of St. George, Perry-hill, Lewisham, Kent, was consecrated on Saturday, the 17th inst. The entire cost of this church has been about £8,000, exclusive of the organ. The church consists of a nave with clerestory and aisles on the north and south side divided by Mansfield stone pier columns with carved capitals and moulded arches. It has a special feature in the spacious apsidal baptistry at the west-end of the nave, with an open vestibule on each side leading into inner and outer porches. The chancel is 40ft. long and the same width as the nave. The font is a handsome feature, enriched with marble shafts, &c., and this, altogether with the pulpit and the carving, were executed by Mr. Robert Smith, sculptor, of Lambeth-road. The vestries for the clergy and choir are large and fitted with every modern convenience, and are on the south side of the chancel, with communications into the church from the chancel and south aisle. The priests' vestry contains the piscina. On the north side is the organ-chamber (with furnace-room beneath) and tower rising above it to a height of about 70ft. The walls are faced with Kentish ragstone in horizontal drop-courses, the dessings being in Bath-stone. The style is of the English Decorated or pure Gothic, which prevailed during the greater part of the 14th century. The builder is Mr. B. E. Nightingale, of Albert Embankment, and the architect is Mr. William C. Banks, of Gracechurch-street, London.

LONDON SCHOOL BOARD.—At the meeting of this Board on Wednesday, the tender of Messrs. Sheffield and Prebble, of Rifle-street, Poplar, was accepted, at £10,373, for the erection of a school for 1,200 children in Farrance-street, Limehouse. It was reported that the following schools will be ready for opening immediately after the Easter holidays—viz., new schools at East-street, Lambeth, and Salter's-hill, Lower Norwood; and enlargements of existing schools in Latimer-road, and William-street, Chelsea. The following expenditure on new furniture and fittings in new and enlarged schools was authorised:—Sumner-road, Peckham (enlargement), £306 11s., 401 school-places, equal to a cost per head of 15s. 3d.; Webb-street, Bermondsey (new school), £601 19s. 8d., 799 school-places, equal to a cost per head of 15s. 1d.;

Gloucester - street, Stepney (enlargement), £53 3s., 138 school-places, equal to a cost per head of 7s. 5d.; Dalgleish-street, Limehouse (new school), £499 4s. 6d., 602 school-places, equal to a cost per head of 16s. 7d.; High-street, Bromley (enlargement), £284 3s., 400 school-places, equal so a cost per head of 14s. 2d.

WEST LONDON SCHOOL OF ART.—The formal opening of this new school of art will take place on Monday next, the 26th, at 8 p.m., when Mr. H. S. Marks, R.A., will present the prizes anddeliver an address to the students. The new school is the largest of the ten Metropolitan district schools of art, and one of the six largest in the kingdom. The new buildings in Great Titchfield-street comprise a large sculpture-gallery on the top floor, 75ft. by 23ft., with large galleries and rooms for male and female elementary students, and large life class-room on the first and ground floors, and rooms for modelling, designing, and architectural classes; housekeeper, &c., in the basement; the whole well lighted and ventilated. The works have been carried out by Messrs. Watson Brothers, Builders, of Charlotte-street, Portland-place, from the designs and under the superintendence of Mr. Robert W. Edis, F.S.A., architect, of 14, Fitzroy-square, London, W. In connection with the schools are three large studios with anterooms, arranged so as to be used separately if required, but with direct communication to the school on each floor.

CHIPS.

The series of new docks at West Hartlepool, which have been in course of construction for some years past, at a cost of £500,000, are so nearly completed that it is proposed to open them with public ceremony in about a month's time.

An extension of the Yarmouth and North Norfolk Railway, from Martham to Catfield, was opened this week for traffic. The section includes an important bridge over the river Thirne, at Potter Heigham, described in detail in our last volume.

The fine parish-church of Portlemouth, Cornwall, is to be restored at once, from the designs of Mr. J. Piers St. Aubyn, of the Temple, London, and at the sole cost of the patroness, the Dowager Duchess of Cleveland. The contract for the work has been taken by Messrs. Carah and Edwards, of Crowan, who have just completed the restoration of St. Gwinear Church, and are engaged in rebuilding that of Tywardreath.

The restoration of the parish-church of Tresmere, one of the few churches left unrestored in the neighbourhood of Launceston, has just been decided upon. The fabric, which dates from the 13th century, is now almost in a ruinous state, and will probably be in great part rebuilt. Mr. Hine, of Plymouth, has been appointed architect.

Plans have been passed by the Penzance Town Council of the new schools of art, about to be erected on part of the Moorah Fields, just outside the town.

At the weekly meeting of the Metropolitan Board of Works, Mr. Alexander Payne, A.R.I.B.A., and M.I.C.E., who has on several occasions been amongst the final selections for district surveyorships, was elected district surveyor of the district of East Hackney (South), and North Bow, in succession to the late Mr. Gould. In the voting Mr. T. Williams stood second, Mr. F. Hammond third, Mr. W. H. Lees fourth, Mr. E. Street fifth, and Mr. G. Elkington, jun., sixth. There were thirty candidates.

A new Wesleyan chapel has been opened at York Town, Aldershot. Mr. Kemp, of Aldershot, was the builder. The chapel seats 300 persons, and has cost about £1,200, including site.

New Board-schools at Stainland, near Halifax, were opened on Monday week. The architect was Mr. C. T. F. Horsfall, of Halifax.

A new Weslyan chapel in Leeds-road, Halifax, was opened on Monday week. The building is in the Italian style, and has cost about £5,000.

The salary of the county-surveyor for Dorset, Mr. Walter J. Fletcher, has been raised from £200 to £300, in consideration of his undertaking the duties of county-surveyor under the Highways and Locomotives Act, 1878.

We hear that at the recent General Council of the Royal Academy, it was decided that ladies should in future be eligible for election as Academicians and Associates, enjoying the same privileges as male members, excepting that they will not be entitled to vote at the elections, nor have the right to be present at the annual banquet.

The Drapers' Company have voted a donation of fifty guineas to the Parkes Museum of Hygiene.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

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W. H. P. (Having signed the contract, we cannot see how you can enforce your demand. As you have no written guarantee, the question of responsibility will turn on the contract, but under the circumstances you relate the committee would not be liable for any deficiency.)—P. O. (One of the simplest treatises on Perspective is published in Lockwood's series. Another is published by Cassell and Co.)—AUBREY. (Better get one or two useful text-books by Mr. Davidson—"Drawing" and "Building Construction," published by Cassell, Petter, and Galpin. Get also "Notes on Building Construction," published by Rivingtons; but, after all, unless you can get into an office and get practically acquainted with the work, we think, at your age, you would do well to abandon the idea. There are enough *draughtsmen* in the profession already.)—J. BINDON CARTER. (We could be no party to the suggested arrangement in the omitted portion of your letter. One result—and a very undesirable one—would be that our reviews of competitions would appear weeks later than hitherto, and sometimes not at all.)—E. F. D. (Probably at some future period.)—J. J. M. (A building and quantity surveyor ought, in addition to expertness in arithmetic and mensuration, to have a thorough knowledge of building materials, workmanship, and prices, the only means of obtaining which practically is to enter the office of an architect and surveyor. "The Student's Guide to Measuring and Valuing," by Dobson (Lockwood and Co.), is a useful book. No examinations are established.)—T. F. (We are always glad to include really good drawings of old work, such as those which you name by J. Langham, G. R. Webster, and others, and as they come to hand we give them.)

DRAWINGS RECEIVED.—I. W. B., W. B. (We fear this subject is not suitable for our pages.)—F. J. B. (Why draw such poor examples of modern ironwork? Rather study good old work. Your tracing is not suitable.)—I. P. S. (The font will receive early attention.)—W. H. W., Newark, N. J.; Perseverantia, B. B., G. W. W. (will keep drawing a little and see.)

Correspondence.

THE MARBLE MARKET OF EUROPE.

To the Editor of the BUILDING NEWS.

SIR,—In reply to your leader on the Marble Market, I beg to say that recently a vein of the purest white marble has been found in Norway, samples from which are in my office. I know the gentleman who has brought them over, and I understand that, very shortly, Europe at large will learn details as to quantity, quality, and price, which will not be pleasing to Italian and Greek marble merchants, but which will make white marble of the finest grain and purest character far cheaper than either Greek or Italian marbles ever have been, or ever can be, as the Norway marble can be shipped without land-carriage, that is, the quarry can be opened and be worked along the sea-margin.

I do not know the owners of this find, but the samples are before me, and I have not been put under restrictions as to speaking about them. You can see the samples if you wish to do so.—I am, &c.,

ROBERT RAWLINSON, C.B.

P.S.—The above has been delayed until I could obtain full sanction to send it for publication.—R. R.

CONCRETE BUILDING.

SIR,—There is no one interested in concrete building but will, I am sure, endorse the remarks made in a leading article of the BUILDING NEWS of January 9th, with regard to the present—comparatively speaking—little use of concrete as a building material, and the drawbacks to its more general adoption.

Concrete, as a substitute, in many cases, for bricks and stone, has been before the public a sufficient length of time to have assumed a more generally recognised position than is actually the case, but its development as a building material is subject to many disadvantages, none greater, perhaps, than one put forward in the article in question, viz., that patentees of appliances for concrete building are nearly the only prime movers in the matter.

It is well known that builders, in an ordinary way, care but little to tender for buildings where concrete is to be extensively used, and, as a result, architects are often necessarily compelled to call in the aid of concrete patentees to carry out works of the kind. Moreover, within the last twelve years more than forty patents have been obtained for the application of concrete to building purposes, and to select which system is best adapted for the purpose in view, is so perplexing a matter, that it no doubt often leads to the better-understood brick and mortar construction being adopted in preference.

And your remarks as to the materials necessare for an aggregate are to the point, as many people take it for granted that gravel or river-ballast is the only one from which good concrete can be made, when, in point of fact, there is scarcely any locality but produces equally as good aggregates, or, at least, the materials out of which good aggregates can be formed.

In the Metropolis, it is a common occurrence for broken bricks or useless stonework, from buildings in course of demolition, to be carted miles away as rubbish, and Thames ballast, for concrete foundations of buildings to be erected on the same site, to be brought at the same time, whereas, a crushing machine and a small portable engine would have converted what is taken away as debris into an aggregate as good, in many respects, as that conservative article, without which no specification—when concrete is an item—seems to be complete, "Thames ballast."

For instance, how much money might have been saved if the very excellent old materials of Northumberland House could have been utilised for the concrete necessary for foundation, &c., of the new hotel now in course of construction, instead of the thousands of loads of river ballast that, otherwise, had to be brought there for the purpose.

Another drawback which your article enters upon is the necessity involved of providing to concrete walls a finishing coat of stucco, or rough cast; but I suggest that this necessity should only happen to builders when in an initiatory state of knowledge as to the merits and properties of concrete, and that, with so plastic a material, no difficulty should exist on this point.

In the BUILDING NEWS of March 17th, 1876, are plans, sections, and elevations of a concrete house, and for which a prize was awarded by that journal. It was proposed to face the walls of concrete with veneers of wood, filling in the

spaces between with cement stucco, or rough cast, and thus obtain greater durability, and positive weatherproof walls, with all the appearance of half-timber construction, and at about one half the cost.

As an outcome of that suggestion, I send you photographs of two buildings out of several erected in this way (and which system is not a patented one), and would state that, in the case of the larger building, it was constructed without any particular or special knowledge of concrete, either on the part of the designer or the workmen employed, though the two principal qualifications for successful concrete building insured a satisfactory result, viz., care and common-sense in design and superintendence, and freedom from prejudice in execution.

Your article treats also of the cost and difficulties incurred in the employment of moulds or frames for monolithic construction, and the consequent adoption, in some instances, of solid or hollow blocks or bricks moulded into suitable form for building in the ordinary way, or of concrete slabs about an inch, or less, in thickness, built up so as to form a shell, or skin, for a concrete core, and thus constitute its own mould or frame.

The use of slabs in the way described will, I am—for various reasons—inclined to think, eventually become more generally used; but the difficulty with slab walls hitherto, has been that it incurred a necessity of having ties, or cramps of metal, or some other material, to hold the slabs together, and three objections exist to this arrangement, one being that the holes in the slabs must be exactly opposite each other—not much difficulty to arrange in straight walls, but a very considerable one where breaks and irregularities occur; another, that the ties must be of different lengths for each varying thickness of wall; and a third, that it is impossible to face a concrete wall during construction with brick, or anything else but the slabs themselves.

I inclose sketches and sections of a method of building slab walls where no ties are required, but, where a "dovetailed" lug, or projection, at each end forms a portion of the slab itself, so that the concrete core keys the whole into one solid mass, and, by which arrangement, any wall may be formed of brick, stone, or other facing material on one side, and slabs on the other side, with a connecting core of concrete between. I have been enabled to put this plan to a practical test in erecting buildings faced with red brick, and with stone dressings, requiring 50,000 of these slabs (all of which were made by two agricultural labourers and a boy), each 2ft. in length, and 9in. in width, and which buildings, just now completed, are open to inspection. An important feature in connection with these slabs is that they require no facing with cement after leaving the moulds, and that an objection you urge against slab-building is obviated, for they (the slabs) can be made on the spot wherever required for use.

An experimental trial of a slab wall, 9in. in thickness, the core being composed of concrete made of chalk and ground hydraulic lime, has proved that cheap walling of this description is of considerable strength, weather proof, and easy of construction, wherever chalk is abundant, and, therefore, eminently suitable for farm buildings, cottages, and even buildings of a more superior character.

I think that the two important qualities possessed by concrete, of immense strength, and resistance to moisture, naturally point to its use as a constructive, rather than an ornamental material, and that, in point of fact, it will eventually become what may be called the "backbone" of construction, and I, therefore, cannot believe that the principle patented by Mr. Lascelles, of screwing concrete slabs to a wooden framework, and thereby creating the objections urged against wood-framed buildings, and making an indestructible material subservient to a perishable one, can become general.

Lord Elcho has, in Scotland, adopted a method of forming rough frames, or skeletons, with small Scotch fir poles, which are fixed into the ground and otherwise made to resemble a rough, slight, timber-framed building. Encasing boards, on either side, attached to the framework, forms the mould into which the concrete is deposited, and it is claimed that when the poles decay, equally strong hollow concrete walls remain; but this kind of building can only apply to localities where inferior home-grown timber is all but valueless, and where the only requirements for walls are that they shall be weatherproof and strong.

Evidently, there is a prosperous future for concrete, and it is a pity that the various methods of construction—concerning which the public know so little—cannot be put under competitive trial.

The Royal Institute of British Architects might, with advantage, take the initiative in the matter, and their decision and judgment on the various methods of construction submitted to them would, or should, carry more weight with those interested in building than any number of individual advertisements.—I am, &c.,

THOMAS POTTER.

Alresford, Hants.

[We are unable to reproduce the photographs and sketches referred to. The latter form part of Mr. Potter's printed specification, No. 3999, 1877, published at the Patent Office, price 6d., where it can be obtained by readers interested in the subject.—ED. "B. N."]

TERRA-COTTA.

SIR,—The correspondence which has been evoked by the article on "Terra-cotta Architecture" in your Christmas number, has been the means of bringing forward some interesting particulars, and has, I think, in the main, confirmed the accuracy of the views which were expressed. It may be as well, perhaps, to draw attention to certain matters upon which there appears to be a slight difference of opinion, as some of your readers who have not followed the subject throughout may be misled by certain of the observations. The letter of "Architect" is thoroughly to the point, and, except that he quotes a part only of the paragraph concerning red terra-cotta, I can quite agree with him. He thinks I imply "that a red terra-cotta, really good in all its qualities, does not exist." I hardly think what is said can be taken to mean this, as the article reads:—"In the last few years great improvements have been made in red terra-cotta, and many manufacturers are capable of giving us a safe and reliable ware, free from the pale, bricky tint which formerly was anything but desirable."

I should not have noticed this point, but for the letter of Mr. Edwards in the BUILDING NEWS of January 16, on the subject of the temperature at which red terra-cotta is fired. The statement he makes is so contrary to all previous experience, and on the face of it so difficult to understand, that I must respectfully decline to accept as a fact the possibility of subjecting any clay (with iron enough in it to produce a rich red colour) to the temperature which will brown a pure fireclay. I do not wish to charge Mr. Edwards with deliberate misrepresentation, but I am convinced that he does not understand me, as he would not, as a manufacturer of experience, care to turn out terra-cotta with a coating of oxide of iron, and this is all he would get from such a clay exposed to the same degree of heat which attacks the small percentage of iron to be found in the relatively pure silicates of alumina, after exposure for many hours to the intense heat of a kiln in which heavy fireclay goods are produced. He says, moreover, "blue bricks are made from a stronger clay of the same bed." Now, a blue brick runs into slag when placed in a kiln of fire-goods. I do not speak without experience, for I have studied blue-brick making by stoking a kiln all night, and I have spent many a long day in learning the trick of firing, which is needed to give the rich, silvery lustre so much prized in the best Staffordshire blueware.

I am glad to see my old friend Mr. Pulham to the front again. He is quite welcome to stick up for the "mixed clays," but he must be sure to mix them well.—I am, &c.,

THE WRITER OF THE ARTICLE ON TERRA-COTTA.

COMPETITIONS.

SIR,—From your leader of December 26th, I thought you wished the competition question to remain in abeyance until reopened by "the Institute." As you assent to its being dealt with at once, I take the liberty of making a few more remarks.

In the first place, I wish to state more of my reasons for believing in the system of open competitions; and in the second place to make a few suggestions as to the means of making them more generally fair.

With regard to the system of open competitions, I thoroughly agree with its opponents in so far as this:—That no private person or company has any right to ask the profession to expend time, money, and brains in open competition for his or its work, and any architect engaging in such competition, wrongs himself and wrongs his fellows.

The application of the system to obtaining designs for public works is a very different matter.

We members of the architectural profession must remember that we have our public duty to perform just as other men, and just as with other men, we are the greatest losers if we fail to perform that duty honestly and well.

When a public building is to be erected, whether national or municipal, it is the public's right to have the best obtainable design carried out.

It is the duty of the building committee, whether appointed by nation or town, to adopt the only means of getting that design—open competition.

It is their duty to supply every particular of the requirements; to make such rules for the conduct of the competition as will give a fair field to all who may compete; to take steps that will insure themselves against error in awarding the premiums, and to have no bias with regard to any person or persons.

To supply that design is the public duty of any man, be he old or young, eminent or otherwise, who has sufficient energy, capacity, and time. To compete is the duty of anyone of tried capacity, who has the energy and time; his duty to himself as affording the means of increasing his reputation and influence; to the younger brothers of his profession as affording the invaluable opportunity of comparing their crude attempts with his finished excellence; to the public, whose right it is that that which is common to all and to future generations should be of the best.

Similarly with any younger member of the profession. It is his duty to himself, as affording him the means of obtaining reputation and influence, if he have the capacity and knowledge, or, if he have it not, of doing what for the time is equally valuable, of comparing his juvenile productions with the varied works of more practised hands, and thus of obtaining a schooling the equal of which can be had in no other way. To the public he owes the same duty as his seniors.

Thus if the matter be regarded from the standpoint of duty, the true direction of all supposed interests is seen, and the general welfare of the community is found to include the true interests of art. No more right have the seniors to exclude themselves than to exclude the juniors from the benefits and duties of public competition.

With regard to the means of making open competitions more generally fair, I am afraid most of the rules already proposed would be thought to interfere too much with individual action.

Rules, perfect in themselves, and absolutely meeting every case, would soon become a dead letter if any body of architects habitually ignored them.

There is one rule that, if sent as a printed form for signature to every architect in the country, could hardly come short of a single name—a rule to the effect that no architect shall compete unless it be specified in the conditions that the whole of the designs shall be exhibited in some place of convenient public access, during at least two weeks before the declaration of the awards, and one week after; that proper public notice shall be given of such exhibition, and that every facility shall be allowed to the members of the Press.—I am, &c.,

J. BINDON CARTER.

SOIL-PIPE VENTILATION.

SIR,—The arrangement of the soil-pipe ventilator is one of the most complex problems of hygienic science, and on the success of this arrangement depends the sanitary character of the dwelling; if the arrangement is defective the results are fœtid emanations and zymotic diseases. The present most general form of soil-pipe exhibits a singular absence of scientific forethought. The soil-pipe is generally a simple 4in. pipe connected to the drain-pipe; occasionally the soil-pipe is continued to the roof, and

this is certainly an improvement. The defects of these systems are very numerous. First, the fæces and water, when suddenly falling, force the compressed air through the traps, or by vacuum untrap them; secondly, from absence of upward current, the pipe is filled with stagnant fœtid gases, which are absorbed by the water of the traps and water-closet basin, and again set free, polluting the dwelling. Again, if the soil-pipe is inside, the rapid corrosion which takes place, owing to the corrosive action of the fæces, soon causes the pipe to become leaky, and the insidious poison thus enters the dwelling. If the soil-pipe is placed on the external wall, corrosion is still more rapid, though not attended with such dangers; but it is subject in this position to the action of frost, and is nearly always an unsightly object. Messrs. Boyle and Sons exhibit in their soil-pipes, as illustrated by you, one improvement, that is, a means of escape for the compressed gases; but the other defects mentioned are still present, though with a little study they could be eliminated.

On philosophical grounds it is clear that by simple rarefaction of a column of air unobstructed this air will ascend by the ordinary laws of gravity. Therefore (as abundantly proved by the Kew experiments), when a pipe or building has a clear inlet and outlet, any mechanical devices only act as obstructives—except where high wind currents are prevalent, and in these cases a simple cowl is all that is necessary. In cases where the air is stagnant from want of proper inlets for ventilation, such as marine vessels, extracting ventilators are excellent remedies for producing circulation.

The writer suggested a system of soil-pipe ventilation, which was described in the BUILDING NEWS of Sept. 27, 1878, p. 335. The arrangement consists of an inner tube (which acts as soil-pipe) and an outer tube (which acts as ventilating pipe); the soil-pipe has perforations for the escape of the air compressed by the falling fæces and water, thus preventing untrapping either by compression or siphonic action.

The outer concentric ventilating pipe, subject to the heat of the dwelling, would rarefy and produce an upward current, circulation would be continuous, and the soil-pipe would thus be freed from fœtid gases. Again, the corrosive action would only (for a given time) practically affect the inner pipe, consequently there would be no danger of leakage.

B. H. THWAITE.

N.B.—The suggestion is not protected by patent.

THE PROPOSED HOSPITAL FOR INFECTIOUS DISEASES AT HEYCOL-HILL, NEAR SITTINGBOURNE.

SIR,—As the time for sending in the competition drawings for this proposed building expires on the 31st inst., I take the liberty of suggesting that as "the designs will be subject to the approval of the Local Government Board," it would prove not only more satisfactory to competitors, but greatly to the convenience of the committee, trustees, or other authorities, if the whole of the drawings were submitted to the Local Government Board prior to any selection whatever being made, or decision arrived at.

My knowledge of cases where local authorities have made selections which have afterwards been upset by the decision of the Local Government Board induces me to offer these remarks.—I am, &c.,

CITIZEN.

20th January.

ARCHITECTURAL ILLUSTRATIONS AND THEIR CLASSIFICATION.

SIR,—Mr. Cox's paper at the A. A. on the above subject seems to have excited some interest, as, indeed, such a subject is sure to do; and, after all, everyone has his own fad, more or less elaborate, in which he delights to pride himself against all comers in these matters. The effort on the lecturer's part to keep the question in its widest aspect, has, to a large extent, failed, and the real everyday difficulty found by most architects of classifying the architectural illustrations in the professional journals has pressed itself to the front. Most other illustrations are already in books, and so are provided for; but when three or more journals having loose plates are taken in, and these all more or less of the same character, it is no doubt a difficult question rather to know how best to classify the drawings. Mr. Hugh Stannus favoured us last week with a long descriptive article explaining his own elaborate manner, method, and custom of shelves, drawers, paste, paper, and covers, all used by him with success, he says, in classifying his store of drawings and published prints. Now, Sir, I have a very simple method, and it will not require much space to tell it. Once, in earlier life, in the days of bright hope and empty book-shelves, I took in three architectural journals, two at first, and then the third when it appeared, and these were duly bound, till the shelves—no longer empty—soon made it evident that such a swift increase could not go on much longer. I thought the matter over, and here is the result. As Batsford says, "the BUILDING NEWS is a library in itself"; and as the other papers seldom contain anything which your paper does not include, I take it in, and bind it in leather every six months, and *when the other journals do give any drawings worth buying* not already given in the BUILDING NEWS, or when any subject of value to me is published elsewhere, I purchase that number or illustration and stick the drawing or article into my BUILDING NEWS volume where the same matter is referred to, and thus, as far as the architectural journals go, I have them all in one, and at my fingers' ends.—I am, &c.,

AN OLD TEE SQUARE.

BOYLE'S SOIL-PIPE VENTILATORS.

SIR,—As one of your "numerous readers," to whom your correspondent, "G.," has appealed for "enlightenment of his ignorance,"—which, I admit, is apparent so far as his knowledge of ventilation and sanitation is concerned,—I beg to give the following extracts from the *Times* concerning the Kew experiments; and if "G." is a reader of the BUILDING NEWS and other class and scientific journals, he will be aware that the verdict of the *Times* was fully endorsed, not only by the leading scientific and practical men in the kingdom, but by the general public, who, in my experience, have continued to use more extracting ventilators than ever. The *Times* said: "Unfortunately, the method of testing was incorrect, and therefore *the tests are valueless.** But the chief point is, that neither in the case of any of the cowls nor the tubes were their true value as extractors ascertained, for they were simply tested as shafts—and shafts, too, with their lower openings contracted to less than half the diameter of the main tube. . . . The members of the Sanitary Institute have most laudable ends in view, and they are seeking to constitute themselves a recognised authority in sanitary matters. To do this they must avoid being led into errors which, committed in one department, render questionable the work of all the rest." This is a very late date to drag up the Kew blunder, which, for the sake of the Sanitary Institute of Great Britain, should be kept as dormant as possible. But no doubt "G." had some charitable object in view when he went so far out of his way to assume the *rôle* of resurrectionist. "G." makes another display of his knowledge of the subject when he says that at Kew "the open pipes were tried under *all conditions*," when it is well known, and in accordance with the authorised report of the proceedings, that they were tried under only *one condition*, and that the most favourable for them. Had it been otherwise, experience has proved that the results would have been different.

Boyle's Patent Self-acting Air Pump Ventilator creates a continuous upward current, and the reason why the up-cast pipe is placed inside the house has already been fully explained in your columns, and must be obvious to all capable of comprehending the subject. "G." is evidently not aware that soil-pipes are nearly always fixed inside the house in this country. If a hole was knocked into the up-cast pipe of Messrs. Robert Boyle and Son's system of soil-pipe ventilator, it would not matter, as the air-pump ventilator would then draw the air from the house. This result I see, from one of Messrs. Boyle's pamphlets, they guarantee. I do not understand "G." when he persistently speaks of the house-drains as "the sewer," and says that the sewer (?) must be 4in. (?) in diameter. Before he can be accepted as an authority on the ventilation of drains "G." must first of all learn the distinction between a drain and a sewer, and to be more certain of what he is talking about when he informs practical men that in his opinion the ventilating-pipe of a 4in. drain should be the diameter of a sewer. The inventors must be rather edified by "G.'s" original remarks on their Air Pump Ventilator, and I have no doubt they are thankful for the information given.—I am, &c.

W. F.

* The italics are mine.

Intercommunication.

QUESTIONS.

[6014.]—**Tennis-Court Floor.**—Can any of your readers suggest a cheap material for a tennis-court floor which is hard, dark, and smooth?—C. F. M.

[6015.]—**Cameron's Short-Hand Writer's Pocket Guide.**—Have any of your readers seen this work? If so, I should be much obliged for an opinion as to its merits.—H. R.

[6016.]—**Vision Hole and Ration Trap for Cell Doors.**—Would any reader describe the best construction of the above, and the name of any maker?—D. P.

[6017.]—**Banister Fletcher's Book on Quantities.**—I should be much obliged if some reader would inform me whether, in the tables of constants contained in the work on "Quantities," by B. Fletcher, the first item, with regard to excavator, should read "at per yard cube" instead of "at per foot cube."—CONSTANT.

[6018.]—**Foundations.**—I am about to build a house on a bad foundation (soft), and I am inclined to use hot lime and gravel to about 30in. in thickness. Could any practical person inform me if this will get perfectly hard and suitable for the purpose intended?—JAMES HEPBURN.

[6019.]—**Road-Making.**—At a meeting of our Highway Board on Jan. 14, one of the members said he had become impressed lately with the idea that the use of gravel on roads was not at all economical, and he proposed that a committee should be appointed to examine into the matter and report to the Board as to the relative advantages of gravel and flint. The expense of scraping the roads and carting the mud accumulated had first drawn his attention to this. Much of the gravel put on was unsifted and soft, and he held that flints would be the best material to use. Another member pointed out that they could get two, and nearly three, loads of gravel and put on the road for the same price as it would cost for a load of flints. He believed it was an advantage to have a little fine stuff in the gravel. It was ultimately decided to leave the matter to three members of the Board. I should be glad of any information on the subject, as it is one of some importance.—L., Bromley, Kent.

[6020.]—**Ventilation.**—Will some competent reader on this question kindly give information on the following:—(1.) What is the simplest and most efficacious system of ventilation to recommend to the cottages of the working classes? (2.) How can the admission of fresh air be accomplished, without draught to the feet or descending on the head, without connections with fireplace? (3.) Would a tube connected with the outer air and carried 5 or 6ft. high in the room, and a valve let into chimney, be considered a good mode? (4.) Will Arnott's ventilating valve act in bedroom, where no fire is lit in fireplace, or do they only act in flues where fires continually are lit? (5.) Is not a chapel heated by a current of cold air rushing on to a heated plate a wrong system, when no ventilators in roof appear? (6.) Sulphuric smells arise from this system. What is the cause, and is it not injurious? (7.) What are the best and cheapest methods for ventilating chapels and schoolrooms? (8.) How long does it take to make the air in a room unfit for breathing—say, containing four persons, fire, and two gas-lights, nothing but chimney-flue, &c., to act as escape for vitiated air?—A. I. R.

[6021.]—**Strains in Queen-Post Roof.**—Will any reader oblige by explaining how the strains on an ordinary queen-post roof are calculated graphically? Do Rivington's "Works on Construction" contain trustworthy information on those and kindred subjects?—E. F. D.

[6022.]—**Diocesan Surveyor.**—Would some kind friend, through your very useful "Intercommunication" space, kindly tell me what the emoluments of a diocesan surveyor are? How and by whom he is paid? Also what appeal there is, in the event of his taking work as an architect or surveyor and not giving satisfaction?—TEST.

REPLIES.

[5989.]—**Colouring Portland Cement.**—Perhaps "Concrete" has not seen my question in your number of Jan. 2. I should be obliged if you would allow me to ask again, what he used for colouring cement black, and also if he tried to get a dark green colour.—C. F. M.

[6002.]—**Extras.**—I am obliged by the opinions expressed on this subject. The contract contains the usual conditions. The works were not finished and fit for occupation for some time after the specified time, and client was put to some expense, more than the amount in dispute, yet no claim was made for this, though the usual condition was in contract. The amount in dispute is a trifle, and half was offered in settlement. Every opportunity has been given to the builder to go through the extras and consult about them. "Fair and reasonable" is vague, and is a considerable sum in builder's eyes. If W. Jackson knew the full particulars, and they cannot be entered into here, he would no doubt agree that litigious men should be avoided.—PERPLEXED.

[6006.]—**Old Irish Cemetery Crosses.**—I will reply briefly to one or two points which Mr. Hems has not been able to answer. The sculptured crosses are mostly of hard close-grained sandstone, though some may be of limestone. Others of a similar shape, but not sculptured, which I have seen near Dublin, are of granite. The shafts are generally let into the base, but whether lead is used I do not know. There is sufficient ground for believing the date of the great sculptured cross of Clonmac-

noise and that at Monasterboice to be of the 9th century. If this should be thought by any too early a date for work of this class in so remote a part of Europe, I may point out that the Crucifixion and the 11 Disciples sculptured on the lintel of the door of Maghera church, county Londonderry, is early in the 10th century, being of the earliest period of the transition from the native lintel style of the Early Irish churches to the arched Romanesque of the 11th and 12th centuries, which was pretty well advanced by A.D. 1000. The work of this door much resembles that of the crosses. The durability of English, Scotch, and Irish granite may be left to fight its own battle against Mr. Hems's charges, but I am at a loss to know what sort of white limestone from the coast of Antrim, or anywhere else in the north, Mr. Hems's Dublin friend can have meant. The so-called white limestone of Antrim is about as fit for sculpture as sugar-candy would be. It is merely hardened chalk, and in a dozen years would be in as many hundred fragments from the effects of the weather.—F. W. L., Belfast.

[6010.]—**Frozen Water-Pipe.**—Water in freezing expands suddenly to the amount of about 10 per cent. The force of this expansion is nearly irresistible. If, then, water is contained in pipes their fracture is certain on the water freezing. The rent being closed with ice, is not apparent until thaw sets in. It is then very evident. —E. F. D.

[6010.]—**Frozen Water-Pipe.**—"C. D." can easily prove the truth by taking a length of iron pipe, screw a plug in one end and stand it upright in an exposed situation during a severe frost (having previously filled it with water). When the water becomes frozen solid he will observe a cylinder of ice protruding from the upper end, thus proving that expansion takes place during freezing, and not, as many erroneously suppose, during thaw. The maximum density of water is at 4° Centigrade, or 39½° Fahrenheit, and if water at this temperture be either heated or cooled it undergoes an increase of volume, but the greatest expansion takes place at the moment of freezing. Anyone need not be surprised at pipes bursting with frost, as the expansive force of freezing water is 30,000lb. per square inch. It is quite possible for the water in pipes to be frozen solid without bursting the pipes, that is, when it can escape laterally as in the case given above.—FRANK CHESSELL.

CHIPS.

At a meeting of the Colchester town council, held on Wednesday week, it was resolved to revise the salaries of all officials in the employ of the Corporation, and, as a part of the scheme, to give a month's notice of dismissal to Mr. J. Hope, the borough surveyor, and Mr. G. Mosley, the inspector of nuisances. Mr. Hope has been 19 years in the service of the town council, and it was admitted had done his work honestly and zealously.

New Board-schools in Carlton-lane, Rothwell, near Wakefield, were opened on Monday week. The architect was Mr. W. Richardson; Messrs. Chapman were the builders, Mr. Lockwood the joiner, and Mr. Joseph Wright the plumber.

It is proposed to erect a memorial stained-glass window in St. John's church, Gloucester, in memory of Robert Raikes and the Rev. T. Stock, the founders of Sunday-schools.

A stained-glass window has just been placed in the south aisle of Wickham Market Parish-church, East Suffolk, to the memory of the late Lieut.-Col. Lynn; the window of three lights, and the subjects are, in the centre, "Consider the Lilies," from the sermon on the Mount, "Cornelius at his Devotions," and "The Touch of the Risen Lord." The artists were Messrs. Ward and Hughes, Soho, W., and the window was fixed by Mr. G. Dale.

The Congregational Church, at Beccles, Suffolk, is about to be improved internally. A tender has been accepted from Messrs. Calver, of Ringsfield, for the work, including reseating, with benches, new gallery front, pulpit, side windows, and an organ-apse behind pulpit. All the woodwork will be of pitch-pine, and an organ and heating-apparatus are about to be introduced. The total cost exceeds £1,000.

A trial-trip was made on Wednesday week over the new Tunbridge Wells and Eastbourne Railway from Hailsham, were it is connected with the general system of the London, Brighton, and South Coast Railway, to Heathfield tunnel, about half-way between the extreme ends of the works. In the evening the visitors dined at Hailsham, under the presidency of Mr. George Throssell, who had acted as pioneer on the trip.

A mural tablet has just been erected in St. Nicholas-street Congregational chapel, Ipswich, in memory of the Rev. John Raven, for fifteen and a half years pastor of that chapel. It is of white marble, with gilt lettering, and has been erected by Messrs. Wigg and Wright, of Ipswich.

At the adjourned quarter sessions for the county of Norfolk, held at Swaffham on Wednesday week, Mr. Oakes was voted a gratuity of £150, being three years' salary, on retiring from the office of bridge-surveyor for Norfolk, after 33 years' service of the county.

Two joiners were seriously injured last week at Blackburn by the fall of scaffolding upon which they were at work, at the new Amphitheatre in Jubilee-street, now in course of erection by Fletcher and Bolton, contractors, of Blackburn. One of the men had both thighs and several ribs broken.

Our Office Table.

THE arbitration as to the amount to be paid to the Wandsworth Bridge Company on their undertaking being purchased by the Metropolitan Board of Works, was resumed at the Institution of Surveyors, Westminster, on Friday, and terminated on Saturday in last week, having occupied eight days. The arbitrators were Mr. Little, Q.C., for the Wandsworth Bridge Company; and Mr. Meadows White, Q.C., for the Metropolitan Board of Works. Sir Henry Tyler, C.B., sat as umpire. The award will very likely be made soon, but as the Act of Parliament provides that Hammersmith, Putney, and Wandsworth bridges shall be opened at the same time, and as a legal point has arisen in regard to the Hammersmith arbitration, the opening of the bridges will probably be deferred for some time.

THE Eleventh Voluntary Architectural Examination will be held by the R.I.B.A., subject to the usual conditions, during the week commencing Monday, May 10th next. The examination is open to all persons studying the profession of architecture. The subjects are divided into two sections—the artistic and the scientific. Candidates are allowed the option of being examined in either section or in both. A fee of four guineas must be paid by each candidate when his application paper is delivered, and whether he presents himself in one section or in both. A certificate is given to all who pass in both sections, and every passed candidate is entitled forthwith to the consideration of the Council for nomination, at their instance, as an associate of the Institute. A preliminary examination, open to all students who have been not less than one year in an architect's office, will be held at the same time, and subject to the usual conditions. A fee of two guineas must be paid by each candidate when his application paper is delivered, and successful candidates will receive a formal notice from the Council that they have passed. Candidates desirous of presenting themselves for examination at the eleventh voluntary examination, and at the preliminary examination, must send in their applications (according to a printed form to be previously obtained from the undersigned) on or before March 25th next. The rules of these examinations, as well as the papers of questions set at the architectural examinations of 1879, may be had at the office of the Institute, price 1s. 6d., or by post 20 penny stamps.

THE twenty-second session of the Society for the Encouragement of the Fine Arts was opened on Thursday, the 15th inst., by the annual general meeting of members only; and yesterday the first conversazione was held at the Galleries of the Society of British Artists, in Suffolk-street, Pall Mall East. The programme for the session is as follows, all the meetings being held on Thursdays:—Jan. 29th, lecture by Mr. J. W. Bradley on "Book Decoration"; Feb. 12, lecture by Mr. George Bertin on "The Art Culture of the Ancient Assyrians"; Feb. 26th, lecture by Mr. Walter J. Allen (hon. sec.) on "The Art Costume of the Stage"; March 11th, lecture by Miss Edith Heraud on "Tennyson"; April 8th, lecture by Mr. Frank Roland on "The Influence of Dramatic on Pictorial Art"; April 22nd, conversazione at Galleries of the Society of British Artists; April 29th, lecture by Mr. J. C. Griffiths on "Wood Engraving; its Past, Present, and Future"; May 13th, lecture by Dr. Phené, F.S.A., on "Travels in Asia Minor"; May 20th, conversazione; June 3rd, lecture by Mr. William Simpson, F.R.G.S., on "Afghanistan"; June 17th, a morning meeting at Lambeth Palace.

THE vexed question of the right of public bodies having jurisdiction over public thoroughfares in the vicinity of the coast to remove and utilise shingle, &c., from the seashore for the purpose of maintaining in proper order the roads in those places formed the subject of a long discussion at the monthly meeting of the way-wardens for the Kent Home division, held at Canterbury on Tuesday week. It arose out of an application from the owner of a large property abutting on the sea at Hampton, near Herne Bay, known as the Hampton Estate, to have the roads repaired and maintained in proper order, the district being properly rated for that purpose. The board's surveyor mentioned that the work could be easily accomplished if he were permitted to obtain the necessary material from the beach; but he was reluctant to adopt this proceeding on his own authority, fearing lest an indictment might be preferred for what in certain circumstances the law regarded as a serious offence. The legal adviser of the way-wardens said he had carefully looked through the Acts of Parliament bearing upon the subject, and was of opinion that local authorities could exercise such power for the purpose in question, provided always that no danger could possibly result in the matter of endangering thereby the proper protection of the land by inroads from the sea. The board ordered the material in question to be used for the purpose.

ON Wednesday evening, at the meeting of the Society of Arts, a paper by Mr. H. Carr, on "Domestic Poisons," was read by the secretary. Limiting his attention to poisonous materials used in manufactures and allowed to remain in the finished goods, the author treated the subject as affecting both the public and the trades. The principal offenders put on their trial were arsenical pigments in wall-papers; arsenical dyes in cotton fabrics, such as curtains, chintz, tarlatan, &c.; in artists' water-colours and common paint; poisonous colours dusted on in lithographic printing and in tin-plate work. Poison was also introduced in artificial flowers, lamp-shades, fly-papers, cardboard boxes, and labels. Paper collars and cuffs were said to be sometimes arseniated, but the indictment had not been sustained. The trade interests supposed to be involved were investigated, and the alleged advantages of the use of arsenic for wall-papers, &c., were shown to be for the most part imaginary. Some paper-stainers had abandoned the use of arsenical pigments, and there could be no doubt that they were gradually becoming disused. The trade circulars of the manufacturers were quoted to prove that the tide of public opinion had already turned strongly against these "domestic poisons." The foreign trade was the main difficulty in dealing with the question. The production of arsenic in this country was on a scale that would surprise most people when it was borne in mind that two or three grains would destroy life. An output of 4,809 tons, valued at £30,420, in one year was the yield of the mines, which were twenty in number, all situated in Cornwall and Devon. For meeting the evil the remedy suggested would be a law prohibiting the use of arsenic in the manufacture of all fabrics for domestic use—that is, in all those processes which leave the arsenic in the finished goods.

THE opinions of the principal German engineering authorities on the Tay Bridge disaster are worth quoting. The *Deutsche Bau Zeitung* comes to the conclusion that the catastrophe was attributable in the main to the peculiar construction of the bridge, and was due not to the train getting off the rails. While the part that fell comprised the 13 widest openings and the weakest portion of the bridge, the cause of its giving way is to be sought not so much in the structure of the pillars and girders by themselves as in the superficial measurements of the foundations of the bridge, whose stability was diminished by the sinking of the massive substructure. In bridges of this description it is a mistake to make them so narrow as one pair of rails. There should be a double pair of rails, with frequent interlacings or intercommunications, so that by using the parallel sidings, according to the direction of the wind, there might be a more uniform distribution of the vertical pressure, and a counter-balancing of the horizontal force of the wind. In the *Wochenblatt für Architekten und Ingenieure*, Herr Gustav Meyer arrives, after a series of calculations, at the following results:—"The fact that the front half of the train lies just opposite the fifth opening of the horizontal part, leads to the conclusion that the catastrophe commenced here, and that at that moment the train was exactly above the columns. The whole force of the wind's pressure now acted on the train, the girders, and the columns precisely at the weakest part of the bridge, at the spot where the arrangements for expansion interrupted the continuity of the girders. But the fact that on one of the pillars going the others of the same system followed is explained very easily by the construction of the bridge, which possesses only a very small power of resistance against longitudinal pressure. A force of about 30 tons is sufficient to overthrow a column in the longitudinal direction when the bridge has no train on it."

THE BUILDING NEWS.

LONDON, FRIDAY, JANUARY 30, 1880.

ARCHITECTURAL COMPETITIONS.

THE paper read by Mr. Thomas Porter last Monday evening at the Royal Institute of British Architects, on Competition will, we trust, receive the full consideration the subject deserves from the profession. As we give a report of it this week, our readers will observe that Mr. Porter has furnished a comprehensive résumé of professional opinion upon the subject, and has dealt with the various aspects of the question. He has spared no labour to render his account as exhaustive as possible, and the replies from architects who regard competition from opposite points, as well as those who have no interest in them, represent fairly the position of the question. But the most instructive and interesting part of the paper is that which deals with statistical information and the analysis of the cost of recent competitions. At the onset we may observe the general tone of the meeting last Monday, seemed rather towards reform than the abolition of the system; there was clearly a desire to mitigate the abuses which exist in a system which has its strong as well as its weak points, rather than to substitute for it the influences of professional position and name. It is also seen that the defects of the system of open competition are attributable more to the men who comply with advertised conditions and who compete for prizes often inadequate to the bare cost of production, than to the system itself, and we consider also that the public as promoters have a right to be heard in the matter. We have on previous occasions pointed out what we consider to be the evils attending unlimited invitations of designs. No one who has studied the progress of art has failed to see that competitions have affected the interests of the architect and lowered the tone of thought, and we may say that between open and limited competitions there is this difference, the first has favoured the art of competition drawing, while the latter has developed study of plans and designs. Under the present unlimited system the draughtsman reaps the harvest, and we know of many recent instances where the cost of preparing competition perspectives has been a considerable loss, even to successful competitors. The open system, under the imperfect conditions that exist, has been a contest between architectural artists, and not architects. Unlimited competitions inspire boldness of conception; but we have always observed that detail is less studied, and careful design is the exception, results which arise mainly from the fact that competitions in large offices are given to the assistants and pupils to fill up their spare time. Referring to the advantages claimed for competition in bringing out the talents of young men of the profession, and the value of the exercise it affords for skill and ingenuity, Mr. Porter alluded to the changed circumstances of architectural education and practice, and justly remarked that what "worked beneficially for a few individuals in one age" does not necessarily apply to the present period. It is very true that architectural education and practice now are different; but we do not think the conclusion follows that "it would be somewhat difficult for any man of real genius at the present time to remain long in the region of the unknown and unappreciated." Business habits and other qualities have to be taken into account in determining the conditions necessary to success, and Mr. Porter is well aware that men of real genius are not often gifted with the more sober but equally necessary elements of success. Educational societies have done much no doubt to stimulate those who have any ability, and yet it must not be forgotten that the effect of education is, as Mr. Porter elsewhere says, to render it more difficult to reach the very highest position. While agreeing with many of the remarks of the writer of the paper, we cannot think the open competition system has been so fruitless in good results as he imagines. It has, in the first place, aroused a great deal of the dormant energy and talent of the profession, which, but for its existence, would never have been called into exercise. To this extent the public also have benefitted, and the spirit of true architecture itself, as Mr. Porter admits, has left its impress upon the age. In open competition many men of bad business habits, but with brains, have contributed to the common fund of architectural taste, and have thrown light on many difficult problems. We must admit the force of such facts, even though we may confess to a doubt as to whether the open competition system is the best means of obtaining a design for a building of a large or important kind. Mr. Porter has at some labour brought forward a number of opinions bearing upon the question from fellows of the Institute, and provincial architects, the gist of them being a general disagreement with open competitions as generally advertised. Some, while acknowledging personal benefit derived from competitions, express their willingness to co-operate in any measures to improve the system, while others would limit or abolish it altogether. Perhaps one of the most convincing letters is that from a provincial architect, who believes that the present system "has caused a degeneration in the practical knowledge of architects, as they imagine that draughtsmanship pays better than knowledge of construction." The same writer says: "As far as my own experience goes, I have won several competitions, and carried out the works; but I could have produced better work by being of direct commnnication with my clients from the first." Several letters on the other side are quoted, showing that even the Fellows of the Institute are far from being unanimous, or even willing to sign a declaration such as that proposed by the author of the paper. The bulk of those replies go to show a strong feeling against taking away from the younger and less-known among the profession, the only chance they now have of bringing their talents before the public, and of obtaining a start in the profession. One writer goes so far as to say that he has learnt a good deal from competitions.

The remarks made by Mr. C. Fowler, and others in the discussion that followed the paper prove that there is a motive in competition beyond the idea of obtaining a prize. As Mr. Christian observed, there is an ambitious desire with many young men to strive to do something; they impose upon themselves the task of designing a building of importance, not with the remotest idea of obtaining it, of which they have not the slightest chance, but for the satisfaction a knowledge of self-imposed effort brings with it. The practice is useful, if not always successful. Mr. Christian's own case, instanced by himself, is a very important one. That very successful ecclesiastical architect has, on his own showing, acquired, like many others, his position entirely by success in competition; and it is scarcely necessary to remind readers of the careers of eminent architects like Sir Charles Barry, Sir R. Smirke, Sir W. Tite, Sir Gilbert Scott, Mr. Waterhouse and others. We are willing to admit, with Mr. Porter, the time has arrived for some rules to be adopted by the profession in the conduct of competitions. With few exceptions, all agree that the terms usually offered are in fault, and that justice is very seldom meted out to the competitors. It is pretty well agreed also that the Institute is the right body to formulate and enforce the claims of architects in the matter, and the chief questions are what should be the nature of the reforms. In the first place, Mr. Porter would, if we rightly understand him, limit competitions to works of a certain amount and importance. He says "it is especially the small competitions that are bringing discredit and loss to our profession, and country architects have reasonable ground for considering that they interfere materially with their legitimate field of practice, and that architects away from the neighbourhood, although perhaps possessed of more power of making pictorial and highly-finished drawings, cannot be so familiar with the practical requirements of the locality." The truth of this remark will be admitted by many provincial architects. It does not, however, disprove the value of local limited competitions. With the proposition to limit competition to works the contemplated cost of which, in any case, is not less than £10,000, probably, many will agree, after studying the figures adduced by Mr. Porter, showing the cost of drawings, in relation to actual expenditure. We have some hesitation, however, in agreeing with the dictum that the larger and more costly the building competed for the more unlimited may be the competition; and that smaller works do not justify the trouble and cost entailed. It appears to us, that the larger and more important buildings demand greater skill and experience, and would be preferably undertaken, as regard well-studied plan and design, by a limited number of chosen architects, as the thought and labour involved necessarily imply a knowledge of a larger and different kind, to that necessary for a smaller and ordinary kind of structure. Clauses 2, 3 and 4 of Mr. Porter's catalogue of objections to open competition are very sound, and we refer the attention of our readers to them. We have always thought a good deal of unnecessary labour is entailed, by requiring a whole set of general drawings, instead of one well-studied plan, and a geometrically worked-out elevation, or two of the main fronts, or a correct perspective taken from the most frequented and accessible position or point of view. Objections Nos. 5 and 6 can only be met by limiting competitions to local men, or to those who undertake to inspect the site and make careful inquiries. The remark of Professor Kerr and Mr. Christian, that architects who enter competitions should go in to win on sure principles, that is by sending in good plans, may well be commended to the majority of competitors. From our own experience of open competitions, we can say with truth that more than half the designs submitted have bad and ill-studied plans, proving clearly that their authors have not obtained the best information of the requirements, or have neglected to inform themselves of the actual wants of buildings of the class. With respect to the suggestions made, we cordially agree with the first, restricting all members of the Institute to regulations that may be framed, and we believe this is one way in which the Institute can help the profession to make the necessary reforms. We have already hinted why competitions should not be limited to costly buildings, as suggested in No 2. Suggestion Nos. 3 and 4 will, we fear, meet with opposition from a large class of young architects, whose experience is practically *nil*. Suggestions 5, 6, and 7 are reasonable, and cannot be objected to; the last one, that "no competition be adjudicated upon by any single referee," meets an objection recently urged by us, that a single referee often has a bias in favour of a particular style, and that under such circumstances, a large number of competitors have scant justice afforded them.

The statistical information on competitions given by the reader of the paper is instructive. Few, probably, will disagree with the author in the remark that the national competitions have not, as a rule, been satisfactory in their results; but we may observe they have been unsatisfactory from a miscarriage of justice, and not altogether from an inherent defect in competition itself. We are sorry the author has not been able to obtain, in answer to questions, many opinions from the promoters of competitions, as their replies to the questions would have been valuable. But the figures furnished by the author, dealing with the results of competitions and their cost to the profession, are interesting. All will admit the wastefulness of competition in many cases; and of course in every instance, as only one obtains the work, the labour of the others is thrown away. Mr. Porter says, from an analysis of several recent instances, that every competition is an absolute loss to the profession of £500, without reckoning anything for principal's time. In this estimate the minimum cost of competition drawings is put at £2 each, a figure which is certainly rather below than above the mark. Taking a few recent town-hall competitions, involving an expensive kind of labour, we may estimate the cost of a set of ten or twelve drawings, one with another, at from £40 to £50, and as only one author out of, say, 30 competitors, obtains the commission, there is a loss, at the lowest calculation, for drawings only, of £400 to £500 if set against the commission. It may be urged that this way of looking at results is not a fair one, as the very principle of competition supposes the stake of a large amount of unpaid labour; that, in short, the public or their representatives invite competitors to furnish the best 5 per-cent.-commission-worth for their money. We trust that the promoters of recent architectural contests will also profit from a reflection of the actual cost each competitor is put to in these c n-tests. The Droitwich Free Hospital, the Maidenhead Cottage Hospital, and the present Cardiff Free Library competitions are glaring instances in which we find the actual cost of designs amounts to, or exceeds, half the cost of the building.

The suggestion to pay an honorarium to a limited few would mitigate the evil we have referred to. On the principle of unlimited competitions, those who advertise have no security of receiving designs from men of known ability or experience; it is a public invitation to all who are disposed, and we may safely assert that a large percentage of the competitors undertake the labour without a thought of winning anything. The proposal of some to limit the cost of labour by preparing sketch designs is a good one. These might be drawn to a small scale, and from them a selection of authors might be made to send in more detailed plans. In this manner, we believe thoughtful plans and artistic elevations might be obtained from many who have not the inclination or means to pay draughtsmen for elaborate pictorial drawings of inferior design. The few selected designs, exhibited on the walls of the Institute room by the author of the paper, added much to the interest of the subject. We noticed successful and unsuccessful designs for the Government Offices, the Manchester Town Hall, including Mr. Waterhouse's, and Messrs. Banks and Barry's drawings, one or two beautifully-prepared perspectives for the Berlin Parliament houses, by Mr. W. J. Green, in a Classic style, Sir Gilbert Scott's perspective for Edinburgh Cathedral, and some of the drawings for the museum at South Kensington. Mr. Collcutt's design for Wakefield Town Hall, and Mr. Porter's perspective exterior for the Yarmouth Town Hall were amongst the collection. We hope the adjourned discussion will lead to something being done to place on a more equitable footing the conduct of future competitions, and if Mr. Porter's efforts are supported by the profession in the manner they deserve, not merely by the Institute, but by architects generally, we believe this is practicable.

THE THAMES INQUIRY.

IN a committee-room at the Westminster Palace Hotel, room No. 5, we believe, to be strictly accurate, is being enacted one of the strangest performances which it has been our good or evil fortune to witness during the whole course of our experience. To one who has not been duly prepared by a previous initiation, or who has not, in fact, been let into the secret of the joke, the great arbitration case, as such it really is, which is now in progress will present many features which cannot fail to be of a very puzzling character. To a learned foreigner, for instance, writing an account of our English customs for the benefit of his countrymen, or, indeed, for any outsider who is unacquainted with the leading features of an arbitration case, where there is plenty of money on either side, and an abundance of scientific evidence to be had for the asking, the proceeding at Westminster would be absolutely unintelligible. The public do not trouble themselves much about the case, and but for an occasional paragraph in the *Times*, no one would know what was going on beyond the charmed circle, who are conducting the inquiry, and who alone appear to be interested in the result.

In our previous article* we hinted at the causes which have compelled the Conservators of the River Thames on the one side, and the Metropolitan Board of Works on the other, to name arbitrators to act on their behalf with Sir Charles Hartley, appointed by the Board of Trade, as umpire; the three being commissioned to sit in judgment over the mud-banks of the Thames. But even with a full knowledge of the magnitude of the interests concerned and the weightiness of the skilled evidence which is being brought forward, it is difficult to comprehend the reason for all the chaff and badinage which is being displayed round the great horse-shoe table at Westminster.

Let us peep into the room, for the inquiry is being publicly conducted, and anyone may drop in and try and find out how matters are going on, and how it is possible that twenty long days have been already wasted upon a perfectly needless investigation.

At the head of the table sits Sir Charles Hartley, having Captain Douglas Galton on his left hand, and Mr. Bramwell, by far the most judicial figure of the group, on his right. The left limb of the horseshoe table is evidently the camp of the Conservators. The Board of Works and their forces muster in great strength on the opposite side of the table; they have thus the advantage of the fire and the best light which is to be obtained on a January afternoon. The witness under examination comes up and faces the arbitrators on the inside of the horseshoe, and the shorthand writer sits by his side to take down his evidence. The learned counsel of the respective parties sit close against the engineers, right and left of the arbitrators, and, as they are thus on the sharpest portion of the bend of the table, the witness is under a perfect cross-fire. The learned-looking little man who has just presented himself for examination in succession to Mr. Law—who has rather reluctantly torn himself away from the witness-box, after promising no end of sections, and gaugings, and tables, which he has brought forward in support of his theory that the river has been influenced in no way whatever by the metropolitan outfall sewers—is Mr. Thomas Hawksley. Mr. Law, of course, is the engineer of the Metropolitan Board of Works. Mr. Hawksley listens rather complacently while his honours and titles are being rehearsed to him by counsel, much after the fashion that the heralds of old hailed each new-comer; and, this over, he proceeds to fire off at the arbitrators his opinions that the main drainage works and outfalls were not only not injurious to navigation as respects the formation of banks, but that these works had been productive of great good to the river Thames. "Nothing more," he says, "can now go into the river than formerly; therefore no harm can be done. Moreover, as the gulleys and catchpits retain a great part of the deposit, the quantity of the detritus is greatly reduced, and, of course, the formation of banks is diminished in consequence." Mr. Hawksley is so voluble in his information, that the Board can scarcely keep up with him, and the shorthand-writer, even, looks scared; moreover, the noise of vehicles rolling over the stones in Tothill-street is occasionally deafening, so Mr. Hawksley is begged to take matters more calmly. The counsel, who have been pursuing him, see their way to getting some decisive opinion from a past-president of the Institution of Civil Engineers about the velocity of water, and when he is confronted with the difficulty of a "stream of water," and a "bulb," Mr. Hawksley pauses to take breath. He expounds his views plainly enough, though Mr. Aston, Q.C., cannot elicit what he wants, and Mr. Michael, Q.C., cannot understand him. Then seizing the water-bottle on the table, the neck of which is to represent a tube and the body a bulb, Mr. Hawksley endeavours to expound to the three or four Q.C.'s present the simplest laws of hydraulics, though he spills the water over the shorthand-writer in his anxiety to prove that in a short bulb the current in passing through would retain its velocity and but slightly influence the liquid in the expanded part of the bulb, which would in this case represent the slack water of the Thames.

All this is only what huntsmen would call a check, for Mr. Hawksley is quite prepared to go ahead again and to upset Dr. Frankland's evidence, by asserting the inorganic matters in suspension in London sewage to be but 9 grains per gallon, which would give, on 120 million gallons per diem, about 75 tons per day of detritus. To build up banks of the size of those which had been observed near the outfalls at Crossness and Barking would therefore, argued Mr. Hawksley, at this rate of accretion, take over fifty years.

There seems to be some trepidation among the Conservators and their friends while these calculations are being delivered. Dr. Frankland consults his blue-books; Mr. Shelford, who seems a sort of prompter to the counsel, is busy, and Mr. Abernethy is obviously uneasy and changes his chair. Meanwhile, Sir Joseph Bazalgette gets up and looks quite two inches taller, and Captain Galton looks at his watch. The time for adjournment is approaching, and Mr. Hawksley's figures are inconvenient.

During our brief visit we have come to pity the poor umpire, who yawns so much, and must hear such terribly conflicting statements; and from a sense of amazement at the marvellous way in which the fun of the whole thing seems to be appreciated, we have come to feel that a little joke now and then is a matter of actual necessity where so much dulness would otherwise reign.

Still, we must return to the charge: Why is all this permitted to take place? Who is to blame for such an exhibition? Here are a score of men, each of them pre-eminent in his own department, going over questions which have again and again been argued, and we hoped had been set at rest for ever.

* See "The Silting-up of the Thames," Vol. XXXVII. p. 572.

Here are learned barristers, engineers, and chemists fighting over a matter which ought not to be in dispute at all, and sacrificing valuable time about a subject on which all are practically agreed.

The pollution of the Thames by the discharge into it of the London sewage is a fact about which there cannot be a shadow of doubt. Whether the mud-banks are caused by the sewage or not is a wretched quibble, quite beside the main question at issue, and one which ought never to have been imported into the case.

Everyone is aware that the sewage of London ought to be defecated and clarified in some way or other, previous to its discharge into the river, and it is only a question of time how long the Metropolitan Board of Works will be allowed to continue such a nuisance as they are daily creating at Barking and Crossness. In no other river in England would such a state of things be permitted, and yet here, in the year of grace 1880, we find that all the best talent of the country is engaged for more than a month of days in endeavouring to decide whether or not such a flagrant and glaring evil can be considered an *impediment to navigation!* It is an impediment to far greater interests than those of navigation, and we are only doing our duty in declaring that such a state of things must speedily be put an end to.

FALL OF HOUSES NEAR FINSBURY PARK.

THE alarming accident, briefly recorded in our last issue, which took place last week in the Seven Sisters-road near Finsbury-park, the fall of a number of houses, forming a recently-erected block of considerable size, will set people once more thinking about the many possible risks to which we are exposed from the overgrowth of cities and the blundering jurisdiction of authorities. This feeling of insecurity will probably be intensified by the remembrance of a recent casualty attended with fatal consequences in Tottenham Court-road, but caused by circumstances of quite a different kind. By the fall of houses at Finsbury, happily no lives have been lost, though this circumstance must be attributed to the very fortunate fact that the accident occurred while the workmen engaged in finishing the houses were away at breakfast. An hour or two later, a considerable loss of life must have been the result. We may describe the houses that have fallen into the roadway, which was also a tram-car line, as being the half of a long frontage towards the Seven Sisters-road of several houses forming one side of a triangular block of fifty houses recently built by Mr. Edward King, of Leadenhall-street, E.C. One of the longest frontages faced the junction of the Great Northern and North London Railways. The plans were prepared by Mr. John Groom, of Finsbury, architect and surveyor; and the works were being carried out, we understand, by Mr. Rudkin, sub-contractor, who acted under the supervision of Mr. King. The houses consisted of a basement of considerable depth, shops, and three stories above. The facades are faced with red brick, and the windows are relieved by stone pilaster jambs and arches, the front being crowned by a cornice and parapet in cement. Nine of the houses are said to have been completed, and one of those which have fallen was occupied by a draper and hosier who had recently entered. Six houses have given way, and two others adjoining are, or were at the time of our visit, in imminent danger. Before the publication of the evidence about to be taken on the inquiry to be made by the Metropolitan Board of Works and the Board of Trade, it would hardly be possible to form a decided opinion as to the cause of the accident; we may, however, just review the facts which we have been able to gather for ourselves, and express an opinion as far as the evidence of the broken walls enables us to do so. From what we have learnt, this large block of new dwellings which has been erected by the proprietor as a private speculation, and some of which were let on lease, at rents varying from £80 to £120, for the usual terms of years, was built upon ground of a not altogether impenetrable character, though, to all appearance, the buildings were substantially constructed with good materials. The brickwork of the front and party-walls looks sound; the fractured portions caused by the tearing away of the front walls indicate a forcible splitting of the work in many instances, while the nature and direction of the vertical fissure in the front between the firm portion and the half-slipped houses clearly points to a failure in the foundations. Like most buildings erected for shops, the main front rested on plate-girders and wooden bressumers of good size, and these were supported by brick piers, square in plan, which piers formed the outer legs of the structure. These were carried down about 16 feet to give a deep basement, and were connected below the ground by fourteen-inch walls arched outwards so as to resist the soil of the roadway. From such a construction it will at once be seen that the outer earth exercised a considerable pressure against the piers, which derived probably much support from these wing walls. Recently it appears the District Board of Works constructed a sewer within six feet of the houses and parallel to them, a proceeding which, under any circumstances, would not be regarded as a desirable one, and which, bearing in mind the retaining walls we have described, could scarcely be considered safe. From the evidence of several persons who were acquainted with the operations, we find this sewer was below the footings of the walls, and the trench had been dug about nineteen feet deep at one end and thirteen feet at the other. We also understand that another sewer or drain was being formed to connect with it from the block of houses, and the trench was being cut under one of the houses for this purpose. When to these we add the fact that the roadway has been made upon the site of an old ditch, and that its constituents were of a particularly loose and yielding nature, we cannot greatly wonder at the disaster that has befallen the houses. A trench cut in a loose and yielding clay close to the foundations of a recently-built structure and below its footings, is a hazardous undertaking, even when the utmost precaution is taken.

Why the trench was not cut in the roadway instead of under the pavement, and for what reason the construction of sewer was postponed till after the building was completed, are questions that will occur to any one at all acquainted with operations of this kind, but will no doubt receive attention at the inquiry. The fall of the buildings has been attributed to the "slipping of the supports of the sewer"; but it may be asked whether the security of buildings ought to depend upon strutting at all, or upon the carelessness of excavators. If it did so depend, many of our greatest buildings would be seriously jeopardised by the opening of trenches in our roadways.

We are not aware whether any additional precautions were taken in the filling-up of the trench; but all we learn from inquiry is that clay of a soft kind was employed for that purpose. In deep cuttings for sewers in the immediate neighbourhood of buildings it ought to be made compulsory to bed the sewer on, and fill up the trench at least to the height of the footings with, concrete. We do not hear of any concrete being employed, or whether the foundations of the houses rested on any. In building a row of shops where the weight of the superstructure rests on a number of piers or legs at several feet apart, one of the most obvious safeguards would be to build the piers on wide masses of concrete, or to turn inverted arches under the piers—the former plan would be more practicable, so that the building would be equally supported along its length. It is easy to imagine what would take place in a bad soil if a heavy building resting on a few points were undermined by a trench cut below the footings. The vertical pressure or weight concentrated on these front piers would cause a "flow" to take place in the soil beneath them; the soil, in fact, losing its lateral support, would squeeze out into the space, or a sudden slip or displacement would ensue, causing immediate subsidence of the building. Such a sudden slip might easily be accelerated by the vibration or jar caused by the tram-car, such as that which actually passed the houses in question just before they fell into the road.

We trust the investigation of the circumstances attending this disaster will receive the attention it deserves. From *primâ facie* evidence the dwellings were substantially built, and there appears nothing in the building itself to have warranted one in thinking they were unsafe. The houses yet standing, including the two that still remain in a perilous position from the tearing away of adjacent support, show the coherence of the brickwork, while the manner in which the fall took place seems to point to the same conclusion. Whatever may be the cause, the accident ought to be a warning to those who build houses in localities not having been properly sewered. It will also show that even when architects and builders conform faithfully to the Building Act, and carry out their work substantially and well, they may still be liable to danger from operations over which they have no control.

THE PRACTICE OF ITALIAN ARCHITECTURE.*

THE reviving taste for Classical architecture, evidences of which we have not failed to observe and chronicle in the metropolis and throughout the country, makes it necessary for the architectural student to acquire a more than historical acquaintance with the best works of Italian architects. Our own pages have borne witness to the gradual change, while we are constantly being asked by correspondents to recommend works of an elementary and practical kind, treating upon Italian architecture. Mr. Thomas Porter, F.R.I.B.A., has just brought out a useful work, professedly for the student who desires to acquaint himself with the elements and best models of this style. The first part of the work now before us gives an example of a small and unpretending villa in the Italian style, designed by and erected under the author's superintendence. The author gives a good reason for selecting this subject, and the treatment and details exhibit correctness and careful elaboration. We are only sorry the plan has not been published, an omission that will not be repeated in future illustrations of the style. There is an advantage in showing how Italian can be applied to small villa residences, and though there is no aim after originality in the example selected, it will furnish the student unversed in the style with a few good details, and show him how much the character of this class of architecture depends on good proportion and purity of detail, qualities of a subjective kind that just now go for nought. But the Italian is not an easy style to work in. To many of our readers who are practising in Queen Anne and other more

* The Student's Guide to the Practice of Italian Architecture. By THOMAS PORTER, F.R.I.B.A. Part I. London: B. T. Batsford, High Holborn.

picturesque varieties, Mr. Porter's first subject will appear uninventive, uninteresting, and even commonplace, though if it leads a few to inquire into the merits of the style that appears on first introduction so uninviting, it will have done some good. The style of architecture that has lately become fashionable depends entirely on fortuitous grouping and accessories of an ornamental kind; it has no claim to be called an architectural style in the strict sense of the term, nor can its followers claim for it the same merit they do for Gothic. The Italian, as practised by modern architects, on the other hand, depends wholly on principles; its scheme is based on that of the best examples of Classical architecture, and its followers profess to have adopted the principles of such masters of the Italo-Vitruvian school as Vignola, Palladio and Perault to the requirements of modern practice. We learn through the dedication, and it may be some recommendation to remind the reader, that Mr. Porter was a pupil of Messrs. Banks and Barry, a firm that will always be associated with some of the best and more recent buildings in the Italian style. To the former of these gentlemen Mr. Porter is related indeed, and it was while in their office that the author acquired the principles of Italian architecture. The late Sir Charles Barry was an admitted master of this style in its purest phase, as instance the Reform Club and the Travellers' Club houses in Pall Mall, and Bridgewater House, all exhibiting a keen appreciation of the subtilties of Classical composition. But to refer more particularly to the work, the author in his introductory remarks, says the object of the "Student's Guide" is "to lend the student a helping hand by illustrating in detail some very carefully-selected examples of the works of modern English architects (beginning with simple works and following on to those of more elaborate character), thus leading him to carry into his daily practice the valuable rules that have been laid down or commended by the best writers and adopted in the executed buildings of those architects who are regarded as authorities on the subject." If this well-intentioned programme is carried out, we cannot question the success of the author's venture. It is very necessary that the younger members of the profession should render themselves acquainted with both schools of architecture; and the author's attempt is to supply the deficiency that exists in the available means open to the student for obtaining a practical education in Italian design. Referring to the plates, of which there are eight in the present part, we observe the drawings are to a good scale, and that the elevations are drawn in two shades of ink, black and brown, the lighter shade being confined to the joints of brickwork, and the shading of the windows. We like this arrangement better than the harsh black lines generally adopted in geometrical drawings. The first plate shows a villa erected at Norwood by the author, in a plain Florentine manner, without columns, parapets, pilasters, or any of the more pretentious embellishments of the Venetian school. As we have observed, the want of plan seems an omission; but we pass on to details of the ground-floor windows, which are drawn to the good working scale of two feet to an inch. They are simple square-headed openings with architrave dressings, crowned by entablatures resting on consoles, and the proportions and details are good. The author observes that the "height of such windows should not be less than a double-square," and will be better to be about one-sixth or one-seventh more. The proportions of the entablature and consoles are also given. Sections through the window-head, showing both the external cement cornice, and York stone core, and the internal finishings of sash, shutters, and plaster cornice, are given as well as the plan of architrave. Another plate gives section through the sill of window, the oak sill and bottom rail of sash, and the metal water-check. The details of entrance-doorway follow; after which, the upper window eaves-cornice and string-course are illustrated in section. A few useful suggestions to students are to be found in these drawings, relating to the meeting stiles of casements, the advantage of allowing space at the head of window for Venetian or other blinds, by carrying up architrave. The hint that the large-size details are more important than the small drawings, and should be drawn by the architect himself, is one we have constantly insisted upon. Shading has been avoided in the drawings, which are intended to be facsimiles of what working-drawings should be. The plates are lithographs, a mode of illustration that is certainly inferior to hand-work and varying tints of the photo-lithography, from the fact that the real drawings are lost in the printing; but, nevertheless, suitable for technical illustrations. The "Student's Guide," we may add, is intended to furnish the young architect with a façade in the Italian style, and its details complete, and every part is intended to be perfect in itself. If Mr. Porter desires to make his work generally useful, he will not confine himself to any one variety of the Classic Renaissance, but give the student examples from the Florentine to the later florid styles, saving only such vagaries as the Louis Quinze, which a few of our so-called Italian architects have adopted under its name.

THE BEDFORD PARK ESTATE, CHISWICK.

THE picturesque little colony of Queen Anne middle-class houses, with their church and club, which has been formed during the past four years to the north of Turnham-green Station, was the object of the Architectural Association's first "visit" for the present year. We have several times described this estate, both generally and in detail, and have illustrated most of the more noteworthy buildings upon it; we may remind our readers that it consists of rather more than a hundred acres of flat country, between Chiswick and Acton, laid out in three main roads, diverging from a point near the railway-station, and several cross-roads. All the thoroughfares are fifty feet wide, are more or less curved, and are planted with lime-trees. The few old trees on the estate have been carefully preserved, roads being diverted and houses set back to avoid their removal. The plots are about 75ft. depth by 50ft. frontage for a pair of tenements; and the houses are set back 15ft. or 20ft. from the roads, allowing of front gardens. Some 220 houses have now been built; and, with three or four exceptions, all those completed are, we understand, let. The club-house is in full working order, and the church will be finished in about six weeks' time. The first half-dozen houses built were designed by Mr. E. W. Godwin, F.S.A.; and many of our readers will recollect the criticism provoked by their arrangement when the plans and elevations were published in our pages three years ago. Three or four pairs of semi-detached villas in the Avenue-road were next built from the design of Messrs. Coe and Robinson, and one or two more in other roads by Mr. Wilson; but Mr. R. Norman Shaw, R.A., has been the architect under whom the greater part of the estate has been developed. The aim of Mr. J. T. Carr, jun., the freeholder, has been to give as much diversity and picturesqueness to the estate as possible. The buildings, although all of the character of English domestic work of the seventeenth century, with overlappings into the preceding and subsequent hundred years, are greatly varied in plan and style; and the services of rough-cast, tile-hanging, red brick, and wood frames have been requisitioned to give play of feature. The stone-mason does not appear to have set foot on the estate, except for the dressings and columns of the church.

Having now roughly limmed in outline the history and character of this unique experiment, we will add a few notes as to the Architectural Association's visit of Saturday afternoon last. A large party of members went to Turnham Green, and were received at the Church by Mr. Maurice B. Adams, who, as a member of the Church Building Committee, in the absence of Mr. Norman Shaw, exhibited the plans of the building and described the leading features. As built, it consists of nave, 25ft. in span, of four bays, south aisle and porch, chancel, with organ-chamber on north, opening into a vestry. The north wall is temporarily filled in between the columns of an arcade intended to open into an aisle to be hereafter built. The style is a blending of very late Tudor with seventeenth-century details; thus the side windows are square-headed, and all upper lights are cusped in cinquefoils; but over the south aisle is carried a lead flat, with wooden balustrade painted white, the long slopes of the red-tiled roof are broken by three dormers on each side with curved gables, and the junction of nave and chancel is externally shown by a lead-covered turret, in two domical stages furnished with a wrought-iron cross. The outside walling is of Acton red bricks, with struck joints in white mortar; Bath stone is sparingly introduced for mullions, window heads and sills, and string-courses to plinth; red Kentish tiles are used; a cove below parapet of south aisle is of plaster. On this front a deep porch projects two bays, and is finished with brick parapet; a large, moulded and carved, wooden pent will project from the face of the porch over the entrance, and in which elaborate gates are to be placed. Near the north-east angle, the vestry similarly breaks up the composition, to which variety of outline is also given by the stepped brick buttress between each bay. On entering the church, it was seen that the floors are being laid and the walls rough plastered to receive dadoes. The main roof, of one span throughout, is heavily but simply treated with a solid wrought tie-beam, set on stone corbels and also supported by curved braces; from this rises a king-post, and on either side a truss carrying a straining bar; by these an exact square is spaced out on either side of king-post. All this timber is painted green. The nave piers are to be cased with wooden panelling to a height of about 6ft., or not quite level with the ledge of aisle dado and the chancel floor, and above will be columns of Bath stone. Above the dado the nave walls will be of white plaster. The west window has been altered, by the architect's request, from the original circular design to one more in keeping with the general style, of seven lights, resembling that at the east end, the heads being acutely cusped. Many of the details came under discussion, Mr. Stannus asking whether the little wooden balconies to the clerestory dormers (to which access could only be gained by a forty-rung ladder) were meant for family pews, to which Mr. Adams replied that their use had not been decided—it would probably be left for the coming New Zealander to speculate as to and determine the matter. Increased height of floor at the east end is given by a flight of steps to the chancel, which will also be divided by a rood screen; the dado to this portion of the church will be of embossed gold leather, when funds permit. The roof corbels will be moulded, and not carved, but are at present left in the block. The organ-fronts will face west and south, and an entrance to the church is provided from the vestry beyond. The heating will be by hot water. The contract is in the hands of Messrs. Goddard, of Farnham, and amounts to about £5,900 for the present portion of work, by which 600 sittings are provided, so that the church cannot be considered an expensive one. It will be benched in the nave, chairs being provided in the south aisle. The consecration will take place on April 19th. The site will be inclosed with oak park fencing.

On leaving the church, Mr. Jonathan Carr, junr., explained that a vicarage is to be built to the east of the church, which will form the fourth side of a Queen Anne-square, of which the seven-gabled block of hostelry and stores, now raised to first-floor level, will form a portion.

The Club-house was next visited. The exterior is that of a plain red brick and tiled building, roofed in two divisions, and decorated with a deep cove in plaster on the principal fronts. A porch, with heavy wooden head, opens through a hall into an assembly-room, 36ft. by 24ft.; on the left are a

reading-room, and a billiard-room, each 25ft. by 20ft.; on the right of entrance is a small card-room. The walls are hung with Japanese paper of dark tone, and with choice specimens of old tapestry; some genuine old furniture, including an arm-chair carved in oak and dated 1636, are interspersed with chairs by Godwin, Morris, and Jackson, and here and there a piece of old china sets off a cabinet or what-not. In the assembly-room is a mantelpiece, exhibited by Heaton in the last Paris Exhibition; the wood is painted with clear, green colour and relieved by gesso-work in transparent colours and large gilded human figures, the general effect being rich and handsome, though it fits badly with the cornice and frieze of the room. At the rear of this room a stage is being fitted up, and will be thrown into it when completed, and a ladies' billiard-room is nearly finished. The oak dado and pedimented doorway to this room is from the late Church of St. Dionis Backchurch. The billiardroom has been built on a concrete bed, to ensure steady foundations for the table; the lighting is from three small windows on east, and from glass prisms in the ceiling, and a series of half a dozen Sugg's gas burners, furnished with hoods, and placed at equal distances over the table. The fire-places have open grates set with tile borders, by De Morgan, and these are very good in colour.

The Tower House, Mr. Carr's residence, was next visited. The fittings here much resembled those at the Club, but were of a more domestic character. In the dining-room the high oak dado was described as having originally formed the organ-case and other fittings, purchased from the demolished City church of St. Dionis Back-church, Fenchurch-street, the church already referred to. The wall-papers exhibit Morris's spirited designing. Before leaving, many of the visitors ascended to the belvidere, which forms such a piquant crown to the roof, and obtained a bird's-eye view of the estate and district.

Many other houses on the estate were afterwards visited, showing the same system of planning and decoration applied on a smaller scale, and treated in a variety of different ways. In answer to questions, Mr. Carr stated that the use of large bay windows had been given up on account of the cost of the girders; both rough-cast and tile-hanging had also been partly abandoned, because either necessitate going twice over the work, and moulded brick was now largely employed for decoration. Practical experience in building a large number of houses of similar cubic capacity (the freeholder finding materials and contracting for labour) had shown that the more work one could give the bricklayer, and the less left for the joiner, the cheaper and better was the construction. The smallest class of house built on the estate was one having dining and drawing-room, and pantry, sink, kitchen, and offices at back, all on ground floor, and six bedrooms, which let at £45; and the majority of houses were from £55 to £65. Hot-water pipes were laid on the larger houseas, which let for £75 and £100 per annum. Several inquiries were made as to whether it would not be possible to provide a library, or other third room, on the ground floor, on a 24ft. frontage, by putting the entrance at side, but Mr. Carr replied that the dining and drawing-room would be unduly cramped; at present he had seen no satisfactory plan solving the problem. Discussion of the plans and decorations, except in the form of questions, was not attempted, but congratulations were more than once offered that the estate is just outside the limits of the Metropolitan Building Act. A full and interesting visit was closed by the acceptance of Mr. Carr's hospitality at Tower House, some of the members also availing themselves of a further invitation to smoke and take coffee at the club.

As we have already remarked, the Bedford Park Estate has been frequently illustrated in the BUILDING NEWS during the past three years. Amongst the photo-lithographs we have published we will mention those of the church, of which plan, sections, elevations, details, and general perspective appeared in our issues for Jan. 17, 24, and 31, 1879 (Vol. XXXVI., pp. 62, 90, 118); the Club House, May 3, 1878 (Vol. XXXIV., p. 442); hostelry and stores, Jan. 2, 1880 (present Vol., p. 10); Tower House, Oct. 31, 1879 (Vol. XXXVII., p. 522); Mr. E. W. Godwin's villas, Dec. 22, 1876 (XXXI., p. 622), and Jan. 12, 1877 (Vol. XXXII., p. 36); Messrs. Coe and Robinson's semi-detached villas, Feb. 23, 1877 (Vol. XXXII., p. 192), and other semi-detached houses and terraces by Mr. R. N. Shaw, Nov. 9, 16, and 23, and Dec. 21, 1877 (Vol. XXXIV., pp. 456, 482, 508, 614); Jan. 11 and April 19, 1878 (Vol. XXXV., pp. 43, 392; and April 18, 1879 (Vol. XXXVI., p. 412). Last week we gave a conservatory just added to one of the semi-detached villas illustrated on Nov. 16, 1877.

CASKETS OF JEWELS.

UNDER this title, Mr. John P. Seddon, F.R.I.B.A., delivered, on Tuesday evening, at the Royal Architectural Museum, Tufton-street, Westminster, the first of a series of monthly lectures, descriptive of the contents of the museum, illustrated by a series of photographic magic-lantern slides of some of the most interesting objects in the museum and the buildings from which the casts are taken, this popular accessory to the lecture being managed by Mr. Bedford Lemere, by whom the photographs were taken.

In his opening remarks, Mr. Seddon referred to the humble character of the museum premises, the casket itself, and to the need for improvement, not only in the building, but in the neighbourhood in which it is placed. Humble as it might appear, this casket had proved a very costly one, and, from its crowded position, the school of art was doing good service among the working classes, for whom it was specially intended. Although the Department of Science and Art had recommended removal to more commodious premises, it seemed the wisest course to make the best of what existed. Before displaying some of their jewels, by which was meant the miscellaneous works of art the museum contained, he would reply to the imaginary query, Was Art, "the expression of the soul of man, as nature is that of God," capable of being shrined in mere plaster, in a single collection of casts? Yes it was; even the history of the civilised world might be traced within those rough walls, lithographed from actual writings by the most skilful and gifted craftsmen of successive generations. In this Museum, superstitious Indians were prating still of the uncouth but picturesque divinities of their fervid imagination; and the rich exuberance of their bossy-sculptured details might teach our artists several lessons in the treating of relief. Here, also, the refined and philosophic Greeks, searching in the ideal for some tangible vision of an "unknown God," had winnowed out for us the chaff and garnered the grain of the earlier Oriental types; had perfected material excellent in construction and intellectual conception in decoration; had set for us the laws and shown us the principles of beauty and proportion in architecture and sculpture. Here the proud Romans displayed luxury and pomp in decoration, which they affected, to the neglect of the refinement and grace, which eluded their grasp. They first applied ornament irrespective of construction, and so fathered all the host of shams, architectural and decorative, which have since been, and still are, the bane of art. Here, gleaned from a hundred widely-scattered caskets—cathedrals, abbeys, priories, churches—were exquisite jewels of Christian art, higher in aim if less perfect in execution than their Pagan predecessors. Here, too, treasures of Mediæval art, handed down from the mis-termed dark ages, gleamed with a light of the sources of which we were ignorant, while its brilliancy fairly astonished us. Nor did this close their list of possessions, for in the museum were also many specimens of the sumptuous, though less consistent, work of the courtly and luxurious Renaissance period; Pagan mythology, artificially revived by studious literati, could not, however, supply art with any spring of new life, so that it sank into mere copyism, and that of the false work of the later Roman empire; and yet so learned were these copies, and so consummate in point of technical execution, that the lack of real life and earnest purpose was too often condoned, and mere husks, so long as they were pretty and graceful, were accepted in the place of the fruit of vigorous and original life. The work of most past ages would be found fairly represented within the museum, so that without having to roam from city to city, and from village to village, the student had here the works he wanted to study, brought actually to him for comparison and reference—even more accessible as casts than the real sculptured stones would be. Although some might wish that these jewels were in a more beautiful setting; yet they did good service, where they were, to the very art students and workmen for whom mainly they had been collected, and, therefore it was that he claimed for the museum the support of those who desired to further the interests of art. In their galleries there were amusing as well as instructive leaves from Bibliæ Paupera, written in stone and wood, by monks of old, or workmen under their direction, when cathedrals and churches were the only books that the masses of the people could learn from. Between the ninth and seventeenth centuries, as M. Didron had pointed out, ecclesiastical and monastic edifices possessed an almost incredible profusion of figures, sacred subjects, sculptured, carved, painted, engraved, and even woven. In these buildings, by this means, were set forth the whole history of the Bible, from Genesis to the Apocalypse, as the written word of God, and the whole category of nature as His handiwork, as then known or imagined by science and legend. With these graver scenes were mingled others of gayer cast—representations of the contrasted virtues and vices, fables, the labours of the months, and other subjects in which the grotesque was freely introduced. Indeed, the complete realisation by means of art of a universal mirror of the universe was aimed at in the comprehensive artistic schemes of the Middle Ages. Having thus given a general sketch of the contents of the museum, the photographs were exhibited to large size on the lantern. These consisted of views of buildings of different styles, lands, and periods, shown in chronological order, followed in almost every case by some details from the edifice depicted, these being necessarily shown on an enlarged scale. Commencing with some views of Indian topes, followed by fragmentary carvings in marble from the temple at Raj Potana, given to the museum by Sir Bartle Frere, Mr. Seddon alluded to the non-progressive nature of Indian art, to the rich but lifeless and doll-like character of its figure sculpture, and to the elaboration and the want of force and unity that mark the composition of its buildings and their decoration. Casts from capitals at the Erechtheum were introduced by a few words on the inherent defects of the Ionic capital, and the delicacy with which the intricate curves were worked out in the finest marble, with lustrous eyes of crystal in the centre of each volute. St. Mark's, Venice, was followed by a view of a cast from a panel of the baptistery in that building, showing a vigorously-treated figure of St. George, as a youthful warrior, on horseback, in the act of slaying the Dragon; this cast was given by Mr. Ruskin. From the façade of the Doge's Palace some capitals were exhibited, and described as amongst the most spirited of Gothic work; they were variously treated as storks, foliage, lions, and human figures. As a specimen of Lombardic Romanesque architecture the stern west front of Lucca was shown. The museum is rich in carvings from Notre Dame, Paris; the central west portal, with its marvellously rich incrustation of sculptured Prophets, Priests, and Kings, was shown, and also the ironwork on the door itself, which was spoken of as an exceedingly rich specimen of wrought-metal work, well deserving attentive study (Mr. W. A. Lethaby's drawing from this cast was published in the BUILDING NEWS on September 27th, 1878). Some capitals, of almost Byzantine character, from the same cathedral, were shown, and also a series of three casts from panels at the back of the choir-stalls, representing the death, burial, and assumption of the Virgin, these last being works of great excellence of execution, and most vivid dramatic character. In that depicting the funeral scene, Mr. Seddon pointed out a couple of *gamins*, who have laid profane hands on the bier as it was borne in procession, with the result that one boy has lost his hands, which were seen severed from his body, and remaining attached to the pall, while he had fallen to the ground; the second boy hangs to the bier, unable to remove his hands. The very rich porch of Rheims Cathedral was also shown, where the profusion of Prophets, Priests, Kings, and Saints carved between the capitals, and in the mouldings of the arches were greater than at Notre Dame, but the replacement of the tympanum by a rose window impaired the composition. Censing angels from spandrels in the Angel choir of Lincoln were followed by numerous illustrations from West-

minster Abbey, including the capitals, diapers from the wall-surface of choir, the monuments of the De Valences, and after some other illustrations the series closed with Ghilberti's delicate and refined bronze doors at the Baptistery, Florence. Resuming his lecture, Mr. Seddon said he thought, after what samples had been exhibited, that his hearers must have recognised the genuineness of what had been esteemed as precious stones, deprived though they were of appropriate settings. Had he claimed too much in calling them jewels? Was it a mistake to imagine that things of beauty could no longer be joys for ever? And had printing superseded art so as to render its teaching henceforth of none effect? Judging from our familiar surroundings, it would almost seem as if such questions must be answered in the affirmative. The besom of modern progress was sweeping away all that was venerable or picturesque, which would soon only be sought for as relics in such museums as this. Whether or no while ringing this knell we were but ringing in a new and truer order of things, he would maintain that art had been the salt of the earth, and had flavoured the work of man hitherto. If art had sometimes been misused, to the gratification of low tastes, and if it had at other times pandered to pride and superstition, it was but the expression of the soul of man. If the latter be depraved, it was as well that it should be exposed; and this possibility of its degradation rendered it only the more necessary that nobler natures should also have the same language of art by which to show forth the higher ideal that had been vouchsafed to them for the benefit of their fellow-men.

THE NATIONAL ASSOCIATION OF MASTER BUILDERS' RETURNS OF THE STATE OF TRADE AND THE LABOUR MARKET.

WE have on our table the half-yearly return published by the National Association of Master Builders of Great Britain, showing the hours worked, rates of wages, state of trade, and supply of labour in the principal towns of England and Scotland. The statement has always a special interest to those engaged in building operations, and owing to the last year or two of depression, arising mainly from the unsettled state of the country and the attitude of our Government, it has a significance of even greater moment at the present time. Taking first the tabular statement showing the state of trade and the labour market, to January 1st of the present year, we are struck with the very disheartening returns from all the leading towns in the kingdom. With very few exceptions all are either in a bad or very dull state. As regards trade at Birmingham and Bradford, its condition is described as "very bad," and "bad" in all the trades, while the supply of labour is largely in excess of demand. In both towns notices of reduction to bricklayers and masons, and to other branches have been given. In Bradford the reduction is to 7½d., to commence on May 21st, while at Birmingham a notice of reduction is given of 1d. per hour in all branches, and the abolition of walking time, overtime, &c. From Bristol the work is slack in all the trades from the abundance of labour except plasterers, of whom it is stated there are sufficient. A similar tale comes from Barnsley, Barrow, Bolton, and Blackburn, the only exception being painters. Liverpool is tabulated as "very bad," and no prospect of improvement in all the trades, and there is intimation of a reduction of 1d. per hour all round, to come into operation on the 1st of April. Leeds is in a like state; in Manchester also there is a general depression, and notices of reduction have been given to masons and plumbers of 1d. to expire on the 1st of June, and to bricklayers of ½d. to expire in July. Nottingham reports that plumbers are busy, but no account is given of other trades which are presumably slack. Wolverhampton, Widnes, Wigan, Wakefield, Warrington, and other northern towns furnish by no means flourishing accounts of trade, while labour is plentiful. If we look at some of the towns in the South, the prospects are not much brighter. From Southampton the state of trade is said to be moderate, though the supply of labour is bracketed as "plentiful." From Portsmouth we learn trade is "quiet" in all branches, and the plasterers are the only trade exempted from the category of plentiful. Plymouth is tabulated "all except plasterers good." At Chatham, trade is "dull," at Dover, "very bad," while if we take Bristol and some other Western towns, trade is generally described as slack. In Scotland, from Aberdeen, the trade is said to be fair, but prospects not bright.

Turning to the statement of hours worked and rate of wages, we may give a few instances from some of the ordinary branches. At Aberdeen, where no bricklayers are employed, we find the masons earn from 7½d. to 8d. per hour, and work 51 hours per week in summer, and 45 in winter; while if we look at the same trade at Bradford and Birmingham, Liverpool and Leeds, we find the rate is raised, 8½d. to 9d., the hours worked in the two last-named towns being 55 and 50 in summer, and from light to dark in winter. At Edinburgh we find the masons are paid only 6d. per hour. In other Midland towns, the rates are from 7½d. to 9d., and in the south of England from 7d. to 7½d. At Southampton, Salisbury, and Portsmouth, the wages are equal to this rate, and the hours worked 56½ in summer to 51 in winter. At Taunton the rate per hour is as low as 4½d. to 5½d., and the hours worked all the year through 59½. If we take the bricklayers, we find a considerable variation in the rate of wages. At Edinburgh, it is 6½d. to 7d., the hours worked being 51 in summer and 42½ in winter; at Bradford, the rate of wages is 8d. to 9d., the latter in winter, and the hours 49½ in summer and 45 in winter. At Birmingham, the rate is 8½d., and the hours worked 54 to 47¾ average. At Blackburn, the rate of wages are 36s. a week in summer, for 49 hours, and 33s. in winter, for 44 hours. Darlington, the rate is 7¼d.; Liverpool and Leeds, it is 1d. more, and the hours 55 in summer and 49½ in winter, and 50, and from light to dark, at Leeds. The wages at Manchester are 9d., while the hours are 54½ and 47. In the southern districts, there appears to be a considerable fall in the bricklayer's rate. Against Portsmouth, we notice, the wages are 7d., at Plymouth and Southampton, 6½d. to 7d., and at Salisbury and Winchester it is as low as 6d. and 5¾d., the hours worked being about 56½ in summer, and 50 to 54 in winter. In the column for carpenters and joiners, the rate of wages vary also considerably. There is one place in the kingdom where carpenters are paid as low as 5d. per hour, and work 65 hours both in summer and winter; this town is Dorchester. At Devizes, in Wiltshire, the rate is only a trifle higher, being from 5d. to 6d. The next town in which the rate is equally low is Winchester, it being 5¾d. and the hours 58½, the same rate as the bricklayers. At so large a town as Southampton the rate is as low as 6½d. to 7d., and this appears general in the South. The highest rate paid in this trade, after London, in which it is 9d., is 8½d., and this prevails at Birmingham and Nottingham, though in many other towns in the North and Midlands it is 7d. to 7½d., the latter appears to be the average wages. The longest hours worked in summer is 70 at Canterbury, where the wage rate is only 6d. to 6½d., and the shortest appears to be 49 hours at Blackburn, where the wages are 7½d. We have no space to analyse the other branches. The plasterers appear to earn a higher wage in the Midland and Northern towns than they do in the South. At Birmingham and Manchester, for instance, they earn 8½d. an hour, at Liverpool, 8¼d., at Leeds the same, while the rate at Chichester is 6d., at Gloucester 6½d., and at Dorchester, 5d.; 7d. to 7½d. appears the average. Plumbers' rates also differ much, though 7½d. and 8d. are average figures. In the painters' trade, the rate varies from 8½d. in London to 5d. at Dorchester, the best prices appearing to be paid in Blackburn and some of the towns in the North. We have confined our attention chiefly to the extreme rates, as they will enable those interested to strike a fair average. We have not space to enter into the labourers' hours and wages. Sixpence and 6½d an hour is a high price, but we find it paid in some towns in the North and at Birmingham, Crewe. In a few other places in the Eastern part of the country it is as low as 3½d. To enable the reader to form some idea of the rates paid for high-class work, we may quote the wages paid in London. The masons, bricklayers, carpenters and joiners, and plasterers, are paid 9d. an hour, and work 52½ hours in summer and 47 in winter; the slaters earn the same wages, but the hours are 56½ and 51½ respectively; the plumbers are paid 10d. an hour and work 50½ and 47, the painters 8½, and work 52½ and 48 hours, while the labourers obtain 6d. an hour, and work 52½ hours in summertime, and 47 in winter. After London, the great towns of Lancashire and Yorkshire represent the highest rates paid. Thus, in Liverpool, skilled workmen obtain, at present, 8½ an hour in nearly all the trades, while, at Manchester, the rates of masons and bricklayers are the same as in London, and at Birmingham, Blackburn, and Leeds, 8½ is an ordinary price. A few towns have not sent in returns since July, 1874.

On the whole, the building operatives cannot look back with much satisfaction, and the prospects of reduction of 1d. and ½d. per hour in many of the larger towns are not very encouraging. In some towns, as Liverpool, counter notices have been received from masons, bricklayers, and carpenters, who have had intimation of a 1d. reduction after April 1st. The National Association, in publishing this summary, undertakes a useful work, though the list is not quite complete in a few particulars, owing probably to the dislike of some towns to furnish information not flattering to their trade. A glance, however, at the leading returns show a superabundant supply of labour in all branches, with its inevitable result.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE fourth ordinary meeting of the Institute was held on Monday evening, Mr. Horace Jones, V.P., who occupied the chair, announced the death of Mr. Geo. Mayhew, Fellow, the brother of Mr. Charles Mayhew, describing him as a genial, courteous, pleasant gentleman. A number of donations to the library were announced and acknowledged with thanks. The Secretary (Mr. White) read a letter, signed by H.R.H. the Duke of Edinburgh, as chairman of the Council of the Royal Albert Hall, calling the attention of the members of the Institute to the exhibition of works of fine art proposed to be held in the Albert Hall in March next, opening on the 22nd of that month, and asking them to contribute works of art. The next meeting, to be held that day fortnight (the 9th February), would be set apart for the discussion. The secretary added that a lithographed copy of the letter had been sent to every member of the Institute. He also read a letter from the Manchester Society of Architects, asking for suggestions as to the cause and mode of prevention of decay in timber, commonly known as dry-rot; observations on a building in which this decay had been arrested had been, it was added, specially valuable. With regard to the Barry portrait, he had the pleasure to announce that the commission, which had been put into the hands of Mr. Lowes Dickinson, was near completion. The fund now amounted to more than eighty guineas, and as over half that sum had been subscribed by members of the council, the committee thought some other influential Fellows would desire to add to the list. The following gentlemen were elected as members:—As Fellow, Thomas Goodchild, Duke-street, Adelphi, W.C.; as Associates: Maximilian Clarke, St. Lawrence-road, Notting-hill, W.; Alfred Hill, Queen-street, Cheapside, E.C.; Walter Talbot Brown, the Square, Wellingborough (Pugin medallist); Samuel John Thacker, Montague-street, Russell-square, W.C.; and Leslie Evelyn Liardet, Breakspear-road, Wickham Park, Brockley, S.E.

ARCHITECTURAL COMPETITIONS.

A paper upon this subject was read by Mr. THOMAS PORTER, and will be found in a summarised form on p. 143.

After the reading of the paper, the CHAIRMAN remarked that no one who heard Mr. Porter's elaborate calculations of the losses sustained by the profession in competitions would continue to wonder that the Institute so feebly supported the Architects' Benevolent Society, or at the great need for such an organisation. He called upon

Professor KERR to open the discussion. The Professor said he had competed a good deal, and with more success than was generally known. He had conducted his competitions with much less expense than the £2 average which Mr. Porter had suggested. The drawings prepared for the Government Offices Competition of 1857, including a plan over 7ft. long, cost less than £15, frames included. At that time he worked very hard, pencilling his designs during the day and inking them in at night. The South Kensington Museum designs cost him very little

in money. In that competition the subordinate who prepared the design placed first was turned out of office for revealing the secret. When the designs were considered the Committee preferred the speaker's, but Mr. Cowper, then in office, said he could not help that, they must simply have Captain Fowkes' design amended till they could approve it. Ultimately the scheme was thrown overboard. Experience had shown him it was of no use going into a competition unless you are sure to win (laughter), and the way to win was perfectly well known. The man who knew how to win a competition was successful, and the man who didn't know how—well, he had to pay for his experience.

Mr. KITSON: Perhaps Professor Kerr will kindly explain himself.

Professor KERR: Oh, I don't mind telling you if you don't know. First of all, you must produce the best plan, and, to do that, you must go the right way to work to get the best "information." (Renewed laughter.) Ah, I see you know what I mean by that. Now, I got the best information at South Kensington, but, practically, Captain Fowkes got better. So, in addition to using the best information, the man who means to win must have "friends."

Mr. CHARLES FOWLER observed that the curious feature of competitions was that so many entered, and that most of these were the younger and less-experienced members of the profession. There must be a cause for this attractiveness, and it would be worth while to inquire what it was. He believed that while most of those who entered had vague hopes of obtaining a premium, the real reason that they entered was that young men who had previously worked in the offices of others felt that they now had an opportunity and an incentive to make a design that should be entirely their own, and of comparing their work with that of other people. In his own younger days, he entered into many competitions simply from this love of designing; he only won one premium, and then a local man was appointed to carry out the work. This advantage of the system to young men themselves in giving them a motive for work, and so enabling them to gain experience which at least injured no one else, had been overlooked in discussing the subject. That local committees, probably ignorant of architectural matters, should decide on the merits of designs was manifestly absurd; but the practical difficulty was to induce the people who arranged the competition from exercising to the full their privileges. He should like to see the senior members of the profession decline to enter into open competitions, and this would be generous towards the younger men, but he didn't think the Institute as a body should take any action as to competitions.

Mr. EWAN CHRISTIAN said money matters ought not to be the first consideration in reference to this question. He, himself, owed his position and all he was to success in competitions; for when he began he was without friends or influence, and had to live by his work. There was a way to insure success, and that was by taking the greatest possible trouble in learning all that was wanted, and giving time, brain-work, and skill to the enterprise. As to the suggested "friends in court," he had always tried to prevent his name from being known during the competition, and he believed it was quite possible to procure anonymity. He believed it would be a very bad thing for the profession if competitions were given up. It was quite true that young men entered into competitions for the fun of the thing. In adjudicating upon drawings, it was rare to find out of thirty or forty sets more than half that number which deserved to be looked at. Most competitors deserved to fail, however they might grumble. Some time ago, Mr. Henry Clutton suggested to him the desirability of making competitions turn, as Mr. Porter had proposed in his paper, on sketches. In a recent case of a church he had, as adjudicator, been able to adopt this plan, and it had proved highly satisfactory, six selected architects being asked to prepare new designs, when the man premiated was appointed to carry the work out.

Mr. R. E. POWNALL referred to the discussions on competitions held at the Architectural Association in 1877; nothing came of the inquiries subsequently made, as the Committee felt that any attempt to regulate competitions should come from the Institute, and not from a merely educational body, like the Association. He strongly supported the suggestion of sketch competitions; this plan had been successfully adopted for the Shakespeare Memorial Theatre, at Stratford-on-Avon, and it would be a step in the right direction. He would suggest that the Institute should issue a new code of rules for competitions, in which Fellows should be put under greater restrictions than Associates, and Members of Council, as the penalty of greatness, should not be allowed to compete at all.

Mr. ROBERT WALKER could not understand Mr. Porter's attempt to prove that competitions ought to be discouraged, and he did not think the effort to discourage them would succeed. In the Civil Service, the army, and the navy, competition had been introduced, and whatever suggestions the Institute might make, the people who decided to have baths, washhouses, town halls, and other public buildings believed in the system, and would continue it. What the profession would be justified in asking woud be that, admitting the perfect right of a local authority to determine who should carry out a building; they should call in an expert, who would put the evidence of relative fitness fairly before them, and this referee ought to give his reasons for arriving at a conclusion. The local body could not be expected to bind themselves to adopt a referee's recommendation, for they were responsible, as trustees, for the ratepayers' money. Where competitors used another man's plan with their own elevation—a thing which had happened to himself,—they ought to be exposed, although he did not approve of disappointed architects writing to the professional papers, and had not done so himself. Mr. Porter had made a great point of the "loss to the profession." In other professions, especially the medical, young men spent much time and money without payment, simply to acquire a knowledge of their art, and, looked at in this aspect, the experience gained in competitions ought to remunerate the young architect. Great as might be the waste of time in preparing drawings, at least two-thirds of those in every competition were worthless. Perhaps a reason why so large a proportion of competitions were advertised from the provinces was because parties were greatly divided in country towns, and if one side proposed the work to be given to a man, a second would be put up by the other side, with the almost inevitable result, if the two architects do not coalesce, of throwing the competition open. The great bane of the competition system was the tricky manner in which drawings were got up. Perspectives, except perhaps mere sketches, ought to be excluded altogether, as members of local authorities could not understand them, and they were often taken from impossible points of view.

Mr. CHARLES BARRY having spoken, it was decided on the motion of Professor Kerr to adjourn the discussion till the next meeting of the Institute, to be held on the 9th February.

ROYAL ACADEMY LECTURES ON ARCHITECTURE.—III.

THAT Architecture must be governed by technical principles was the theorem set forth by the late Professor E. M. Barry in his third Academy lecture, delivered on the 22nd inst.—an address to which is now given a special interest, as Mr. Barry's last public utterance. Architects must always, he reminded the students, acknowledge guiding rules to a far greater extent than painters or sculptors. Either artist might advantageously study the principles of composition practised by the old masters; a chemical knowledge of pigments or of stones and a practical acquaintance with all the mechanical details of art were desirable, and manual dexterity might be increased by practice in schools. At this point, however, the worker on canvas or the carver of stone must be left to himself, while the architectural student was as yet only on the threshold of his career when he had learned as much as this. Less unfettered than his brother-artists, he had to deal with more intractable materials, to say nothing of more troublesome persons, and attempts at originality too often in his case proved a snare. He therefore needed to deduce and regard some principles which would aid him not so much in imitating successful works as in avoiding errors. An architect in designing a work of art had always to keep before his mind the *size* and *scale* of his building, the necessity of *stability*, and the method and materials of *construction*, all of which might be described as technical principles of architecture. In respect to the first principle, that of size, architecture had an advantage over the sister-arts, for the impression caused by the size of an architectural work was almost independent of the art displayed in it; while one of the chief elements of impressiveness, size was only a lower attribute of architecture, but it should not therefore be neglected by the student. In order to obtain the effect of size, scale must be studied. By frequent subdivision and the multiplication of parts the apparent size of a building may be considerably increased. Thus, in some of the great portals of French churches, while the door itself was of only moderate dimensions, it was set in a succession of frames of great architectural elaboration, order after order of column decorated the splayed sides of the recess in which the door was sunk, and between the columns and over them an infinitude of small figures and canopies filled the whole surface with small details, imparting a grandeur unattainable by other means. The next great principle was that of stability. Any work of architecture must not only be stable, but must be seen to be obviously stable; and this being so, the artistic value of a good base-line could scarcely be overstated. The absence of solidity was painfully evident in much of the street-architecture of modern days. Under the pressure of commercial requirements, the architect often found it impossible to secure apparent stability in his work, as shops demanded great areas of plate-glass in their windows, hiding the necessary supports in the shape of some miserable iron bars of stunted proportions behind goods or mirrors. Possibly changes in the current of trade, like those now leading to the concentration of business in large establishments, might in the future tend to diminish the importance of the plate-glass window in the eyes of the shopkeeper, and so relieve the architect of some difficulties. At present all that seemed feasible was to so group the upper windows as to avoid the appearance of great central weight, and to make the most of the solid piers enjoined by the law. Intimately connected with stability was construction, and here the architect felt in full force his lack of freedom in contrast with the liberty of his brother-artists. His drawings may be as pretty as theirs; but, unlike them, they are but a means to an end. The knowledge of construction was as essential in an artistic sense, as to the utilitarian side of this art. Not only was it important to know in what portion of a design certain materials might be safely used, but also what would be their appearance and effect. Most of the materials at the disposal of the architect have been in use for centuries, but the use of iron had been so greatly extended as almost to invest it with the character of a new material. This increased employment had added considerably to the architect's difficulties, while it gave him much additional power to over-span large spaces. As a general rule, those materials which required the greatest amount of labour to be expended upon them pleased the most. Marble, in this way, while demanding more work, and consequently costing more money than stone, enables us to carry out a delicate design with more precision and sharpness than the commoner material. Marble was not for outside use in such a climate as ours, but for internal positions it was becoming much more extensively used than formerly, and from its fineness of surface-colour and susceptibility of polish, it formed an important resource in decoration. For exposed portions the value of granite had not been fully appreciated, and its finely-polished surface, hardness, and durability were important qualities. A less expensive substitute was afforded by glazed tiles, which might please if judiciously combined with other materials, but in themselves had a poverty of appearance. Glazed bricks, while more costly than tiles, were preferable as a more stable mode of construtions. Wood had always been a favourite material, but nowadays was chiefly used for internal work. The young architect, in preparing his designs, must remember that details appropriate to woods easily worked will not be suitable to those of harder texture, different grain, or of greater difficulty to work. The lecturer combated the notion that the impression produced by materials varied directly with their money value, and said the expenditure prized was that of the brain rather than the purse. Moreover, the art in a building must be fine art; the mere clever development of the art of building would, if carried to such an extent as to excite notice, produce discontent. The art should conceal art, and the construction

should appear to arise naturally from the circumstances of the case, leaving always on the mind an impression of sufficiency. In conclusion, the student must never suppose that attention to technical rules alone will make a good architect. Architecture, besides being an art of imagination, was also an art of reason and taste. Dealing with practical matters of importance, the imaginative architect needed to control his imagination by reason, as much as to impress upon the latter the influence of his artistic spirit. His necessary dependence upon practical considerations required him to be acquainted with the history of his art, with the conditions of climate, and with construction. The nineteenth-century architect ought not to approach the history of art with a despondent feeling that nothing modern can be good, and that his aim must be to bring back to us the past. Lastly, said the lecturer, with reference to scientific progress, the architect should be careful not to oppose himself to its dictates. Setting aside such buildings as those of a purely monumental character, in which sacrifices may be made of usefulness for considerations of the sentimental class, he must train himself to secure all possible advantages to those who confer upon him their confidence. Details, however dear to him on historical or archæological grounds must, for example, be unhesitatingly set aside if found to conflict with requirements of sanitary science. Working in this manner, the architect will deserve, and receive, the consideration due to an earnest co-operator in social improvement, and may best avoid the sarcasm sometimes heard that "*Fools build houses, and wise men live in them.*"

THE "BUILDING NEWS" DESIGNING CLUB.

REVIEW OF DESIGNS FOR A PORCH.

OUT of the numerous designs that we have received for this subject there are very few that display invention or any attempt to produce something different to the ordinary type of Classical porch, than which there is scarcely any adjunct to a building more commonplace. Nearly all the designs show a square-shaped projection, open or closed, adorned with columns at the angles and sides, with or without a pediment, and it is remarkable that few have shown any other mode of adornment than that by the employment of one or other of the "Five Orders." The lighting to the hall, instead of being made a feature, has been ignored in many instances. "Sub Silentio," which is the best of a large batch of similarly-designed porches, adopts an arched porch with side openings, relieved on the front by three-quarter columns and pediment of the Roman Doric. The angles are canted with inverted curve, and the sides are relieved by pilasters. The angle break thus obtained gives relief, and the order is well proportioned; but the author has not been happy in his mode of lighting the hall, which he does by two circular and a central oval opening above the flat roof of his porch. "Mot" has certainly hit rather nearer the mark than many others. The porch is a lofty Roman Doric composition, open all round, the centre intercolumniation being emphasised by a projection of a column, thus making two columns deep in the centre. This portion is crowned by a pediment which abuts against a balustrade, forming the governing line of the porch. The side intercolumns are about a diameter and a half, and plenty of light can pass through the porch. The internal entrance wall is treated as a square screen with side and upper lights, and a large square light over the door, the divisions being marked by jambs with Atlantes, and by a transom relieved by a Greek fret. The advantage of this arrangement is that a dark background is afforded to the columns, and ample light can enter; though the adoption of such a plan would, of course, necessitate a lofty porch, with ample intercolumnar space. The details of mouldings are carefully drawn. "Sub Silentio's" second design exhibits a plain porch open on all three sides by semicircular arches, relieved at the angles by pilasters of Roman Ionic, and crowned by balustrades. The side openings are filled below with balusters, and the lighting to hall is by a semicircular fanlight above the roof of porch, which is flat. "Null bien san peine" sends an open porch with pediment supported by coupled Ionic columns at the angles, and resting on a low podium or balustrade and pedestals. The elevation of internal doorway, showing a leaded-glazed light beneath the roof of porch, has merit; but we hardly think the diagonal panel in keeping. "Clansman" shows a plain, unpretending porch with prominent corner pilasters and with a wide-arched opening. The ceiling is intended to be flat, of panelled stone; there is no pediment or balustrade, but a simple blocking course. A fanlight over the internal door which has side lights is intended, and there are square-headed side frames for glass. The merit of the design consists solely in its bold simplicity and its freedom from all pretence. "Toledo" is arched on all three sides, the side openings having balustrades. We find fault with the rather weak effect of the single-angle column and the projection, defects in the design. It would have been preferable to have had a square pilaster at the angle, and another column in the flank to correspond with the front. The roof has a plain span covering of lead with ribs, and a front pediment. An ordinary fanlight under porch is the mode of internal lighting adopted, a method that is certainly defective, as no direct light from the sky can be obtained. "Wasp in Triangle" has some good points, though little that is new. The porch is an open Roman Doric one, with a square pilaster and a column each side of the front opening; it is covered by a flat of lead and crowned by balusters. The author shows the inner hall entrance within a large square frame or screen, with angle as well as circular fanlight, and with lights on each side of the door. Details are carefully shown. A better attempt to get light for the inner hall is made by "Motto J. L.," who, however, has set about it rather awkwardly by introducing a low oblong opening above the flat of porch that would be invisible except in elevation. He also pierces his side porch walls, which are rusticated, by two openings. The Ionic pilasters near the angles, with the rounded corner between, is a rather happier method of relieving a porch than by placing them close to the corner, as many of the competitors have done. The mouldings show want of knowledge in Classic. The design by "Quod" is simply a small portico of the Corinthian order carried up to a lofty proportion to obtain a large light over the inner door; the slight break of the pediment over the two inner columns gives a little variety to the treatment, but no side elevation or section is given. "Fleur de lis" is a design distinguished for some originality; the porch is shown open, with columns or square pilasters; we cannot say which, as no plan is afforded through this part. The front is broken; the centre part above the inner columns is carried up by flat consoles, which support a high pitched pediment; the side wings over the angle pillars are crowned by plain entablatures which carry a rather steep roof, but no good use is made of the height, as a very insignificant doorway with side windows and circular fanlight appears. There was evidently the germ of a good idea present, but the designer has not made use of it. The design of "F. W. in a Lozenge" does not aim at anything more than a very ordinary porch with side windows and pilasters with a flat roof. It is such a porch as one may see miles of at Pimlico. The same remark applies to "No. 90," which is a common open porch with flat over; to "N.B. North" to "Presto," "Belteshazzar," "Ogmore," "Lancaster," "B in Circles," "Nineteenth Century," "Fidessa," "A. U. C. in Triangle," "Attempt" (good detail), "Timeo." Some of these remind us of small "Bethels," others of sentry-boxes. One word to "Timeo." He has shown his plan through the pedestals, instead of through the columns. This is incorrect drawing, and makes the plan appear as if there were huge buttresses at the corners. For "A. U. C.'s" information also, we beg to point out that his section is not correctly shown; the entablature is never taken through its whole depth, as if it were a solid mass of masonry, the ceiling or soffit should be raised above the level of architrave. "Our Praises are our Wages" attempts something less common; but its broken pediment, the diminutive pilasters, deep frieze and heavy corner piers, are rather features borrowed from Queen Anne than pure or Classical. The best part of the design is the light over the flat roof of porch; the drawing is also careful. "Resurgam" is much too florid and overloaded with ornament to be seriously criticised; the labour bestowed in drawing the reclining figures in the spandrels, and the ornament in the screen has been thrown away, and the best point in the design are the mouldings; the balusters are too big below the swelling. "Figaro" is as unredeemably plain and meagre in elevation as the last is over-done; the panelled pilasters standing over the lower piers are bad in design as they are not central, and the panels in pediment weak. "Figaro," however, is the only one that has hinted the idea of lighting the inner hall through the roof of porch, but he does so in a manner that cannot be pronounced satisfactory, namely, by having a glass roof. It is rather singular that not one competitor has thought of making the porch a part of the composition of the screen or inner wall which is pierced for the light; but that all, with one or two exceptions we have pointed out, have looked upon a porch as a structure demanding a flat roof of some sort. The consequence of thus considering the porch has given it as we find in most executed examples, a mere box-like effect—an appendage with little or no connection with the building behind it.

DESIGN FOR AN ORGAN CASE.

The designs for this subject are numerous, and on the whole of a higher merit than the porch. We consider the claims of "Alfred" and "Edwin" to be equal in many respects. "Alfred" has arranged his pipes without regard to symmetry; the largest pipes are placed rather on one side of the centre, and this arrangement is reversed in the smaller row of pipes. The effect would not be unpleasing. The front framing, is plain and open, forming, as it should do, a mere casing for the pipes; the lines of the organ are vertical and continuous at the angles, the lower portion of the case being studied with regard to the requirements of the organist. The cut bracket-shelf on each side of the player, the framing and mouldings are all suitable. In "Edwin's" design the pipes are arranged in the usual curve, beginning with the largest and highest at the extreme ends, and gradually becoming smaller as the centre is reached. The lower part of the pipes is encased in an open panelling forming a series of flat Tudor cusped arches, below which is a bold coving. The bottom part of case is quite plain, framed with square panels at the side of organist's seat, but the proportion of this part is a little high. The mouldings display taste and refinement in both instances. "Binney" contributes a well-considered case in the Renaissance style; the outline of the upper part is suitable, but the ornament and mouldings might be improved. "North-West" has a good idea, but his framed uprights are heavy, and the ornament rather excessive. The mouldings are also coarse. "Fleur-de-lis" is fairly conceived in its general lines in the style of Late Gothic, Flemish in detail; but it is spoilt by the ornamental bands or scrolls shown across the pipes. We may remind this competitor of our express desire to have all designs confined to one sheet. "Castello" exhibits a suitable case, framed in a sensible manner, but of rather heavy Gothic in the detail, which is over stop-chamfered, and coarse in mouldings. "Burs well" is plain, square in outline, adapted for the purpose, though a little commonplace. "Con Amore," drawn after a rather worn-out type, has merit, but we are not pleased with the termination to the uprights, nor the detail generally. "Ogmore" has the right notion, but his gabled centre indicates rather a finished summit than a mere support for the pipes; a horizontal transom or rail would have been better. "Domestic" shows a design in Renaissance that seems to want another horizontal rail for the pipes. "Gemshorn" spoils a tolerably good idea with the over-panelling of the lower part of case. The design otherwise displays a knowledge of the instrument; two manuals are shown. "Timeo" shows metal standards for pipes. "Glyndwr" is overwrought with poorly-designed detail. "Belteshazzar" has an idea that lacks a knowledge of detail, while "Quiz" shows the pipes without any visible connection, or upper case of any kind. It appears to us that an organ-case should be designed, with the smallest quantity of casing in the upper part, and that the general arrangement of the pipes should govern the composition generally, and become, in fact, the essential ornament of the instrument.

The town council of Nottingham propose to raise the borough engineer's salary to £1,500 a year.

COLCHESTER CASTLE A ROMAN BUILDING.

WE have received another pamphlet upon this subject. Mr. Buckler is still as persistent as ever in his view of the Roman origin of this building, and in the "Third Section," as he calls this edition, he recounts, in the form of a synopsis, the many points and arguments he has urged in his former publications that have been already noticed in these pages. An index is appended to the present remarks, which will be found useful by those who are anxious to learn the author's opinion upon various features of the building. We may just quote one part of the pamphlet bearing upon the remarks of the Rev. E. L. Cutts, who refers to the castle as a Late Norman structure, and who thinks the builders made an attempt to imitate the Roman work in the regular horizontal layers of Roman brick. In reference to these, and other allusions, Mr. Buckler observes:—"There are no mixed materials in the walls, no flints, no Caen stone dressings, no rows of bricks here and there set edgewise. There is one band of herring-bone tilework which marks the divisions of the stories; it is on the apse, the east front, one bay of the west front, at each end of the north front, and across four of the towers." It will thus be seen that Mr. Buckler is directly at variance with Mr. Cutts. He says:—"Essex does not produce hard stone, and yet Portland stone was used in building Colchester Castle to the extent of more than thirty thousand cubic feet; and it is known that the Romans in the time of Claudius quarried Portland stone." Again he says:—"All who are practically acquainted with Essex, know how few of the old buildings in the county are made up with stones of uniform quality." A great deal, we think, depends on the question of material and masonry; but we fear the controversy between the author and his opponents will never be settled to the satisfaction of both parties. Those, however, who are especially interested in it, will do well to obtain Mr. Buckler's recent synopsis of the controversy, where the arguments on both sides appear to be fairly stated.

ARCHÆOLOGICAL.

ANCIENT REMAINS IN WESTPHALIA.—On the northern side of the town of Xanten, in Westphalia, some very extensive remains of ancient walls and buildings have just been discovered, and as soon as the frost disappears it is intended to push forward the excavations again. The foundations of one of the walls discovered extend for 60 mètres in one direction, and are nearly 5ft. in thickness. The character of the mortar and masonry work is excellent. The ruins have not yet been visited by an expert, so that it is at present uncertain whether these ruins belong to a place mentioned in the Nibelungenlied, or whether they are descended from the Colonia rajana of the time of the Romans.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—An ordinary meeting of this association was held on Tuesday evening, at the rooms, Queen's College, under the presidency of Mr. R. B. Morgan, the Chairman. After the usual preliminary business, a lecture on "Art Legends and Symbols" was delivered by Mr. John Roddis.

BRISTOL AND GLOUCESTERSHIRE ARCHÆOLOGICAL SOCIETY.—On Tuesday the winter meeting of this society was held at the Museum and Library, Bristol. A temporary museum was opened in the building. The proceedings of the gathering commenced with a meeting of the council of the society, held in one of the library rooms. Afterwards the members and visitors dined at the Clifton Down Hotel. In the evening there was a conversazione at the museum. Mr. T. Gambier Parry, the President, took the chair and opened the proceedings by reading a paper on "The Place and Value of Fine Art in Archæology."

BRITISH ARCHÆOLOGICAL ASSOCIATION.—On Wednesday week the usual fortnightly meeting of the above association was held. Mr. Cope read an interesting and exhaustive paper on "Jade"—a subject already very largely discussed of late. He showed that, although apparently unkown to, or, at all events, not named by, classical writers, its existence had been known to the earliest nations of antiquity both in the East and in the West, and even in New Zealand, where it formed the material of the emblem of sovereignty now in the possession of Her Majesty the Queen. Mr. Cope illustrated his paper by a large collection of articles made of, or manufactured out of, jade, including candlesticks, vases, bowls, plates, &c. Other fine specimens of jade were exhibited by the chairman and Mr. Cecil Brent; and some beautiful flints, dug up in the neighbourhood of Highbury and Holloway, by Mr. Worthington Smith. The exhibition of these and of the articles of jade called forth an expression of various opinions, Mr. George R. Wright, the Rev. Mr. Mayo, and other members taking part in the discussion. Mr. W. de Gray Birch, of the British Museum, reported that since the date of the last congress of the association he had inspected a variety of early manuscripts at Norwich, at Ely, and at Wells, an account of which would appear in due course in the journal of the association.

NORTHERN ARCHITECTURAL ASSOCIATION.—The ordinary meeting was held in the Old Castle, Newcastle-upon-Tyne, on Tuesday afternoon last. The President, Mr. Thomas Oliver, in the chair. Messrs. James Garrey, West Hartlepool, and Fred. B. Leighton, Lambton Grange, were elected members, and Mr. C. E. Oliver, and W. O. Tidswell, Associates. Mr. J. E. Watson was also re-elected a member. Mr. Geo. Connell then read a most instructive and exhaustive paper on "The Appliances used for Heating and Ventilating Buildings," commencing with the mode of heating adopted by the Romans. He sketched out the varied progressive stages of improvements, and methods employed up to the present date. The various forms of heating by hot water, both low and high pressure, by steam, and also by hot-air, were reviewed with great care, and much useful information was given. The hot-water, low-pressure system was advocated as being the most practical and easily-worked, with the least amount of attention. The subject of ventilation was then fully discussed, and the numerous ventilating appliances, as patented, and now in use, were carefully reviewed, and working models exhibited of the more important patents.

SOCIETY OF ANTIQUARIES.—At a meeting of the Society of Antiquaries, held on the 22nd inst at Burlington-house, Mr. E. Freshfield in the chair, it was reported by the secretary that a communication had been received, through the Admiralty, from Captain Sullivan, R.N., on the West Indian station, announcing that the remains of the great navigator, Christopher Columbus, had been lately found in the cathedral of San Domingo; the chest in which his bones had been laid having not been removed, as was supposed, to Havannah, but still remaining in the chancel of that cathedral with an inscription, both inside and outside of the lid, giving the name of "Christopher Colombe, the Great Admiral." Considerable doubt, however, was thrown on the accuracy of this report by Mr. Milman, who stated that the whole matter had been lately referred to the Royal Academy of History at Madrid, who thought that the inscription was not of contemporary date. He also said that the "translation" of the relics of Columbus in 1795 was made with so much circumstance and publicity that a mistake was not likely to have occurred, and that the bones were probably those of a grandson of the admiral, of the same name. Mr. A. W. Franks, director of the Society of Antiquaries, was disposed to confirm the view entertained at Madrid. The thanks of the meeting, however, were voted to the Admiralty for the communication. Mr. Micklethwaite exhibited some fine tiles, coloured and enamelled, from the chapels in which stand the shrine of St. Alban, at St. Alban's, and which Mr. Franks and another authority of the British Museum ascribed to the 13th century. Mr. Hodson Fowler exhibited a ring found in the Minster church at Southwell, Notts, supposed to have belonged to Archbishop Booth; and Mr. Wyllie a fine copper double axe, probably a bipennis, found in the neighbourhood of the Lake of Neufchatel; and Mr. John Brent, two brasses, without any name or clue, which he had picked up by chance in a shop in Canterbury, and which probably had once belonged to some parish-church in East Kent.

SCHOOLS OF ART.

KIDDERMINSTER.—The annual meeting of the above school was held in the Town-hall, Kidderminster, on Wednesday week, when Mr. Rupert Kettle, of Wolverhampton, distributed the prizes. The report congratulated the subscribers and friends of the institution both on the new building for the prosecution of art studies in Kidderminster, and also on the successful results attained by the students at the recent examination. The number of students had been 192, showing an increase of 16 over the previous year. The number of students submitting works for examination at South Kensington numbered 163, and the number of drawings 918, an increase on 1878. Sixty-six of the drawings obtained third-grade prizes, and considering that more than half the Schools of Art in the kingdom do not average more than one such award per year each, the committee expressed their gratification at so successful a result. Fifty-five of the works were selected for exhibition at South Kensington, 2 of them were awarded national bronze medals, and 5 gained National Queen's prizes of books. At the second-grade examinations, 24 students passed in 26 papers, 3 obtaining second-grade prizes. Second-grade certificates were awarded to 4 students on their passing all the subjects in that grade, and 16 were awarded free studentships for one year. In the examination of the third (or highest) grade, 2 passed in perspective, 5 passed in a time sketch design, and 1 was awarded a Queen's prize of books for excellence in the same subject. The Government grant was £216 7s.

WEST LONDON SCHOOL OF ART.—The new building of the West London School of Art, 155, Great Titchfield-street, was opened last week, when Mr. H. S. Marks, R.A., presented the prizes to the students. The report of Mr. G. A. Stewart, the head-master, showed that 581 students had attended the school during the year—an increase of 80 above the number of students in 1871. The receipts from fees were £704, of which £308 was derived from the Government grants. In the Government examinations testing the year's work, the school had gained 1 silver medal, 2 national book prizes, 23 third-grade prizes, 18 second-grade prizes, and 6 free studentships. For these examinations 372 students sent 2,860 works to South Kensington. At the examinations conducted on the school premises 176 students competed, and 91 were successful. Two of the students—Miss Hoskyn and Mr. Carroll—had gained first certificates of the third grade at South Kensington, and Mr. R. Rickatson, another, had gained admission to the schools of the Royal Academy. At a competition of members of a sketching club, formed of students from five of the principal art schools of London, two out of five prizes were gained by students of this school—Mr. Tidmarsh for the best landscape, and Mr. Breach for the best sketch from animal life. Mr. Marks began by congratulating the students on getting out of their old, dark, ill-ventilated building. They must feel grateful to his friend Mr. Edis, the architect, who had so admirably planned and arranged all the different schools and class-rooms, and with the tact and energy of a business man combined the taste, feeling, and invention of the artist. The facilities for the cultivation and study of art had within the last 40 years become so numerous that we were in danger of having too many painters of pictures. Everybody who had good eyesight could be taught how to paint and draw up to a certain point, but invention, feeling—all the qualities that go to make the painter as distinguished from the mere mechanist—could not be taught, but must be born. Good art might be shown in an infinite variety of ways, and the man who designed a good paper-hanging, an effective piece of metal-work, or a good tile or pattern, was as much an artist, though in a lesser degree, as a painter or sculptor. It had been urged that students should curb their ambition and be contented with the lot which had been cast for them in their callings. The doctrine was to his mind one of rather cruel discouragement. He could not forget that in the son of a common sailor, a journeyman house-painter, a carver and gilder's apprentice, a mason's boy, the son of a small shopkeeper selling plaster casts, and a barber's son, the world had discovered a Clarkson Stanfield, a David Roberts, a Sir Francis Chantrey, a John Gibson, a Flaxman, and a Joseph Mallord William Turner. The Scott Monument at Edinburgh, which suffered little in comparison with late efforts of the kind, was the design of a journeyman carpenter. After giving some practical advice to the students, he recommended them to draw whenever and whatever they could.

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ILLUSTRATIONS.

THE MOSAIC PAVEMENT OF CORK CATHEDRAL.—COTTAGES, READING-ROOM, AND SMITHY AT HOLMROOK.—NEW PUBLIC BUILDINGS, READING.

OUR LITHOGRAPHIC ILLUSTRATIONS.

MOSAIC PAVEMENT OF CORK CATHEDRAL.

WE give this week two more double-page illustrations of Mr. Burges' beautiful pavement of the apse of Cork Cathedral. One is the general chancel plan of the work, together with some detail of part of the ornament, the other contains seven of the smaller figure subjects. We gave the six principal figure subjects in our Christmas Double Number, of Dec. 19, 1879, and hope shortly to give the two last figure subjects of the "Good Shepherd" and the "Sower" at the entrance to the Sanctuary, when we shall probably give some particulars of the execution of the work, which have been kindly promised by Messrs. W. H. Burke and Co., of Newman-street, Oxford-street, to whom it was entrusted.

COTTAGES, &c., HOLMROOK.

THE picturesque group of cottages, village club and reading-room, and smithy, which we illustrate, have been erected at the cost of Mr. Lutridge, of Holmrook Hall, in the pretty village of Holmrook, in Cumberland. The village and hall stand on the banks of the River Irt, a few miles from its source, the beautiful and well-known Lake of Wastwater. The group is built on an excellent site near the centre of the village, and consists of three good and roomy cottages, a village club and reading-room, and smithy, with shoeing-shed, &c. The ground-story, up to the first floor, is built of the beautiful red freestone of the country, and the upper floor of timber construction, filled in with pointed brick between timbers. The roof is covered with green Westmoreland slates. Mr. Baines, of Millom, was the contractor.

READING PUBLIC BUILDINGS.

OUR single-page plate to-day, furnishing a view of the new public buildings at Reading, illustrates the design which is in course of execution by Mr. Thomas Lainson, F.R.I.B.A., architect, of Brighton. We have received no particulars descriptive of the work, but we believe red brick with stone dressings for the walls, and red tiles for the roofs, are being used. The present Town-hall, seen on the right-hand side of the picture, was erected a few years since, from designs by Mr. Alfred Waterhouse, A.R.A., and the author of the present work has studied to make the new buildings agree in style with the former structure. It will be remembered that a competition was held about two years ago, when a large number of architects sent in designs for these new buildings, three premiums being offered by the Reading Town Council. Mr. Lainson was consulted as professional referee, and advised, if we remember rightly, that the total sum of the three premiums combined should be equally divided among the authors of the three selected designs, all of which were thought too costly. This was done, and subsequently the present architect was appointed to the work. The sums of the tenders at first sent in were found to exceed greatly the estimated outlay, and several modifications consequently were made, reducing the design to its present form. Mr. John Chappell, of Pimlico, is the contractor, and the carving has been intrusted to Mr. Henry R. Pinker, sculptor, of Kensington. We give a ground-plan illustrating the arrangements of the building.

SUGGESTIONS FOR THE COLLECTION OF SEWAGE AND SOLID REFUSE.

WE have received a pamphlet written by Messrs. Maxwell and Tuke, sanitary engineers, architects, and surveyors, of Bury, Lancashire, containing suggestions upon the disposal of the sewage of Rochdale. It is addressed chiefly to the Mayor and Corporation of that borough, but its authors intend it to meet a general want. Its main object is to show the advantage of the application of pneumatic power to the disposal of sewage. The authors appear to have spent some time in examining the Liernur process as applied to several towns in Holland, the result of their visits being that they were impressed favourably with the process, and preferred it to the gravitating system for flat districts. They say, "but the weak link in the chain was the want of a comprehensive treatment of slop-water, as well as excreta, and it was upon this point that the system failed to gain a foothold in this country." The invention of Mr. Isaac Shone, C.E., called the Pneumatic Ejector, described in these pages some time since, is recommended as a part of Messrs. Maxwell and Tuke's plan. The authors first examine the existing arrangements of sewerage at Rochdale, the proposed alteration of intercepting the sewage and conveying it to a farm, at an estimated cost of £112,000; they next discuss the pail system of Mr. Taylor, and conclude that for an expenditure in interest and working expenses of over £14,000, the borough "will obtain a very imperfect collection and disposal both of the excreta and refuse of the town." The authors observe that for nearly £6,000 less annual expenditure they can resewer the town, carry away all sewage and excreta, dispose of the whole of the town and market refuse, utilise the present sewers for conveying the surface and storm-waters into the river, and take the sewage either to the selected site or to any waste land below an elevation of 725ft. above the level of the sea. This is an outline of the suggestion contained in Messrs. Maxwell and Tuke's pamphlet. We have no space here to enter into the various details of the proposed scheme. The rainfall would not be dealt with by the system proposed, but would run off by the present sewers; the sewage would be collected rapidly, before fermentation commenced, and carried to certain points, transmitted by compressed air through sealed iron pipes, following the contour of streets to any land within the borough boundaries. The sealed iron pipes will admit the sewage at about 20 or 25 convenient points or stations, at each of which one of Shone's patent ejectors will be placed in a manhole under the street. The motive-power used to force the sewage from the ejectors into the sealed sewers is compressed air. It is proposed to compress this air by steam generated in boilers, constructed on Messrs. Thwaites, Stuart, and Sturgeon's patent principle, so as to burn and destroy all the ashpit and other refuse not fit for carbonising. The pail system is thus dispensed with: the solid refuse, collected in dry ashpits, is burnt, becomes the motive-power by which the liquid sewage of the houses is driven away. We commend the plan, which has many advantages, to the Rochdale authorities, and the conclusions drawn by the authors show a net saving on the sewerage and water-supply scheme per annum of nearly £11,000. The pamphlet discusses the pneumatic system practically, and we recommend it to all towns where flat gradients prevail.

BOOKS RECEIVED.

Half-Hours with Some English Antiquities, by Llewellynn Jewitt (London: David Bogue), has reached a second edition, which is revised and enlarged.——*The Gas Engineer's Diary and Text-Book for* 1880 (Birmingham: John Wright and Co.) seems well adapted for its purpose. Besides a good diary, it contains a directory of the gas companies of the United Kingdom and a series of original articles on gas manufacture, together with an abstract on gas manufacture and some useful tables and statistics.——*The Manchester Diocesan Directory for* 1880 (Manchester: S. P. C. K.) has added to its pages much new and important matter which increases its value.——*The Garden Oracle and Floricultural Year-Book for* 1880 (London: *Gardeners' Magazine*) still enjoys the advantage of that veteran horticulturist Mr. Shirley Hibberd, and is therefore as useful as ever. This, we notice, is the twenty-second annual issue.——*Stained Glass Designs* (London: J. A. Gibbs and W. Howard) is a collection of designs considerably above the average. It is, however, intended rather for the general public than for architects, we should imagine.——*Lockwood & Co.'s Builder's and Contractor's Price-Book for* 1880 (London: Crosby Lockwood and Co.) is first out in the year, and as accurate and useful as ever.

CHIPS.

The Church of St. Andrew, Blo' Norton, Norfolk, was reopened on the 16th inst., after restoration. The nave and chancel have been repaired throughout, the walls re-stuccoed, all the stonework made good; new pulpit, lectern, and choir-stalls in oak, and nave benches of massive design, and executed in pitch-pine, have been placed in the church. Inside the communion rails the floor has been laid by Italian workmen from Messrs. Ebner's, of St. Dunstan's-hill, London, with marble mosaic, and there are also new altar-cloth and dossals. The work has been carried out by Messrs. Adams and Cawley, builders, of Stanton and Bardwell.

The eighth annual exhibition of the Dublin Amateur Artists' Society was opened on Thursday evening in the Leinster Hall in that city; 303 pictures are hung on the walls, and have been reported upon by the judges, Messrs. Thos. A. Jones, P.R.H.A., Thomas Drew, R.H.A., and B. M'Guinness.

The plans prepared by Mr. Rule, of Dawlish, for the drainage of Marazion, West Cornwall, have been approved by the parochial committee and the rural sanitary authority, subject to the approval of the Local Government Board. A scheme of water supply has just been completed in the same fishing-village and watering-place.

Extensive alterations have just been completed at Alderbury workhouse, Wilts. Messrs. Hale and Son, of Salisbury, were the contractors.

At Clay Cross, new Baptist Sunday-schools, including lecture-hall, seating 400 adults, six class-rooms, and cloak-rooms have been opened. The cost has been about £800.

The parish-church of SS. Peter and Paul, Aldeburgh, Suffolk, wherein the poet Crabbe is buried, is about to be restored from the designs of Mr. F. Barnes, of Ipswich. The contract for the work to the tower has been taken by Messrs. Smyth and Sons, of Aldeburgh.

The contract for the Great Northern Railway extension from Melton Mowbray to Leicester has been taken by Messrs. Benton and Woodniss, contractors, and the work will be pushed forward with the utmost speed.

Firth College, Sheffield, the gift to the town at a cost of £20,000 by Mr. Mark Firth, was opened for work on Tuesday. The building forms part of a group erected from the designs of Messrs. Robson and Abbott, and was illustrated in the BUILDING NEWS for Oct. 17th, 1879.

The new church of St. Simon, Uxbridge-road, is to be consecrated by the Bishop of London on the 28th February.

New Board-schools are about to be erected at Wheatley-hill, South Stockton, and Normanby, under the superintendence of Messrs. Weatherill and Moses, architects, Stockton-on-Tees.

The commissioners of the lighthouses on the Irish coasts have entered into a contract with Sir W. A. Rose and Co., of 66, Upper Thames-street, London, for the supply of their "Harp Brand" pure colza oil during the present year.

The annual distribution of prizes and certificates to students of the Science and Art classes, conducted by Mr. Parton Parry, at the London and South Western Institute, Wandsworth-road, was made by Sir J. C. Lawrence, M.P., on Friday.

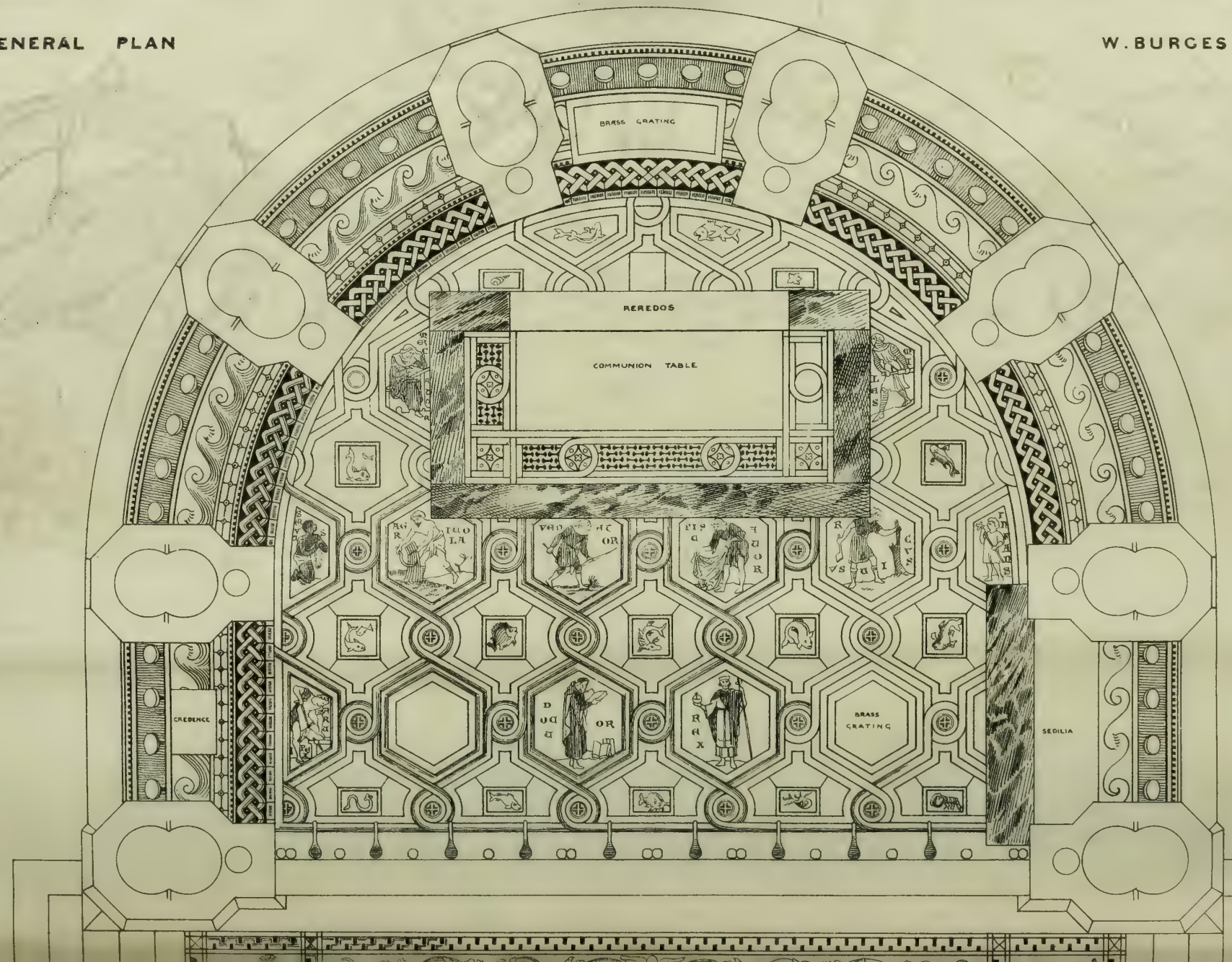
An adjourned Winter Sessions for Glamorganshire was held at Aberayron, on Monday, to elect a successor to Mr. Vaughan, who has resigned the office of county road surveyor. From amongst ten candidates, Mr. Thomas Preston, of Cardiff, obtained the appointment.

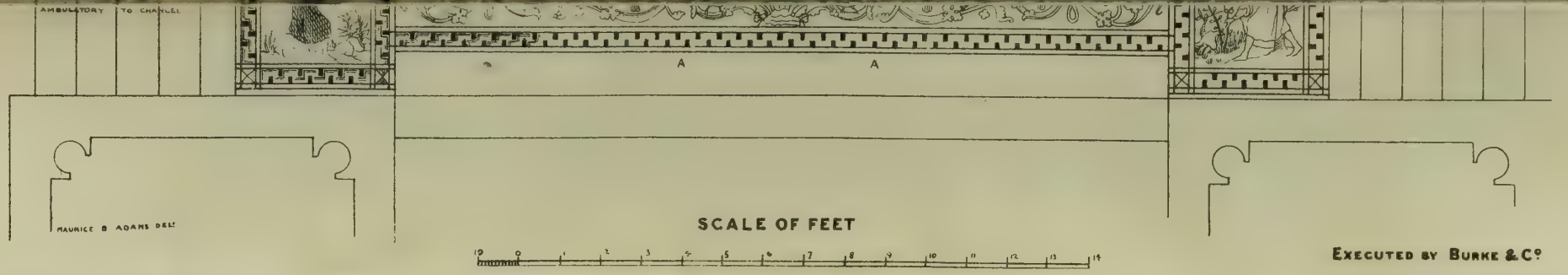
The annual meeting of St. Paul's Ecclesiological Society will be held to-morrow (Saturday) at St. Paul's Chapter House, at 2·30 p.m.

THE MOSAIC PAVEMENT OF CORK CATHEDRAL CHANCEL APSE

GENERAL PLAN

W. BURGES
ARCHITECT





DETAIL OF PART OF ORNAMENT AT A·A·

MAURICE. B. ADAMS. DEL (FROM THE WORKING CARTS)

Photo lithographed & Printed by James Akerman 6 Queen Square W.

NEW PUBLIC BUILDINGS READING

THOMAS LAINSON F.R.I.B.A. ARCH[T].

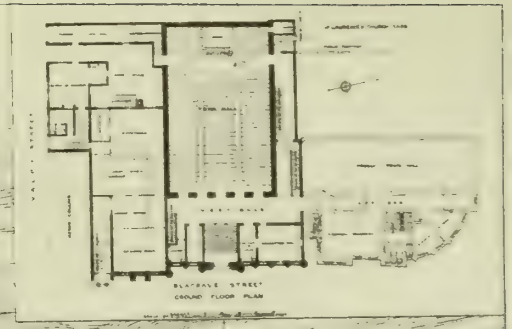


Photo-Lithographed & Printed by James Akerman, 6, Queen Square W.C.


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MAURICE. B. ADAMS. DEL (FROM THE WORKING CARTS)

MOSAIC PAVEMENT OF CHANCEL CORK CATHEDRAL.

SEVEN SMALLER FIGURE SUBJECTS.

W. BURGES. ARCHITECT.

Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.



Cottages · Reading Room & Smithy: Holmrook for C.R. Fletcher Lutwidge Esq:

Paley & Austin, Architects. Lancaster.

Photo Lithographed & Printed by James Akerman, 6, Queen Square W.C.

THE LATE PROFESSOR E. M. BARRY, R.A.

WE regret to have to announce the sudden decease of Professor E. M. Barry, while discharging his duties as treasurer of the Royal Academy of Arts. Mr. Barry had been suffering from an affection of the heart for some time past, and purposed, as soon as his present course of lectures on Architecture, to the students of the Academy, had been delivered, to have acted on the advice of his medical attendant and have gone abroad for relaxation and change. On Tuesday, he was at his office, 21, Abingdon-street, Westminster, as usual, and appeared in better health and more cheerful than for some days previously. He attended to professional duties with the usual vigour, and, amongst other things, superintended the preparation of diagrams for his fourth Academy lecture, which, in due course, was to have been given on the Thursday. In the evening he attended the meeting of the Council of the Royal Academy, and took part in the proceedings. He rose, it is believed to speak with reference to the accounts, when he suddenly fell to the floor, and expired in the room in a few minutes, it is supposed, from an apoplectic fit. It is not yet known whether, under the circumstances, an inquest will be considered necessary, and nothing has been decided upon as to the place or the time of the funeral.

The late Edward Middleton Barry was the third son of the late Sir Charles Barry, and was in his fiftieth year, having been born in 1830. He was educated at King's College, London, and studied architecture under the now venerable Professor Donaldson, in the office of Mr. T. H. Wyatt, and afterwards in Sir Charles Barry's office. During his father's latter years he had largely assisted in the completion of the Houses of Parliament; and at Sir Charles's death in May, 1860, he was appointed his successor as architect of the building, and in that capacity he superintended the final stages of its erection, and the formation of St. Margaret's Square. Among his earliest works of note are the Birmingham and Midland Institute, built in 1856-7, and destroyed by fire last year; Covent Garden Theatre, built in 1857, during the brief period of eight months. At Halifax Town Hall he carried out his father's designs; at Leeds he built the Grammar School, also in a florid type of Decorated Gothic; at Bristol he added a glass roof, and otherwise altered the Exchange. Of other works may be noted the Endell-street Schools for St. Giles', Bloomsbury, illustrated in our pages; the Star and Garter Hotel, Richmond; and the railway hotels at Cannon-street and Charing-cross, with the Eleanor Cross in the courtyard of the latter building; the Floral-hall, Covent Garden; St. Saviour's Church, Haverstock-hill, one of his earlier works, in the type of Early English then prevalent; an opera-house at Malta; the restoration of Crewe Hall, Cheshire, for Lord Crewe; and mansions at Pirgo Park, Havering-by-Romford; Cobham Park, Surrey; Shabden, near Merston; Wykehurst, Sussex (illustrated in the BUILDING NEWS, Feb. 19, March 5 and 12, 1875); and Bolney, Sussex; the Children's Hospital, Great Ormond-street (illustrated July 30, 1875); the Art Union Society's new premises in the Strand (illustrated Feb. 28, March 7 and 14, April 11 and 25, 1879); and the new block of Temple Chambers, in which he worked conjointly with Mr. J. P. St. Aubyn, the latter preparing the plans, and Mr. Barry being answerable for the general design (which, it will be recollected, is a rich and florid Renaissance); the whole of the external details and the works at the Inner Temple moiety of the chambers. The Reform Club has just been decorated from his designs.

Edward Barry frequently entered the arena of competition, and in 1867 his competitive design for the re-modelling of the National Gallery was accepted by the judges. Five years ago the new eastern galleries were built and ornately decorated from his designs; but the general scheme, which we illustrated at the time, and which would have given an Italian front towards Trafalgar-square, with an immense central dome and a cupola at each angle, was abandoned by the Government last autumn, the sum of £5,000 being voted to Mr. Barry as a solatium for not carrying out his design. In 1867 he also competed for the New Law Courts, and was again successful, as the judges recommended the appointment of Messrs. E. M. Barry and G. E. Street as joint architects. On the change of Government all this was upset, and in the redistribution of prizes Mr. Barry got the National Gallery, Mr. Street the Palace of Justice, and Mr. Waterhouse the Natural History Museum, South Kensington, while Sir Gilbert Scott was already hard at work in association with Sir Digby Wyatt on the Home and Colonial Offices. Amongst the large competitions in which he was unsuccessful may be noticed the Royal Mausoleum at Frogmore, the Albert Memorial in Hyde-park, and the large railway hotels at Lime-street, Liverpool, and St. Pancras, W.C.

Mr. Barry worked in all styles, from Early English Gothic to French and Italian Renaissance; but his designs show a roughly chronological progress from year to year, his later works evidencing a decided leaning to the Continental types of Neo-Classic as adapted to modern requirements, and an elaboration and delicacy of ornamentation not apparent in those executed at an earlier period, and he never failed to avail himself of the aid of high-class sculpture. Of his place and rank in the profession it is premature to speak in this first notice of his sudden removal from our midst. In personal appearance he bore a striking resemblance to the late Sir Charles Barry, and his manner was marked by affability and ready courtesy.

Mr. E. M. Barry joined the Institute in 1855, and five years later became a fellow of that body. He several times has served on the council, and at the time of his death was for the second time a vice-president. In 1861, he was elected an associate of the Royal Academy, and in 1870 became a Royal Academician. We summarise in another column his third lecture to the Academy students in this his third course as Professor of Architecture, in which he succeeded Sir Gilbert Scott. He was an associate member of the Institute of Civil Engineers, an honorary member of the Imperial and Royal Academy of Fine Arts at Vienna, and of the Academy and also the Society of Architecture at Amsterdam, and of other foreign societies. In 1878 he was awarded a medal of honour in the Architectural Section of the Paris Universal Exhibition, of which section Mr. Charles Barry was at the time the President.

Of Mr. E. M. Barry's brothers, the eldest is Mr. Charles Barry, ex-President of the Institute, and the second the Rev. Alfred Barry, D.D., D.C.L., President of King's College. In the "Life of Sir Charles Barry" by the latter gentleman, we get in the closing chapter the following pleasant glimpse at the early training of the family in professional thought:—"All the inmates of the home felt the direct influence of its architectural atmosphere. Of Sir Charles's sons, two, Charles and Edward, followed his own profession. The former was [in May, 1860] at work independently, and the latter acted as his father's coadjutor till he began to retire from the more active exercise of his profession. Their career he watched with peculiar interest, and his advice and aid were always at their command. In their names he sent in his last great architectural design—the plan of the Westminster Improvements. Of his other sons, two, Godfrey and John, were engaged, the one in surveying and the other in engineering work, and so followed plans of life not wholly different to his own. So far, therefore, his family life still reflected something of the professional thought and feeling which elsewhere absorbed his interest. But with any successes which his sons achieved, he entered into a special liveliness of satisfaction, and his home relations were those of almost unbroken happiness and affection."

ARCHITECTURAL COMPETITIONS.*

IN opening the subject, the author said he should not have been justified in appearing before the members had he been a stranger to the labour involved in preparing a first-rate set of competition drawings; but having, on his own account, or responsibly for other architects, taken part in all the largest national competitions (except the Law Courts), and frequently in premiated design, he thought he might, at least, claim to have some experience. After reading the circular letter on the subject which he addressed to all the members of the Institute in November last (and which will be found in full in our issue for Nov. 7th, 1879, p. 596, last Vol.), the author remarked that, whether the system of open and unlimited competition worked beneficially, or whether it should be entirely discouraged, would probably be for many years an open and vexed question with the profession. It was urged in favour of competition, that if the system were abandoned, little opportunity would be given for men of obscure position (but with undoubted talent), not having the advantages of professional or family interest, to rise into notice, and that the prizes of the profession would be monopolised by the few well-known leading men, many distinguished by their artistic attainments, but some known rather for their good business habits, social qualities, and advantages given either by birth or fortune. Also, that in our large public buildings advantages arose out of open competition by drawing forth many and varied modes of treatment, and in the probability, or at least possibility, that some obscure genius might arise and produce so vigorous and original a conception as to stamp his ideas at once as the work of true genius, and leave no doubt as to his title to be selected as the architect to carry the work into execution. Again, it was frequently thought that competition afforded an opportunity to a young man to exercise his ingenuity and skill on a definite practical object, and that having the whole responsibility on his shoulders of preparing a design, it put him on his mettle, and had a beneficial influence in rendering him in early life entirely dependent on his own resources in thinking out his plan. Weight might some years ago be attached to such views, and some men of mark had undoubtedly arisen from obscurity through unlimited competition; but it hardly followed that what might have worked beneficially for a few individuals in one age was necessarily applicable to every period, and the circumstances surrounding the architectural education and practice of the present generation were so obviously different to that which immediately preceded it, that it would be difficult for any man of real genius at the present time to remain long altogether unknown and unappreciated. The Institute, and the kindred London and provincial societies, had done much to help the younger members of our profession, who might be wholly dependent for advancement on their artistic skill and professional attainments, indeed, the influence of architectural societies on the members of the profession was clearly shown by the large number who possess high artistic attainments, though there might be fewer than in former years who rose to the very pinnacle of fame, for the spread of educational facilities rendered it more and more difficult to reach the highest position. At the present day the evils surrounding the competition system had become so numerous and patent as to threaten considerable damage to private practice unless something was done to check the mania for small and insignificant competitions. Although it was open to grave doubt whether the systen, even for a large

* A paper read by THOMAS PORTER, F.R.I.B.A., before the Royal Institute of British Architects, on the 25th January. (For the subsequent discussion, see report on p. 126.)

building, was the best means of obtaining a perfect design, few would take violent exception to an honourable and fairly conducted open competition (if such a thing were possible) for a magnificent building involving the outlay of many thousands of pounds; but even the most ardent admirer of the system would never justify its being extended to what was now so common, viz., advertising for designs for buildings of every conceivable sort and size, often combined with instructions of the most vague description, and sometimes in terms even insulting in character; and it was specially to the evils of these smaller competitions that he desired to draw attention, with a view to their discouragement, and to some means being adopted for placing both large and small on a more satisfactory basis. In support of the proposals he was about to make, the author read quotations from the leading articles in the BUILDING NEWS and the *Builder*, and extracts from letters written to him by some thirty architects in practice in London, Glasgow, Liverpool, Bristol and other large towns, all of whom, with four exceptions, condemned the system, and urged him to persevere in his proposal. One of the writers, a London architect, who years ago engaged very largely in competitions, and won considerable premiums, said that he "looked upon competitions as gambling of the worst kind, and as injurious and demoralising to the profession"; another wrote, "I feel certain that the practice is wasteful, and produces no satisfactory results. I have declined all invitations to compete, and have found my practice improve. I believe others would find the same result"; while a third declared that although he had won the only competition in which he had entered, and was about to supervise the execution of the works, the amount of heart-burning, envy, jealousy, and other unlovely concomitants following upon it had determined him never again to enter upon a similar work. Amongst the letters disapproving of the author's suggestions, was one from a provincial associate, who says: "I am largely indebted to competitions for what success I have achieved, and but for them should not have had a chance of obtaining all my larger works. The great advantage of competition is that it gives the younger members of the profession a chance, and it has also an educating influence over the unsuccessful. I have never gone in for a competition without winning or learning a great deal. I feel sure that they have had a very great influence in raising the standard of proficiency in our profession. Another correspondent, a London architect who had largely engaged in competitions, wrote: "Very few architects, who have sufficient work of their own, compete, unless specially requested so to do; and any rules drawn up will be almost entirely for those who compete because they have little to do, and who leave it off as soon as it is necessary. . . . . The mistake is not in competing, but in the manner in which so many competitions are conducted. . . . . The only fair way is to have nothing but sketch plans, to small scale, just to show the general arrangement, and sufficient elevations and perspective to give the outline and idea of the exterior, in fact, if I were asked by a committee to arrange a competition, say for a church, for instance, I should ask half a dozen, or any number of architects, to meet at a certain time, and let them in an hour give a sketch or plan, the architect's *own* designing would be obtained quite sufficient for selection, and it would not be a matter of number of clerks and longest purse." Besides the favoured few who, having good connections, or succeeding to established practices, had secured a high position without resorting to competition, and the fortunate men who by the system had raised themselves to honourable positions, there was a third class of competitors and that the large majority, to whom the practice of competing had been lamentably disappointing, many of whom had been allured from promising appointments to commence business on their own account, too frequently to sink to very secondary positions, perhaps as architectural draughtsmen. While he would be a reckless social politician who would suggest the total abolition of competitions at a sudden stroke, and thereby throw out of employment the hundreds who are dependent on this system for occupation. Surely the time had come when some practical steps should be taken to turn the tide and restore healthy life to the profession. Was the architectural profession so rich, too, that nothing need be said of the half-million of money and upwards that had been expended during the last twenty-three years on absolutely waste work? It might well be asked, What buildings had we obtained for such a sacrifice? Some few undoubtedly of the very highest order, but the cost of the waste drawings made in competition since that for the new Public Offices in 1857 had not only exceeded the professional commission paid on those grand works, but seriously approached (if the Manchester town-hall be taken out of the calculation) the absolute expense of all that could be looked upon as perfect examples of the respective styles in which they have been erected. In open competitions alone the waste drawings made during the last twenty-three years would, if put on a screen in single file, reach from that room to beyond Grantham and nearly to Doncaster, or piled up flat on their straining frames would exceed by some 1,000ft. the highest mountain in Europe. It is a fortunate thing for our profession, as well as a very remarkable and striking fact, that although architects had exhibited a strong liking for competition, the wealthy merchants of London and the public of the metropolis had generally discountenanced it, showing that they were too keenly alive to their own interests and to a sense of the advantages of employing a professional man by direct commission (with whom they could have personal consultation during the preparation of designs) to trust to the uncertainties of competition; they also clearly believed they got better served and more handsomely treated by adopting on their part the more complimentary course. Although London had almost been rebuilt during the last twenty years, an instance of a building erected through competition was rare, and where such had been the case, the results had not been very satisfactory, and the largest London competitions have been lamentable and most disastrous failures. The great arena of competition had been country districts and provincial towns, and the secret why the competition system had gained favour was simply this—that a large number of men entered the profession with no connection, and with no definite prospects of success, and finding that their efforts in London to obtain business by ordinary means were unsuccessful, they devoted their energies to the provinces and country districts, where local committees were only too pleased, and also too much flattered, to have the benefit of London talent to compete against their local men. Consequently, the professional papers teem with advertisements of country competitions. It had been shown by the history of some successful men that advantages do occasionally accrue to individuals through open competition, but the great majority of professional men are serious losers by the system, and it is fraught with many practical evils, among them the following:—1. The buildings that were made the subjects of competition were, in the majority of cases, not of sufficient importance to justify their being taken out of the private hands of the profession. 2. The instructions drawn up for a competition were generally very vague and imperfect, and the requirements far beyond the sum that was put down to be expended in providing for them. 3. The number of drawings asked for caused an undue amount of unnecessary labour, and when given, were seldom examined beyond the one or two of a more pictorial and interesting kind than the others. 4. The constant, or, at least, not uncommon, practice of architects competing, without even taking trouble to examine the site of the building, and, therefore, sending in designs utterly ignorant of the peculiarities of features of the surrounding neighbourhood, and also of such architects often having no knowledge or experience of the particular class of buildings for which they were competing. 5. The difficulty and improbability of being able to prepare anything like a perfect design without being placed in direct communication with those for whom it was to be made, and to whom it was to be submitted. 6. The undesirability of selecting any professional man from his drawings only (under the motto system), who might be totally unknown and inexperienced, and who might reside hundreds of miles away from the site of the proposed buildings, and the employment of whom may be consequently disastrous to himself and to his clients. 7. The incompetence of committees to select the best design, arising from very few amateurs having any appreciation of an architectural drawing, except a perspective view, and of their awarding the premium accordingly. 8. The difficulty of securing a fair and honourable selection of the best design, except at very considerable expense, involving the appointment of more than one referee, as it was manifestly unfair to the competitors in different styles to call in one assessor only, who may have special leanings for Gothic or Classic architecture, or even for a particular phase of these styles. 9. The dissatisfaction created in the minds of all the competitors, except the one who happened to have been successful, and all of whom thought themselves, and too often with good reason, unfairly dealt with. 10. The baneful influence of the modern practice of unsuccessful architects ventilating their grievances in the professional papers, instead of accepting their disappointments as the necessary consequence of a system that could not be exempted altogether from the fallibility and weakness of human nature. He felt it his bounden duty to suggest for consideration some means whereby the competition may be placed on a more satisfactory footing, and they would take the following form:—"(1) That any regulations framed by this Institute for the conduct of architectural competitions that shall have met with the approval of the majority, shall be considered in honour binding on all the members; and it should be understood that any competition advertised, in which the 'instructions to architects' violate the regulations referred to, such competitions shall not be respondeded to by any member of our body. (2) That no building should be considered of sufficient importance to justify a competition, the contemplated cost of which is less than £10,000. (3) That advertisements should (as now) be issued in the professional papers, inviting architects willing to compete to send in ther names, and state their experience in designing such buildings as those contemplated, either in carrying out similar works as principals, or in assisting others in such buildings. (4) That the applicants' letters be considered in committee, and a selection made of those thought to be most suitable, and in the proportion of one competitor for every £2,000, to be expended—that is to say, five competitors for a £10,000 work, and ten for a £20,000 work. (5) That each competitor be paid an honorarium, the successful competitor being employed to carry out the work. (6) That no architect be allowed to submit a design without having personally inspected the site. (7) That no competition be adjudicated upon by any single referee. (8) That it may be favourable for the Institute to elect a 'competition committee' 'to whom all questions arising out of the practice shall be referred for adjudication.'"

(*To be concluded next week.*)

Building Intelligence.

BRADFORD (ST. PATRICK'S).—Six life-sized figures of saints have just been painted for the chancel of this church. On the north side, St. Thomas à Beckett, St. Agnes, and St. Edward the Confessor; on the south side, St. Cuthbert, St. Michael, Archangel, and St. Paul, upon gold grounds diapered. The figures were designed and painted by Mr. Edward Frampton, of 10, Southampton-street, Strand, W.C. The same artist is commissioned to paint the "Last Judgment" over the chancel arch, and is also executing some windows in the same church.

CHESTER.—The chapel recently erected within the Workhouse grounds for the accommodation of the inmates, and the new burial-ground surrounding it, were consecrated on Wednesday week. The plan of the chapel is cruciform. The nave and chancel are of the same width, viz., 31ft., and the length from end to end is 90ft. The transepts are 22ft. wide, and the width across is 61ft. The chapel will seat 342 adults and 120 children. The exterior is built of pressed brickwork, with moulded plinths and strings of brick and stone sills, and moulded brick corbel tabling, the gables having stone chamfered coping and moulded apex and footstones. The building is in the Early English style. The cost of the whole of the chapel has been about £1,800, which is at the rate of about £4 per sitting. The architect is Mr. Henry Perkin, of Leeds, Mr. S. Davies the clerk of the works, and the whole have been carried out by Messrs. Tomlinson and Sons, builders, of Leeds and Sheffield.

LEIGHTON BUZZARD.—A reredos has just been erected in All Saints' Church, Leighton Buzzard, from the designs of Mr. Ewan Christian. It consists of three compartments. The middle one, of alabaster, has five arched spaces filled with Venetian enamel mosaic, in the centre being a cross in statuary marble. The two outside compartments are in rich red Pyrenean marble, panelled with dark bands, and along the top of these, on a band of Jura marble, runs the text, in lead letters: "They said unto Him, Lord, evermore give us this bread." The whole is surmounted by a handsome cornice of Caen stone, with carved paterræ. The cost of this reredos has been raised by the lady teachers of All Saints' Sunday School. The work has been carried out by Messrs. Burke and Co., of Newman-street, London.

LONDON.—St. Sepulchre's Church, London, was reopened on Sunday last. The chief alteration made is the entire removal of the galleries. A prominent feature in the structural alterations of the interior consists of the new organ-chamber, which is now in the recessed space on the north side of the church, called St. Stephen's Chapel. In front of the chapel or recess a screen has been erected in Caen stone, with shafts and capitals in Irish green and Devonshire marble. The organ itself has been considerably enlarged, the case having been extended, the front of which is some 37ft. in width. The former old oak pews have been removed, and open benches substituted, constructed of the material forming the pews. The new clergy and choir stalls are all in oak; and a lofty oak screen has been erected across the church at the west end, a portion of which is made of the old oak which formed the gallery fronts. The only window which has been allowed to remain is that of stained glass at the east end. The floor of the church has been considerably sunk, admitting of the chancel being extended westward to the extent of about 28ft., and approached from the nave by a flight of four steps. Both the columns and arches of the nave façade and the walls have been entirely re-faced. The amount at present involved in the carrying out of these improvements is estimated at about £12,000, but it is believed that the entire cost will not fall far short of £15,000. The work has been carried out under Messrs. Newman and Billing, architects, by Messrs. Dove Brothers, contractors. Messrs. Burke, of Newman-street, executed the mosaic pavement. The clerk of works was Mr. Hammond, and the foreman Mr. Barker.

NEWPORT, MON.—New Board-schools in Marshes-road, the first of three sets of school-buildings in course of completion for the Newport School Board, were opened on Monday week. The buildings are in the Queen Anne style, and the ground-plan takes the form of the letter E. There is provision in the mixed department for 183 children, and for 180 in the infant department. Class-rooms, and an extensive playground are provided. The cost has been £3,018, of which £1,000 was given for the site. Messrs. Habershon and Fawckner, of Newport, whose plans were selected in competition, are the architects, and Messrs. Davies Brothers, of the same town, the builders.

PEMBROKE DOCK. — The parish-church of Pembroke Dock was reopened on the 4th of January. The whole of the interior of the church has been thoroughly renovated, with the addition of a porch. The aisles and chancel-floors have been laid with encaustic tiles, from Mr. Godwin's works, the nave reseated with pitch pine pews. Handsome choir stalls and prayer-desks have been placed in the chancel, and a glazed tiled reredos, with the emblems of the four Evangelists. Over the Holy Table, inserted in the tiles, is a white marble cross, the gift of Mr. Phillips. An octagonal pulpit, with carved panels, replaces the wood pulpit, and an altar screen of Beer-stone, richly carved, divides the chancel from the nave. The interior has been coloured throughout, and the roof over chancel decorated. The woodwork and general contract has been carried out by Messrs. Jones and Johnes, the stonework by Mr. Phillips, of Pembroke Dock, carving by Mr. Watts. The church is heated by Messrs. Bacon, London. The whole of the works have been executed from the designs of, and under the superintendence of, Messrs. Wilson, Willcox, and Wilson, architects, Bath.

PERTH.—The memorial-stone of a new U.P. church at Perth was laid on Wednesday week. A competition was arranged some months back, and Mr. Dick Peddie (of Edinburgh), who was consulted, drew up a report upon the various designs. With Mr. Peddie's report to guide them, the committee decided to adopt the design by Mr. T. L. Watson, I.A., architect, Glasgow, and that gentleman was accordingly instructed to proceed with the drawings. The style is founded upon the best examples of Italian architecture. The outside length is 99ft., and the breadth 61ft. A light freestone is used. The pilasters are built of polished ashlar, the walls between being filled in with polished courses. The pinnacles are 55ft. 6in. from the ground to the top, and the apex 35ft., surmounted with a finial of 4ft. 6in. The side walls are 38ft. high, and reach to the top of the parapet. There are entrances from the side elevation, and a front staircase; and there are five doors of exit from the building. The body of the church inside is 69ft. 6in. long, 55ft. 8in. broad, and has a back gallery 27ft. 9in. by 27ft. The side galleries are 14ft. in breadth, and run the whole length of the church. Behind the pulpit the organ-loft is situated, which is 27ft. 6in. by 10ft. The ceiling is of octagon shape, lined with pitch-pine, and surmounted with mouldings and angles. The interior of the roof of the main body of the church is circular in shape, with large moulded ribs 13ft. 10in. apart, filled in with small moulded ribs 2ft. apart, and the ceiling of the side galleries is divided into five spaces, with arches forming a dome in the centre. These arches spring from columns reaching from floor to roof, and terminate on the side walls with carved drops. Accommodation is provided for 710 in the area and 495 in the galleries. The work is being carried out under the superintendence of Mr. David Geekie, clerk-of-works, Perth, and the contractors are:—Mason and joiner work, Messrs. Craig and Auld, Motherwell; plasterers, Messrs. John Mackay and Sons, Perth; plumber, Mr. Alex. Davidson, Perth; and slater, Mr. Peter Reid, Perth. The total cost will exceed £7,000.

ST. JUDE'S, SOUTH KENSINGTON.—An important addition has just been made to the embellishment of the above church. The entire sacrarium up to the string-course has been painted with a representation of the Adoration of the Lamb, surrounded by the emblems of the four Evangelists upon gold grounds. Upon the east wall, either side, are seated figures of the Apostles, Prophets, and Elders. On the north and south walls of the sacrarium there are kneeling figures of angels swinging censers and playing musical instruments, the whole of this portion of the work being painted on diapered gold grounds. The whole of the work is surmounted by canopy work, designed to harmonise with the architecture of the church. Two windows have been also added in the north aisle, one the parable of the Good Samaritan, the other the Pharisee and the Publican. The whole of the work, mural painting and glass, has been designed and painted by Mr. Edward Frampton, of 10, Southampton-street, Strand, London.

CHIPS.

The inhabitants of Hammersmith have resolved to erect a new parish-church. The present church was built in the reign of Charles I. as a chapel of ease to Fulham, and was consecrated in 1631.

The church of St. Mary, at Burrough-on-the-Hill, Leicestershire, has just been restored at a cost of £900. A stained-glass memorial window has been placed in the chancel, by Messrs. Clayton and Bell, and a memorial clock, by Messrs. Benson, has been given by the rector.

Tyberton Church, Herefordshire, was opened on Thursday week, after restoration. The work has comprised the complete replacement of the windows formerly existing, the provision of a warming-apparatus, and other things. The interior walls of the church are plastered and coloured. The interior of the church altogether has been thoroughly renovated. The work itself has been carried out by Mr. Beavan, builder, of Hereford.

M. Gustav Klotz, architect for many years of Strasburg Cathedral, has just died. He was the colleague of Toudouze and Lassus, architects of the first chapel, in founding the Labrouste studio, where so many eminent men were trained. A diploma of honour was awarded to him at the last Paris Exhibition, but diplomatic difficulties prevented his admission to the Legion of Honour.

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A. M. M. (Write the Secretary of the R. A. for answers to your second and third queries.)—A COMPETITOR. (Better offer your suggestion to the secretary of the R.I.B.A. direct. If he chooses to comply we should have no objection.)—PERPLEXED. (Write the secretary.)—S. J. (It would make no difference. The person to whom the patent is granted is legally the patentee, and the patent will stand, unless, of course, the invention is proved to have been anticipated.)—A LEARNER. (We do not know of any works with full-size details of Early Fourteenth-century work, except the "Architectural Association's Sketch Book" and Mr. Galsworthy Davie's "Architectural Studies." Brandon's "Analysis" and Pugin's "Specimens" are useful works. Some of the best examples of Early Fourteenth-century work are to be found in Yorkshire and Oxfordshire, as, for instance, the choir of Howden Abbey and Merton Chapel.)

"BUILDING NEWS" DESIGNING CLUB.

LIST OF SUBJECTS.—1. A country parsonage, to contain drawing and dining-rooms, study, with parishioners' entrance, four bedrooms on the first floor and three as attics. Materials left to competitors. One elevation, one section, three plans, and perspective view. Scale, 8ft. to the inch. 2. A carriage-entrance gateway for a park, with turnstile on one side for foot-passengers. Material, wood. Inch scale and sketch.

DRAWINGS RECEIVED.—Mot, Padishah, Fidessa, Clansman, Burswell, Fleur-de-Lis, Figaro, Perseverantia, Our Praises are Our Wages, Edwin, Excelsior, Ogmore, Æquanimitu, Binny, Chip.

Correspondence.

THE MARBLE MARKET OF EUROPE.

To the Editor of the BUILDING NEWS.

SIR,—Herewith I send specimens of the statuary marble from Norway. It must be

noted that these are from the surface, as the quarry has not been opened out. From the specimens, I say that blocks of any available and required dimensions may be obtained, and no doubt of the greatest purity (Lat. 65·30 North and 12 Long. E), is about the site of the deposit, or quarry. General Cotton has just called in on me; he has been to the Carrara Quarries, and says that the marble varies in quality, the finest and purest being most scarce, but that there is a market for second and third best.

There is deep water up to the face of the rock at the bend of an inlet forming a natural harbour absolutely safe.—I am, &c.,

ROBERT RAWLINSON, C.B.

Local Government Board, Whitehall,
24th January, 1880.

P.S.—I wish to say that I have no interest in the above, direct or indirect. The gentleman who has brought the discovery to notice, is, however, an old friend. R. R.

[The specimens sent are certainly worthy of attention, and we should think the owners would readily find a sale for the marble; but it is, in our opinion, unfit for statuary purposes. In a second letter, which reaches us just as we are going to press, Mr. Rawlinson says:—"From what I have learned this week, I fear that the samples of marble from Norway, sent to your office, will not turn out to be of the value I was led to expect. The crystals contained denote it as distinct from Carrara, and deposits of this character are known to exist in other places. Your leading article of the 5th December will, therefore, stand good, and the old Carrara Quarries remain unrivalled. The deposit in Norway is very extensive, and in all quarries there are varieties in quality, good and indifferent; this is the case in Carrara, and if the Norwegian quarry should be fully opened out, beds of statuary *may* be met with; but if not, as the marble can be quarried at a light cost, and can be shipped direct, it may be laid down at such a price as shall command a ready market for many purposes." Any one interested may see the samples at our office, and we will willingly publish any further information which may reach us.—ED. B.N.]

THE CLASSIFICATION OF ARCHITECTURAL ILLUSTRATIONS.

SIR,—Mr. Cox's scheme, I think everybody will agree (except Mr. Cox), is really an alarming one. He hungers after a subject-index, to include every remarkable essay or illustration now in existence, bearing on any subject having a near or remote connection with architecture or building. Mr. Stannus deals merely with his plan for keeping periodical illustrations in his own possession in elementary portfolios. Mr. Cox, although anxious to grapple with the possessions of the whole world, occupied about thirty lines of your journal (page 84) in the exposition of the main outlines of a similar plan.

What everybody wants is not an encyclopædia of references, but an octavo pamphlet of about 100 pages, which will enable anyone to find out where there are illustrations of good specimens of buildings for modern uses. This is really a work of the first necessity, which would reduce what is now an admirable specimen of chaos to something like order. In looking for specimens of Magistrates' Courts, Courts of the First Instance, erected within the last ten years in countries with Western civilisation, an entry would be found in this form:—

Courts of the First Instance:—* Chicago, 2 p. and v., A.; A., 3/7/78; Durham, 1 p., B. N. 3/5/79; Cannes, 2 p., e., and v., R. G. A., 4/7/79, &c.

Under some headings (Middle-class Residences, for instance), the specimens would be so numerous that a good deal of subdivision of such a class of buildings would be necessary. Notwithstanding the activity of illustrators in so many countries, complete illustrations of the larger number of modern buildings of the first merit are, however, all too rare.

The BUILDING NEWS is now in the habit of giving between three and four hundred illustrations in the year. It probably supplies a larger number of the best illustrations of modern buildings than any other weekly publication. Its competitors are mainly English, or published in English-speaking countries; but other countries are not without their own periodicals, and in Transactions of Societies, in volumes dealing with special buildings, and so on, there are many illustrations of modern work. All ought to be looked up, and their contents mentioned in the little book we have in view. I will, for the sake of argument, put the whole number of drawings of the kind in question at 20,000, going back thirty or forty years. The R.I.B.A. was founded in 1834, and *The Builder* started in 1842. If Mr. Cox could secure twenty indexers, 1,000 illustrations, or about three years of the BUILDING NEWS, would be the share of each of them. I have named Mr. Cox as Director, having an idea that he might undertake the work. His literary aptitudes, perseverance, and knowledge of modern languages would justify his selection out of the whole profession. Making a list of the matter to be indexed, and settling preliminaries, would take a little time, but the indexers could be at work in a month from the band being organised. On an average, fifteen illustrations could be indexed in an hour, working pretty strenuously; that is, each would do his work in about seventy hours, or in three months, devoting five hours a week. Those to whose lot the foreign illustrations fell, might beg for, and be allowed, a smaller number than others; their task would be more difficult in many ways, and they would probably have to resort to public collections, whereas a good deal of the other work could be conveniently distributed among those who happened to possess the works to be indexed.

The classification might be something like that detailed by Mr. Stannus (page 62), but with modifications; for decorative use of materials, ornamentation, &c., would be excluded, and parts of buildings for particular purposes would be put with buildings for the same purposes. Grouping would be more desirable than an alphabetical dictionary-like arrangement of the whole of the subjects; and I have little to say against Mr. Stannus's groups, except that I would begin with buildings for private uses, and work up to public buildings. Group I. would be "Buildings for Residence, &c.," and begin with almshouses and finish with palaces. Mr. Stannus's No. 73, Clergy-houses and Almshouses, and No. 91, Conservatories and small Glass Buildings, might very well go with "Residences and their Appurtenances." Group II., "Buildings for Refreshment and Amusement," might include No. 36, Country Inns, and No. 90, Crystal Palaces. Group III., "Buildings for Manufacture, &c.," would classify places in which men make things, and Groups IV., "Buildings for Commerce, &c.," with buildings for settling who is to be paid for making them. Group V., "Buildings in connection with Locomotion, Public Health, and Poor Relief, &c.," would go some steps farther in the direction of works erected by, and for, the many; and Group VI., "Buildings for Legislation, &c.," would pass from local to national purposes. Group VII., "Buildings for Instruction, &c.," would deal with the highest interest—learning, moral, and religious teaching. Mr. Stannus missed this principle a little when he sandwiched manufacture between legislation and public utility, so I have gone through the whole list.

I have struck in for a course half-way between doing nothing, and doing something to startle the world and satisfy Mr. Cox. I find it difficult to reach what he would look on as the proper attitude of mind, and to regard everything in the universe as existing in order to furnish a paragraph in an index. Those wonderful subject-indexes on the new shelves at the desk-ends in the Museum have, no doubt, a strange power of fascination, and, nurtered upon them in a solitary cell, a wild ambition might possess the soul. There are thrones on which the kings of bibliography are seated, each ruling his own domain. Upcott, Watt, Lowndes, Allibone, and their congeners will rest in their seats unchallenged by me, at least, as I have no wish to scale the heights and reach their level. Busy professional persons must be content with more modest ambitions. JAS. WEBSTER.

ARCHITECTURAL ILLUSTRATIONS AND THEIR CLASSIFICATION.

SIR,—Simple as is the plan of your correspondent, "An Old Tee-Square," mine is simpler still. Like him, I conclude it needless to take more than the BUILDING NEWS: but life being short and art (as accumulated in your voluminous pages) long, I sort the illustrations into Modern Churches, Schools, Domestic Buildings, Ancient Views, and Details. I then winnow and destroy the bad, next the indifferent, and in time the moderately good, and at last leave the best only. When I find several of them fall under the same authorship, I group them as such. I find then that I have the collected works of a very few, and I consider I am conferring high honour when a new name gets a new group, so much so, that I hanker to let some little bird bear tidings of the honour; but I don't, for fear of fostering vanity. I have, besides, a few other sets of miscellaneous subjects, the contents of which I know and can turn to at pleasure and with profit. As to adding to my collection, when I come across occasionally something worth keeping, I can generally find room for it by destroying something that can be spared without loss. If for special occasions I need wide research, I can refer to the library of the Institute. In general, my own time, and what is of more importance, my own taste, is saved by not having to wade through masses of rubbish, actual or comparative. I keep a select Chamber of Horrors for the most characteristic abortions of the Queen Anne Mania.—I am, &c., CYNIC.

SIR,—As so many have given their opinion on the above subject, I beg, as a student, to give my method as it may be useful to others. In a similar way to that of "An Old Tee-Square," described in his letter of last week, I limit myself to the BUILDING NEWS, only buying others when they contain something that may be useful to me. The matter of the BUILDING NEWS I have bound in yearly volumes, the illustrations, including those collected from other papers, bound separately, arranged in the following order.

No. 1. Perspectives and other drawings of Municipal Buildings, Museums, Libraries, Colleges, Schools, Hospitals, Asylums, &c., &c.

No. 2. Theatres, Banks, Shops, Hotels, Clubs, Mansions, Villas, Cottages, Lodges, Stables, Farm Buildings, Sketches of Old Houses, &c., &c.

No. 3. Cathedrals, Churches, Chapels, Convents and Religious Buildings, Sketches of English and Foreign Churches, &c., Reredoses, Screens, Fonts, Pulpits, &c., &c.

No. 4. Illustrations by The BUILDING NEWS Designing Club, Conservatories, Bridges, Fountains, Monuments, Chimney-pieces, Furniture and Fittings, Metal-work, Ornaments, Decoration and other Miscellaneous Illustrations.

I generally have them bound in two volumes: the Public and Domestic Buildings, Nos. 1 and 2, in one; the Ecclesiastical and Miscellaneous, Nos. 3 and 4, in another: they thus form books of about an equal thickness. At the commencement of each volume I have bound a few sheets of foolscap paper, and write on them the contents, giving the name, place, date, author and page, each illustration being numbered in the order bound. By this method a particular illustration can be found in a few seconds, and if any description be required, the date being at the top of each and also written in the index, it is easy to refer to the volume of matter for that year, and to be able to examine the illustration and its description together.—I am, &c.,

A YOUNG TEE-SQUARE.

THE TREATMENT OF TERRA-COTTA.

SIR,—I am surprised to read what Mr. Roddis says in his excellent letter in your issue of the 16th, and beg the opportunity of saying we are not aware of any great demand for architectural ornament in terra-cotta; our wonder is that there has not been more demand, owing to the great expense of repetition of carving in stone, the early decay of some of it, and the rapidity with which it becomes discoloured in towns, &c. The facility for modelling, pressing and burning, the great durability, clean appearance, and the variation of colour, it is so capable of, well adapts it for all kinds of architectural ornament as well as figure decoration. It can also be very readily undercut or relieved, and sharply defined while in a plastic

* p. = plan, v. = view, e. = elevation, &c.; A. A. = *American Architect*, B. N. = BUILDING NEWS; R. G. A. = *Revue Générale d'Architecture*

state, crisp as the finest stone carving, and as easily fired as the plainest blocks.

Of course, it is unknown to Mr. Roddis that I and other manufacturers were invited to tender for a portion of the South Kensington Museum and Horticultural Garden buildings, and the Albert Hall, two of the chief works of magnitude in which terra-cotta has been used until more recently. I therefore beg to explain the peculiar circumstances under which manufacturers were required to execute the work. We were to be supplied with plaster models, executed by modellers employed by the Science and Art Department, from which we were to take our moulds, instead of having, as much better, the soft clay models of the ornamental parts to mould from. We get more of the artistic feeling of the modellers by taking the moulds direct from the clay, whereas taken from plaster the model has to be twice moulded, thus losing much of the original crispness, and causing what we call blindness, and is more costly.

We were forbidden to touch up the ornament or to undercut it—only permitted to remove the seams of the mould, hence it is that much of the terra-cotta of late years becomes, as Mr. Roddis says, compared to stamped leather or cast iron, and thus he sets it down to lack of skill. I believe that the influence of such authorities has tended generally to damp our ardour for what I agree with Mr. Roddis is good enrichment. I believe the idea was that, by allowing the touching-up and undercutting, the ornament would be injured in the hands of unskilled workmen, and expense increased. I had from my boyhood, commencing with my father at Carlton House-terrace, in 1832, as modeller, to undercut and relieve all ornament, and do to this day when not hindered, as may be seen abundantly in work we have executed in our own way.

When the late Captain Fowke told me their principle at South Kensington, and that he wanted the portions of the ornamental columns at the same ratio of cost as chimney-pots of the size, I was dismayed, and rather displeased him in venturing to differ with him; and I think an able artistic manufacturer I could name did the same, for neither of us were employed by him; in fact, I objected to tender, saying I had not been in the habit of doing such like work, consequently the work has been severely commented up by some architects, and others who suppose from such authorities it was a sample of terra-cotta, and has been a means or cause of its slow introduction to more general use. In saying this, it must not be supposed I am saying anything against the manufacture or durability of the terra-cotta used, but simply bearing out the argument from Mr. Roddis's point of view, sharpness, relief, &c. And of course, expense being a consideration was some excuse; but I may mention the undercutting or crispness is not affected by the firing, nor does it increase the total cost so materially, as the material, cost of modelling, all other processes being the same for plain or enricted work. It is no new thing to make and fire such a thing as a Corinthian capital, a yard high and more across the abacus, in one piece.

It is the additional time bestowed on finish and relief, and though in the case of the South Kensington Museum, it was feared it might be injured. I, as a modeller, consider the undercutting a comparatively mechanical operation. Any good finisher, to use a trade term, should be able to do it after being well pressed from a good mould; this is an essential, and good moulders are comparatively scarce. Mr. Roddis has been misinformed if he thinks the "burner" has much to do with the success of the ornament, as it is a mistake. I am glad that some architects stipulate for crisp and well-relieved ornament; but to be more sure of it, they should endeavour to have the terra-cotta moulds taken direct from the clay models, crisp as the modeller leaves them, thus effecting a saving of expense in not having them twice moulded, and getting more of the artistic feeling; and another great advantage is that the mould leaves the clay much more freely than plaster, as the deep and fine parts are apt to get broken off in taking the mould off, by the swelling of the plaster, &c. Then, again, to be more sure, architects should endeavour to do as they do in building work generally—not have it done piece-work, in which the brush, knife, and sponge are the chief tools; that, together with keen competition, is at the bottom of badly-executed work, and the deadness complained of in so much terra-cotta, as also other defects, as well as the desire for small pieces, which are easier of execution and cheaper.

As to the terra-cotta secreting smoke and dust as stone and marble does, it is easy to make it do so by granulating the surface; this is what we have sometimes been desired to do to assimilate it to stone, though we do not advocate it as a rule.

As an old modeller, in days when the Classic styles were in the ascendant, I can understand and appreciate the remarks of Mr. Roddis on the V section of much of the foliage in the Greek ornament, &c. I also agree with his mode of working as most essential to relief and effect. Having practised in every process, from the modelling to firing, personally, I hope my long experience will convince him we can burn anything in terra-cotta, and beg to add that any work can be burned direct from the modeller's or sculptor's hands, without the intervention of the moulder, provided terra-cotta in its soft state is used and worked soundly together; for instance the Mulready effigy, &c., by us.

I am much obliged by your able correspondent's hint in your last issue, respecting the mixing of clays, which has always proper and careful attention, and by proper mixing we are able to render the material more durable, and burn a moulding as a frieze, if buff, with red ornament, or figures, in or attached to it. This is, we believe, a novelty, and a great acquisition to architects.—I am, &c.

Broxbourne, Jan. 26. J. PULHAM.

SIR,—The writer of the article on terra-cotta evidently does not credit my statement that the red terra-cotta manufactured from the Penybont bed of clay is capable of enduring even greater heat than many fireclays, without becoming either twisted or discoloured, and that the more the fire plays upon it the richer the colour and closer the texture, and he brings forward certain chemical reasons to disprove it. If he will refer to my previous letter, he will perceive that I was careful to speak, *not* of terra-cotta and blue-ware generally, but of that manufactured at my Penybont works. I can only tell him that he does not know the properties of this clay, and notwithstanding all that he has said, the simple truth remains as I have stated. I will not go into the matter chemically, as I have the results daily before me; but if he will favour me with his address I shall be pleased to correspond with him, and send him samples such as would convince him. With regard to the blue-ware, he says:—"Blue bricks run to slag in a fire-clay kiln," and also that he has had some experience in blue brickmaking, having stoked a kiln. No doubt his experience lay with the Staffordshire clay, between which and mine there are many differences, not one of the least being that very little, if any, of the Staffordshire blue-ware is thoroughly vitrified throughout, being only coloured to a depth of about a quarter of an inch.

I shall be very pleased to place one of my blue kilns at his disposal to stoke, and I think he will find, as I do, to my cost, in the quantity of coal it takes to burn them, that it would be the fire-bricks that would be most "punished" if placed in the same kiln, and most likely to run to slag. If he will extend his experience as far as Penybont, and will accept a little Welsh hospitality at my hands, he will then be able to see and judge for himself.—I am, &c.,

F. C. EDWARDS.

Trefynant Fireclay Works, Ruabon, Jan. 27.

SIR,—I have read with great interest a letter in your last issue under the head of "Treatment of Terra-Cotta," signed by Mr. Roddis, which appears to me to deal with a most important point in the use of terra-cotta. There can be no doubt that its treatment is not yet altogether understood by some of the profession, and that as a consequence its introduction into a building is liable to become a failure, and thus a beautiful and most pleasing material has not unfrequently to bear the blame that ought properly to be attached to the mode in which it is introduced. A mode of construction suitable for one material is admitted on all hands to be not necessarily suited to another, but poor terra-cotta being of a plastic nature, is supposed to lend itself to any treatment, instead of which its effective use requires special study.

If thus specially studied, as suggested by Mr. Roddis, it is unquestionably a most effective constructive and decorative material, and I have used it with great satisfaction to myself and my clients.

I experienced at first some difficulty as to the modelling; but eventually I found a local manufacturer, who had evidentally studied the subject artistically, and from whom I am now able to procure modelling of the highest class, with plenty of relief and shadow, in a good hard red terra-cotta that will stand any weather. There is no doubt this subject of modelling is a most important one: terra-cotta ought not (as it does too often) to look as if stamped or embossed, nor ought it to have sharp hard lines. It has in this form no beauty or character from an artistic point of view. It may interest Mr. Roddis and your readers to learn that a new adaptation of terra-cotta has recently been introduced by the manufacturer already alluded to, which seems to me to have a future as a material for first-class work. It is made of a very fine quality of fire-clay, very hard burnt, and glazed with a beautiful transparent kind of glaze in many quiet, neutral, yet rich tints. The modelling, so far as I have seen it, is all that can be desired from an artistic point of view, and the effect somewhat novel; the application and nature of the glaze not only does not detract from, but very much enhances, the effect of light and shade, and the result, in my opinion, is a decided stride forward in the artistic use of terra-cotta for architectural and decorative purposes. Messrs. Wilcock and Co., of Burmantofts, Leeds, are the manufacturers I allude to; their new ware is, I believe, named Burmantofts' Faience.

I am convinced that if the question of modelling be taken up more directly from an artistic point of view, and always bearing in mind the nature of the material, that terra-cotta, or some adaptation of it such as I have just alluded to, will grow in favour with both the profession and the public.

I trust the keynote struck by Mr. Roddis will be followed up, and am, &c.,

AN ARCHITECT.

SIR,—If the writer of the article on terra-cotta in your issue of 23rd inst., will pay our works a visit, we will be glad to show him, or we will be glad to send him, blue bricks which we venture to think will not "run into slag when placed in a kiln of fire goods," but on the contrary, if a good many of the so-called fire goods were put into our blue-brick kilns they would run into slag at the heat it takes to burn ours. Evidently your correspondent has "studied blue brick-making by stoking a kiln all night," and has spent many a long day in learning the trick of firing; he has not yet arrived at a perfect knowledge of all clays—ours included—and we will be glad to further enlighten him.

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ST. ALBAN.

SIR,—In a book of St. Paul's use, probably written about the middle of the 15th century, and containing miniatures of saints commemorated in that cathedral, there is a picture of St. Alban. He is represented as a young nobleman in a tunic of cloth of gold, girdled, and a blue cloak; his blue hat has a jewelled band; his right hand holds a red-bound book, and in his left is a triple cross of cross-crosslets, which is mentioned as that preserved in the treasury of the abbey, *quam in passione suâ tenebat*. This is an authentic representation of the manner in which he was conventionally portrayed. The MS. is in private hands.—I am, &c.,

MACKENZIE E. C. WALCOTT.

CONCRETE CONSTRUCTION.

SIR,—May I say a word on this matter? There has been more than one reference in your pages, lately, to my system, and I should like to tell your readers what I am aiming at, and with what success.

First, as to solid versus hollow walls: I contend that all experience is in favour of the hollow wall, and, though wet does occasionally come through the best-constructed solid walls, it cannot come through well-constructed hollow walls.

Next, as to the thickness of the interior and exterior surfaces. I hold, if the substance is strong enough to withstand ordinary wear and tear, it is all that is required. I find three-quarters of an inch, with supports a yard apart, to be the minimum thickness; this gives 1½in. as the total thickness, with a 4in. space, or 5½in. in all. I have two houses, now occupied, built in this way (one of my tenants being a civil engineer), and they appear to answer well.

Next, as to the materials. I think it is better to use a smaller quantity of the best material than a larger quantity of inferior material, and, therefore, the best Portland cement, mixed with a calcined substance, makes the best concrete. I have tried dozens of things, and Mr. Matthew Allen's valuable discovery of the properties of coke and cement will be hard to beat.

Slabs made too thin get broken in transit; an inch and a half thick is quite thin enough for travelling. I have just had notice that a parcel of 130, shipped loose to Trinidad, have arrived there without one being broken.

Then, as to the skeleton structure to which I affix the slabs. I have used wood because it is the cheapest and handiest material I know of, and, if it is protected from the wet, I see no reason why wood used in the outer walls of a house should not last as long as the inner stud partition.

My first studs and joists were made of concrete, with an iron bar in the centre, and I prepared in 1874 all the work for a cottage in this way, but I used wood instead. I have also by me an experimental stud, made of steel, but I do not think the extra cost—for ordinary buildings, at all events—worth incurring.

The first houses I built had single-slab walls. I found the condensation of moisture on the inside almost as great as on the inside of glass in frosty weather, and, although single-slab walls are good enough for sheds or stores, I do not now recommend them for living-rooms.

In a block of cottages I built in 1875 I used slabs for roofs, and they have answered well; but, in other instances, where they have not been fixed under my superintendence, they have not proved satisfactory, and I have discontinued their use for dwelling-houses for the present, although, I believe, they will ultimately be found superior to any other covering, as they have advantages no other material I know of possesses.

Long experience has taught me that labour done out of doors costs much more than labour in the shop, and, consequently, concrete slabs sent hard dry, and ready bored for screws, to the works, are better than slabs made on the spot, and, as there is not more than 3in. of concrete in my thickest walls, the weight is comparatively small. The floors, too, are of 1½in. slabs, faced on the upper side with red cement; this makes an excellent floor, quite waterproof. The joists are planed, and the underside of the slab forms the ceiling, and, the walls being much lighter than other walls, less foundation are necessary.

I have had as much experience as most people in all kinds of building, and I feel convinced that concrete houses will, before long, take their place with houses of brick and stone, and, in many cases, supplant them.

I have no doubt that, in cities, where room is so valuable, the present massive walls, that take up so much room, will be superseded by steel framework, embedded in some fire-resisting material, occupying less than half their space, and that in the country, where protection from the weather is so necessary, my thin, hollow walls will be preferred, and that the hollow spaces will be used for warming and ventilating purposes; that the penetration of railways into our remotest country districts will do away with the system which has always prevailed, of building houses of the materials nearest at hand, making up in thickness what is lacking in strength, and that all the materials will be prepared at some great central depôt, and sent ready to the site, leaving as little work as possible to the fitters-up; and, that houses so built will be cheaper and better than those built on the existing system.

Concrete has a future; it is assailed with far less virulence than it was a few years since. Many men—to my knowledge—of high standing, are changing their opinions with regard to it. If some man of genius would take it in hand, and show its capabilities, it would materially help to bring this change about.—I am, &c., W. H. LASCELLES.

121, Bunhill-row, E.C., January 27th, 1880.

CONCRETE BUILDING.

SIR,—Mr. Thomas Potter's letter published in the BUILDING NEWS of 23rd inst. makes it imperative for me to state a set of facts, without knowledge of which the readers of Mr. Potter's letter will be seriously misinformed, and serious injury may result to myself and others.

In the year 1873 I commenced experiments in the manufacture of concrete slabs for the purpose of building concrete walls not requiring any after application to give a decorated finished surface; but, taking more interest in investigating and testing concrete slabs and beams for floors and roofs (which I commenced in 1867), with a view to ascertain the quantity of iron necessary to give adequate tensile strength to plate floors, and fire-resisting capacity of various concretes and cements; and, through a long and serious illness, I did not take a patent for my new idea of building monolithic concrete walls, without the ordinary apparatus, and with a finished decorated face, until 1876. But even before my patent of 1876 was complete, I conceived an important improvement, for which, after experiments, I obtained another patent. This patent bears date 9th July, 1877, and is *precisely* the method for which Mr. Potter obtained a patent, dated 29th October, 1877, as described in his letter. The specification of my patent states thus:—"Another part of this invention relates to facing monolithic concrete-walls with thin slabs or tiles composed of terra-cotta, or other clay-ware, or of concrete, having roughnesses, indents, or projections made at their inner faces, whereby they are held and fixed by and to the concrete of the walls without requiring any inner tie-bars or cross-pieces."

Herewith I beg to hand official copies of the specifications of my patents of 1876 and July, 1877, and beg you will compare them with Mr. Potter's patent specification of October, 1877,* and I trust that any readers of Mr. Potter's letter, who may be interested in the subject, will also do so.

It is but fair to Mr. Potter to state that the specification of my patent of July, 1877, was not published till January, 1878, some months after the date when Mr. Potter applied for his patent. It will be evident, I think, to everyone who reads Mr. Potter's letter, published in the BUILDING NEWS, his specification, and also my specification of 1876, that Mr. Potter had obtained my specification of 1876, had conceived precisely the same improvement upon it, but fortunately did not patent it until after I had done so, and secured the legal rights to the invention.

I may mention that another inventor also took a patent for almost precisely the same idea, involving, however, only one of the two important points contained in both mine and Mr. Potter's patent, and his patent bears date 31st October, 1877—two days only later than Mr. Potter's date. This is a curious illustration of the possibility of several inventors working in the same groove unknown to each other, and arriving at the same result. Of course, Mr. Potter's patent, being a direct infringement of my patent, cannot be permitted to be worked except under license from the owners of my patent, and this point is mentioned in order that any unpleasant complications may be prevented.—I am, &c., CHARLES DRAKE.

Railway Wharf, Battersea Park, S.W., Jan. 27.

DEMONSTRATIONS OF THE USES OF SANITARY APPLIANCES.

SIR,—It was with no small surprise and concern that I read in your columns of last week some rather extraordinary statements which were made by Professor Corfield in the course of a lecture on sanitary appliances lately given by him to working men at the University College. Dr. Corfield, in his introductory remarks, says, "When people first thought about ventilation, they supposed they only needed to let the heated air out, and made an opening at highest level for that purpose. They found, however, that the external air was so much heavier that it fell into the rooms in a cold shower. Openings were then made at the floor-level to admit air, but the draught thereby produced was speedily regarded as insufferable."

Thus, according to Dr. Corfield's own words, a mere opening in the roof, which we may reasonably presume was fitted with a casing or shaft of some sort, was found not to act as an outlet, but as an inlet for air—the very opposite of what was desired. This is perfectly correct, and quite in accordance with the experience of most people who have attempted ventilation by means of an open pipe through the roof. But now comes the remarkable part of the lecture. Referring to the Kew experiments, the lecturer informed his audience that "cowls were supposed to extract the air from rooms, but the wind passing over the top of an open pipe did the work quite as efficiently." Now I contend that this is not only against reason, but in exact opposition to general experience. In warm weather, with the wind blowing fair and straight in an unobstructed course over the top of the open pipe, it may then act as an upcast, as demonstrated by the lecturer blowing across his experimental glass tube, but let the wind have an angle a little above the level (which is very commonly the case, more especially in cold weather), and the result would be a downward draught. This may be proved by experiments with the glass tube.

I would like to know how Professor Corfield reconciles this assertion with his preceding statements. They certainly do not agree. The lecturer goes on to say that "cowls are only useful to prevent downdraught." The whole matter now lies in a nutshell; the Dr. admits that open pipes are very subject to downdraughts, showing that, for all practical purposes, they are useless as extractors, as it is only on very rare occasions they will so act. He also admits the value of cowls for removing the pressure off the top of the pipe, and preventing down-draught, thereby maintaining a continuous up-draught. What more is required? If an open pipe is considered an extractor, with the air only occasionally passing up it, what is a ventilator to be called which insures a continuous upward current? Why, then, in the face of this, say that extracting ventilators are superfluous, and that an open pipe is all that is necessary? Does advice of this kind, coming as it does from the people's instructors and guides, tend to advance sanitary science, or promote the welfare of the community?

I had the pleasure of seeing Dr. Corfield experiment with a model of one of Boyle's air-pump ventilators, which produced an up-current, no matter how it was blown upon. Let the Dr. try the same experiment with the plain tube, blowing across the top at different angles below and above, and he will see the difference in the action. Dr. Corfield at that time seemed to have a high opinion of the air-pump ventilator, and recommended its use. At a friend's house I saw a Boyle's air-pump ventilator applied to a pipe, in which, when there was not a down-draught, the air was generally stagnant. Such was the case when the ventilator was applied, which was no sooner put on than a strong up-draught set in, sufficient to draw the flame off a candle, conclusively proving that this ventilator, at all events, acted as an extractor.

I note that Dr. Corfield in his lecture strongly condemns ventilators having any mechanical movement, and quotes the failure of a ventilator driven by water playing upon a wheel, in support of his disapproval. He says "no sanitary appliance should be movable which was equally good when a fixture." In this I am sure the majority of your readers will agree with him, as it is generally owing to the trouble caused by ventilators having moveable parts always going wrong and requiring attention, which has prejudiced the public against ventilators.—I am, &c., EXPERIENCE.

SOIL-PIPE VENTILATORS.

SIR,—In reply to "G." in your last issue, I beg to state the trials of cowls and extractors at Kew, are not conclusive proofs of their usefulness, as the extraordinary number being fixed at present testify. "G." states that a plain or trumpet-mouthed pipe is far more effective than the so-called extracting apparatus; but experiment proves the contrary. Buchan's experiments I find in most cases reliable, and coincide with my own: he says, with a plain 4in. pipe, a trumpet-mouth 4in. at bottom and 9in. at top, and a Buchan's induced current fixed ventilator for 4in. pipe, the outlet of each in four minutes, in lineal feet, was as follows:—Plain pipe, 800, trumpet-mouth, 1,400, Buchan's 4in. fixed ventilator, 1,960.

As to down-draughts, another experiment showed in one minute, plain pipe, up, 30ft.; down, 40ft. Trumpet-mouthed, up, 200ft.; down., 25ft. Buchan's 4in. fixed ventilator, up, 250ft.; down, none.

I might quote other experiments, but prefer the experience of others against the so-called conclusive experiments made at Kew. Perhaps some correspondent may be induced to forward the full table of trials at Kew, for the guidance of your readers, as I do not find them recorded on looking over my file of the BUILDING NEWS.—I am, &c., TRADE.

SIR,—I have read with interest the letter signed "G." published in your issue of the 16th instant, relative to extracting ventilators, in which he particularly mentions those introduced by Messrs. Robert Boyle and Sons. Your corre-

* This we have no time to do. It is not our place to settle the claims of rival inventors, nor can we afford any more space for their discussion—ED. B. N.

spondent writes apparently under the plea of endeavouring to obtain information, and had he confined himself to this (if I may be allowed to borrow the well-chosen words of your preceding correspondent in the same issue), "It is at all times an agreeable task to instruct the uninitiated, provided they are temperate, and understand, when they are addressed." But on careful perusal of his letter, it appears his desire is, like that of a great many more, who, not having sufficient talent to produce a really practical invention of their own, try their best to pooh-pooh the praiseworthy and useful productions of others, who are rather entitled to be rewarded by the commendations of the public, for their successful efforts to benefit the community at large. And, as a member of that community, with some experience of the benefit derived from these ventilators (having used in the course of my business upwards of twenty), I feel it due to Messrs. Boyle, or any other inventor, to speak as I find.

In reply to his first observation, as to the results of the experiments at Kew. If the accounts which came to my knowledge were correct, the proof there obtained was anything but conclusive, insomuch as the method of testing was incorrect, and therefore valueless; and while admitting what any practical person knows, that a vertical shaft (even independent of the trumpet-mouth mentioned by "G.") will allow the air to pass up, as in the case of an ordinary chimney-flue, yet we are unfortunately too well aware, that such action of a vertical shaft is frequently connected with a most unpleasant accompaniment, in the shape of a down draught (impossible with the air-pump ventilator). Moreover, your correspondent mentions the open, or trumpet-mouthed pipe, altogether forgetting or ignoring the fact that such a pipe would not only be subjected to down-draught, under the varying conditions so well known to those practically acquainted with the all-important subject of ventilation, but also allow the rain to enter, thus placing it out of the question as a ventilator, in the majority of places where ventilation is required.

With regard to his further remarks, as I have yet to hear of the construction of such an absurdity as a four-inch sewer being permitted by any properly-constituted local authority, I may leave them to such appreciation as they deserve, and will undoubtedly obtain, from the practical readers of your paper.

In conclusion, I cannot help thinking the time of your correspondent would be more profitably spent in obtaining a sound knowledge of sanitary matters, than in foolishly rushing into print on a subject concerning which the evidence contained in his letter renders his acknowledgment of ignorance in the first paragraph rather superfluous.

FACTS ARE BETTER THAN THEORY.

Liverpool, Jan. 22, 1880.

SIR,—Mr. B. H. Thwaite, in his letter on the above subject, asserts "that on the success of the arrangement of the soil-pipe ventilator depends the sanitary character of the dwelling." If the arrangements, he says, are defective (that is, the arrangements of the soil-pipe ventilator) the results are fœtid emanations and zymotic disease. This is rather startling and, if I mistake not, *new*, therefore I should like to know upon what grounds he bases that assertion; or am I to assume that it is on the hypothesis that particles and gases having an injurious effect pass through the trap by pressure and absorption, and that the proper arrangement of soil-pipe ventilators will prevent the emanation of gas from our present water-closet apparatus. This, from the most recent experiments, has been proved to be fallacious, therefore I should like to have the facts which led him to that supposition, or if it be from actual experiments made by him, then the result would be of great interest to myself and others at present, so that they may be compared with the results of a series of experiments extending over a period of seven months, which have been made by Dr. N. Carmichael, of this city, and which will be read before the Philosophical Society upon an early day, and from what I know of them, I am afraid Mr. Thwaite's ideas will receive a severe check.—I am, &c.,

JAMES BOBSON, S.I.,

105, John Knox-street, Glasgow, Jan. 28.

SIR,—Mr. B. H. Thwaite, by his own statement, has evidently a system of soil-pipe ventilation of his own; it is only reasonable to suppose that he has some knowledge of existing sanitary arrangements. Yet how can we reconcile this supposition with his expressed ignorance of the fact that the method of soil-pipe ventilation which he speaks of, as if they were still firmly locked in the fists of the future, has been in general use for many years.

I know that it is a very long time since Messrs. Robert Boyle and Son first connected the soil-pipe by means of a small pipe with the tops of the house-traps to prevent unsiphoning, and ventilated the discharge-pipes. Yet your correspondent speaks of this arrangement as the "only improvement" in Messrs. Boyle's new system, "the other defects mentioned still remaining," these defects being, first, the absence of a through current in the soil-pipe. If your correspondent had read your recent description of Boyle's different systems of soil-pipe ventilation, he would have seen that the improvement claimed for this "new system" consisted in a double force being applied to create a through current; that is, the force of the wind driven down the soil-pipe from a great height, and the extracting power of the air-pump ventilator. With the other method described, the through current is secured by having an "air inlet at the bottom of the soil-pipe, with an air-pump ventilator on the top." Your correspondent further says that, "on philosophical grounds a rarefied column of air always ascends, by the ordinary laws of gravity." Philosophically, this is correct; but practically, entirely wrong, experience having proved that in nine cases out of ten, where proper means have not been used to prevent it, the cold and heavier air, by the same laws of gravity, presses down, and often forces back, this rarefied column, in its—the colder air—passage to its natural home, the lower regions. I have repeatedly experienced this, and know it to be the experience of others. This brings us to the question of open pipes *versus* pipes with cowls. Your correspondent says in one part of his letter, "extracting ventilators are excellent remedies for producing circulation," and in another that "cowls are unnecessary, and only act as obstructives," as when the weather is calm the open pipe acts beautifully, and that "*cowls should only be applied when it is windy*, and currents of air blowing about." I think those remarks of "B. H. T.'s" need no comment from me; they sufficiently testify of themselves to your correspondent's sound philosophy and logic, which is the same as that of all other theorists only, but which is opposed to the experience of all practical men, and I may say of the public as well, that an open pipe used for the purposes of ventilation is superior to a pipe having an ingeniously contrived ventilator on the top, which may have been successful in ten thousand cases where the open pipe was not only a failure, but a nuisance. Let the wind blow upon the top of an open pipe in a direction slanting but a very little downwards, and witness the result. The *Times* said of the Kew experiments, "Unfornately the method of testing was incorrect, and therefore the tests were valueless." The corrosion of soil-pipes, urged by "B. H. T." as an argument against the usefulness of Boyle's system, is beside the question, all soil-pipes being subject to the same corrosion.—I am, &c. W. F.

[WE have received several other letters dealing with this subject for which it is impossible to find room. "G." replies to "W.F.," whose letter appeared last week, reiterating his belief in the Kew experiments and calling attention to Dr. Corfield's remarks, as reported in our last number—which, it will be noticed, are attacked to-day by another correspondent. The correspondence must close here.—ED.]

WATER SUPPLY AND SANITARY MATTERS.

DRAINAGE OF THE NAR VALLEY, NORTH NORFOLK.—A meeting of land-owners and occupiers was held recently at the Town Hall, King's Lynn, to consider a report prepared by Mr. Edward Easton, C.E., with reference to the prevention of floodings in the valley of the River Nar, between Litcham and South Lynn. Mr. Easton, after showing the danger and loss occasioned by the present state of the district, recommended: 1st, a dam and sluice across the Nar, near Lynn, deepening and improving the river at Setch-corner, estimated to cost, including land and compensation, £6,000; 2nd, new drainage outfall into the Ouse, with sluices and other works, including land, &c., £9,000; 3rd, lowering and enlarging the Puny drain, and extensions in the parishes of Shouldham and Marham, siphon under the Nar, including land, &c., £10,000; 4th, making new cut to join the Middleton Stop and Pierpoint drains, with the new outfall, works, and improving and enlarging those drains, £3,000; making a total of £28,000 for new works; besides Parliamentary, legal, and engineering expenses, estimated to be another £10,000. After some discussion, the plans and report were approved, and it was decided to promote a Bill in Parliament for carrying out the scheme.

Intercommunication.

QUESTIONS.

[6023.]—**Rendering Casts Washable.**—Having received from Venice a large and most valuable second consignment of casts from Venetian sculpture (taken under Mr. Ruskin's personal superintendence), I should feel greatly obliged if some of your readers who have had practical experience in the preparation of such so as to render them capable of being washed if need be (and thus to ensure by all available means their perfect preservation and freedom from discolouration) would favour me with the results of their experience in this matter. I may add that in the gallery to be built for them in connection with this museum, it is proposed that the greater part, if not the whole of them, should be further protected by glass, so that these treasured memorials of Venetian art, now gained at no little cost of Mr. Ruskin's time and labour (some of them having even been packed by his own hands) shall remain a gift in perpetuity for the art-students of England. A preparation of the silicate of potash is the mode which has occurred to me as most likely to attain the desired result of increased permanence and strength; but I have had no experience in its application to fine plaster casts, and know not where to procure the solution of quality suited for the purpose. —HENRY SWAN, curator, St. George's Museum, Upper Walkley, Sheffield.

[6024.]—**Indian Stones.**—What stones and marbles suitable for fonts, &c., are to be obtained at Bombay, India?—A. M. M.

[6025.]—**Manuals on Cathedrals.**—Will any of your readers kindly give me information as to the above, especially those of Gloucester, Lincoln, or Salisbury, showing elevations of nave bays, choir ditto, and any details of importance, and the history and characteristics of the same?—E. G. D.

[6026.]—**Architects' Responsibility.**—I received an order from a client to build a wall, which was to stand on the line of an old temporary fence. The work was commenced, and I was called away to the West of England. On my return, in about a week, I found the line of the old fence had not been kept, and I at once began to upbraid my foreman for not keeping the line, when the gardener to my client put in an appearance and declared he it was who had ordered the deviation, whereupon my ire began to rise, and asked for his authority. He then stated that his master had gone to America and had left him in charge, and as the old fence line was disputed by the adjoining landowner he had taken upon himself the responsibility of making the slight alteration. To this arrangement I rather demurred, and requested to be supplied with the address of my client; but he assured me it was of no use writing as he could not give me any address, but to build the wall, and he would bear all responsibility in the matter. The wall was built, my client returned, when, owing to some restriction the adjoining landowners had imposed (of which I knew nothing), and after the two had haggled for a month, I was called in and ordered to take down the wall and rebuild on the line of the old fence. This was done; now my client refuses to pay for the taking down and rebuilding, and repudiates the action of his gardener. To whom must I look for payment, or must I bear the loss, although I refused to take the responsibility of the alteration, and which the gardener accepted?—ANXIETY.

[6027.]—**Venetian Panel.**—A prize is offered for carving a "Venetian panel." I will thank any one to define the peculiar character intended, also where illustrations may be found.—LLEWELYN.

[6028.]—**Cross Staff Head.**—Would any reader of your paper kindly give me a ready and sure rule of obtaining horizontal angles with the above instrument, and oblige—CROSS STAFF HEAD.

[6029.]—**Church Spire.**—I should be glad of any hints as to construction of a wood-framed slated church spire. How should the slating be managed at angles? Is it advisable to leave openings for passage of wind? How should the framing be bedded on the tower? Any other suggestion would be acceptable.—F.

[6030.]—**Timber-Measuring.**—May I ask some of your readers the following question:—In Hoppus's timber-measuring tables, which are generally considered a standard, he gives a log of timber measuring in girt 144in., or 36in. quarter girt, 30ft. long, to contain 270ft. cube of timber, whereas by calculation it really contains 343′ 5′ 3″, making the great difference of 73′ 5′ 3″. Will any of your readers kindly explain why Hoppus's tables are adhered to?—WILLIAM PHELPS.

[6031.]—**Architects' Charges.**—Is it not just and lawful for an architect to charge committee for 5 or 6 sets of rough tracings which he has furnished to different firms for the purpose of obtaining estimates for the heating of a large building, these parties having been named by committee to estimate? Also on similar grounds, may he not charge for the same number of specifications made of the painting works necessary, the committee as before having named the parties they wish to estimate? Is it not an established rule of the profession that for the 5 per cent. commission all an architect is called upon to supply are the set of contract plans and specifications, and also copies of both, which of course are intended for contractor? Committee argue that for the 5 per cent. architect is to supply tracings and specifications of every description requisite; but, query, what number? Information and advice on the above will greatly oblige.—PERPLEXED ARCHITECT.

[6032.]—**Colouring Maps.**—Will some reader kindly give his advice and opinion as to mixing a red similar to that which the 1-2,500th ordnance sheets are coloured by, having to assimilate the London survey sheets to the parish survey in a cartoon map where the two surveys join about the centre of the same?—W. B.

REPLIES.

[6014.]—**Tennis-Court Floor.**—Replying to your correspondent, "C. F. M.," we beg to suggest that the best and cheapest material for a tenis-court floor would

be Burnettized wood blocks, size 13½in. × 4½in. × 2in., laid on concrete. If "C. F. M." would favour us with a call we would give him further particulars.—WM. BURNETT AND CO., 90, Cannon-st., E.C.

[6018.]—**Foundations.**—It is impossible to answer your question well without writing a long reply. Even then it might not apply to your case. Employ an old-experienced surveyor, meet him on the site, and pay him. He will tell you all about your "soft" foundations, what to do, the depth and width of concrete, and how to make "hot lime and gravel," both baked and boiled (?)—WILLIAM JACKSON.

[6019.]—**Road-Making.**—The gravel should be clean and angular. The round stones should be broken so that they interlock with each other. Do not allow the road-man to bury the larger stones under the smaller ones, for from the effects of frost and the vibration of carriages the larger stones will rise to the surface and the smaller ones descend. It is not an advantage to have "fine stuff" in the gravel. The wearing away will produce enough "fine stuff" to fill the interstices and "bind." As to the use of gravel being economical, that depends upon locality, the amount of traffic, and the price and quality of the gravel compared with the price and carriage of granite. The latter is certainly the best road-metal. Hardness with toughness is the quality to be sought for, a quality which will endure heavy blows without breaking. In the long run, granite at any price is the most economical where there is much traffic in towns. Less mud and dust are produced because there is less wear. The expense in road scrapings and waterings is reduced by having the best material. Flint will not do at any price. Although hard, it is too brittle, and soon crushes into dust. The quality of gravel composed of flints and sandstones avoid. It is ruinous to put on unsifted and soft gravel. The cheapest material for the surface of roads are the best you can get. It is better economy to bring good materials from a distance than to supply inferior ones obtained close at hand. Make your roads with a proper cross-section by cutting down the sides, and fill up the middle part. It is also ruinous to allow water to remain upon the surface. For country roads good, clean, and bright angular gravel is good enough if properly applied. The smaller the size of the gravel the smaller are the interstices exposed to be filled up with mud and dust. The tougher the stone the smaller may it be broken. The less its size the sooner will it make a hard road, and for country roads the size should not be larger than 1in. The selection of material should be entrusted to a practical and an experienced man. It is economy to employ an experienced road surveyor and to pay him well, to keep him in your employ.—WILLIAM JACKSON, Surveyor to St. Neot's Local Board.

[6020.] — **Ventilation.** — A simple and efficient method of ventilating a church or school is to fix a number of vertical tubes round the walls, 8in. × 4in. and about 6ft. high. The number would be regulated by the size of the building. By this means fresh air would be admitted without draughts. The exhausted air to be drawn away through extracting ventilators on the roof. Boyle's air-pump ventilators might be used with advantage, they being considered very reliable, and fixtures not likely to get out of order. The sulphurous smell complained of by "Air," would, by this means, be got rid of. The smell is caused by the air striking the hot iron plate, getting burned and saturated with the sulphurous products of combustion evolved by the metal being possibly too porous and overheated. It is not a good plan of heating. The hot water system is better. A chimney-valve would not act if the fire was off, except there was a strong natural draught in the chimney, and even then in the winter-time there would, in all likelihood, be a down-draught. It is dangerous to use the fireplace as an exit for the vitiated air, as it (the vitiated air) would be inhaled by those sitting near the fire. A workman's cottage of, say, two apartments, might be ventilated by having a vertical tube in each room and an extracting ventilator on the roof, with the rooms connected to it by means of 4in. pipes. I should think the cost would not exceed £3 or £4 for each cottage. As to how long it would take to render the air in a room unfit for breathing under the conditions mentioned, that would depend upon the size of the room and the draught in the chimney.—UTILITY.

[6020.]—**Ventilation.**—The simplest method of ventilating cottages is to introduce air-bricks at the floors and conduct tubes to the inside near floor or ceiling, where small perforated gratings or Ellison's bricks might be inserted. (2.) Little draught can be experienced if valves are fixed to regulate inlet of air. (3.) Arnott's valve acts as a good ventilator at all times. One flue is generally warm enough to create a current. (5.) Certainly; the cause of the unpleasant fumes is the heating of the iron. (7.) For ventilating chapels and schools, I should certainly adopt Boyle's air-pump ventilators, or a similar method of extraction, providing inlets round walls. (8.) Answer depends on size of room, rate of air admission, &c.—G. H. G.

STAINED GLASS.

CARLISLE CATHEDRAL.—The south-west window of the nave of this cathedral has been filled with stained glass by Messrs. John Hardman and Co., of London and Birmingham, to the memory of the late Thos. Barnes, M.D., of Carlisle. The window is of two lights and tracery, and the glass of the Decorated period, corresponding strictly with the character of the stonework. The subjects represented have been chosen for their fitness to the intention of the window as a memorial to a physician, and are as follows:—Letting Down the Sick Man from the Roof, The Pool of Siloam, The Raising of the Brazen Serpent, and Naaman washing in the Jordan.

ST. MARY'S CHURCH, GLASGOW.—Messrs. John Hardman and Co., of London and Birmingham, have just completed the filling of the 10 nave windows. The windows are of two lights, with a subject in each from the lives of the Apostles. The window last erected represents the Election of St. Matthias.

WILLINGDALE DOE.—A new stained-glass window has been erected in the Willingdale Doe parish-church. The design is the work of the Rev. Ernest Gildart. Our Lord is represented as the Shepherd, King, and Bishop of the Church, crowned and mitred, bearing in his left hand the pastoral staff, and in his right hand a lamb from the "Lost Sheep of the House of Israel," resting against the breastplate of the "Twelve Stones." The nimbus shows the crown of thorns glorified, and the feet and hands bear the print of the sacred wounds. Before Him stand two children: a boy bringing an offering of flowers takes hold of the staff, a girl holds the "Garment of His Righteousness." Across the entrance of the archway under which the Good Shepherd stands is stretched the "Veil" bearing the legend, *unum ovile: unus pastor.* The lower panels, filled with tracery, are surmounted by a cornice inscribed, *Ihesu: Rex: Pastor: Episcopus.* The work has been executed by Messrs. Saunders and Co., of 75, Endell-street, Long-acre, London.

STATUES, MEMORIALS, &c.

ELY.—The memorial to the late Professor Selwyn has just been unveiled in Ely Cathedral, and is placed in the south aisle of the choir, under an archway which originally formed an entrance to the Cathedral for the nursing sisters of the old Norman hospital. The exterior doorway on the south of the choir has been walled up for centuries, but the interior of the archway remains intact, and now forms a baldacchino for a life-sized effigy, in white statuary marble, of the late Canon, vested in cassock, surplice, and stole, with the hands joined as in prayer. The figure rests on a moulded base of Purbeck marble, from a design by the late Sir Gilbert Scott.

LEGAL INTELLIGENCE.

ANCIENT LIGHTS, &c.—On Friday, Jan. 23, in the Chancery division, before Sir C. Hall, was brought forward the matter of "The Ecclesiastical Commissioners and Others v. Kino." This was a motion on behalf of the Ecclesiastical Commissioners and the churchwardens of the parish of St. Dionis Backchurch, one of the churches which have been pulled down, for an injunction to restrain the defendant, carrying on business in Fenchurch-street, from erecting certain new buildings in Fenchurch-street so as to obstruct the lights of any building to be erected on the site of the church, so far as such lights might occupy the same positions as the ancient lights which formerly were enjoyed by the plaintiffs, and the plaintiffs also sought to restrain the defendant from digging or disturbing the soil under the covered way leading from the street to the church, and formerly known as the church porch, and from disturbing or removing the remains of bodies interred therein, and from opening any vault under the site of the church or churchyard, or in any way interfering with the same or the walls thereof. St. Dionis Backchurch, one of the oldest of the City churches, was pulled down in 1878. It was arranged that the motion should stand over for a week, an interim injunction, which had been previously granted, being continued in the mean time, but this was not to prevent the defendant from raising the new buildings to the height of the buildings which had previously stood on the site. It would appear doubtful whether a churchyard ever existed on the site.

A DISPUTED SURVEYOR'S BILL.—In the Lord Mayor's Court, the case of Bridge v. Glenny was tried before Mr. Woodthorpe Brandon, assistant-judge, and a common jury, on January 23. The action was brought to recover £12 12s. for preparation of certain plans, and £11 as commission. Plaintiff deposed that he was a surveyor and estate agent in Budge-row, Cannon-street. At the end of 1878 defendant applied to him to obtain a builder who would erect houses on the Selhurst Park Estate, Surrey, defendant being willing to make advances at the rate of 75 per cent. on the usual certificate. Witness was instructed to prepare plans for two villas, and it was arranged that an advance of £800 should be made upon each if approved. Plans were accordingly prepared, and submitted to Mr. Ball, a builder at Norwood, who ultimately agreed to take the land. A formal agreement was thereupon drawn up, approved of by both parties, and engrossed. Defendant, however, subsequently refused to sign the agreement in consequence of his inability to find the necessary money to make the advances to Mr. Ball, and thus the matter fell through. Messrs. Warren and Fleming, solicitors, King William-street, were next applied to, but they did not assent to the proposal made. According to the custom of the profession of surveyors, he was entitled for preparing plans and specifications to charge at the rate of 2½ per cent. and the costs on erection, which would amount to £40 on the two villas. However, as the works did not proceed he had merely charged a nominal amount of £12 12s. to cover actual expenses out of pocket. With regard to the £11 commission, he was entitled to charge one year's rent for all land let, which would amount to £19; but he had made a modified claim under the circumstances. Mr. E. J. Elliot, architect and surveyor, and Mr. W. J. Thornhill, land agent, Cannon-street, gave evidence that the custom of the profession was such as plaintiff had described. They agreed that it was difficult to get a builder to undertake a job like the one in question. Mr. W. Ball, builder, said he had consented to erect two villas from Mr. Bridge's plans, provided the defendant advanced £800 upon each. He would not have undertaken the work on any other condition. Mr. W. J. Glenny, the defendant, was then called. He stated that he was a professor of architectural and engineering drawing in King's College. He was also an architect on his own account. Any number of builders could be found to build on freehold land. He was introduced to Mr. Bridge as a gentleman who was in communication with persons of capital, and who would be certain to find a builder to cover the whole of the estate. The freehold was worth £4,000, and he told the plaintiff that many builders would be glad to get hold of an agreement for that amount of land, knowing that it would not cost them a farthing for twelve months, during which time they might turn over the money and make a profit. He told Mr. Bridge that if he found a builder who would arrange for financing the transaction, he would be appointed surveyor on the estate. A conversation took place about remuneration, when witness told the defendant that he would get 5 per cent. from the builder the whole outlay. He distinctly informed plaintiff that he was not in a position to advance money beyond the land, and he never undertook to get Mr. Wilkinson or anybody else to finance. The builder was to do that. The agreement was signed without his knowledge or consent. His only reason for objecting to Mr. Ball was that he did not agree to finance the building operations throughout. As to the plans, he told Mr. Bridge that he would have the benefit of his (witness's) own. Mr. Driver, architect, Victoria-street, Westminster, said it was the custom for the builder to pay for plans, and not the freeholder, if the agreement were carried out. Mr. Goldring, surveyor, gave evidence to the same effect. Eventually the jury returned a verdict for the plaintiff for the full amount claimed.

PLANS.—At the County Court for Colne, Lancashire, on the 15th inst., Lonsdale Nut,ter builder and contractor, of Nelson, sued Isaac Catlow, grocer, of Nelson, for £3 15s., the price of preparing plans and specifications for the erection of two dwelling-houses. Plaintiff deposed that he was engaged by the defendant to draw him up plans and specifications of two houses. These had been built at a cost of about £800, but the defendant refused to pay for the plans. The latter had been passed by the Local Board, and the houses were built in accordance with them. For defendant, John Landless, architect, stated that the plans were of no use to work to, and that £1 10s. was a sufficient sum for drawing the plans; but the judge gave a verdict for plaintiff for £3 10s.

PEAKE V. BENNETT.—This was an action tried on Monday at the Staffordshire Assizes, at Nisi Prius, before Justice Manisty, in which the plaintiff, John Nash Peake, brick and tile maker, of Tunstall and Silverdale, sought to recover £50 damages for breach of agreement from the defendant, Nicholas Bennett, builder, of Burslem. The case was partly heard on Saturday, when evidence was given in support of the plaintiff's case, to the effect that defendant, who was engaged in rebuilding Newchapel Church, gave an order to the plaintiff for 24,000 tiles for the roofs, but refused to receive them when the order was completed. The tiles were of a particular colour, and plaintiff suffered loss through not being able to dispose of them readily.—The defence was that the execution of the order for the tiles was not completed at the time specified, that defendant was therefore compelled to countermand the order, and to obtain tiles from another source to enable him to complete the building of the church. The plaintiff alleged that eight weeks—the time occupied—was a reasonable time in which to make the tiles, which were of a special kind; but for the defendant witnesses were called who deposed that six weeks afforded ample time for completing the order, and that if necessary the tiles could have been made in a month. —The jury gave a verdict for the plaintiff for £13 damages.

In the Church of St. John the Baptist, at Leusden, near Ashburton, a stained-glass window, representing scenes in the life of John the Baptist, has just been fixed as a memorial, at a cost of £120.

Our Office Table.

A SPECIAL court was held by the Painters' Company on Saturday, at their hall, to meet a deputation of house-painters—namely, Messrs. Pickering, Shipton, Inman, Matthison, Thoroughgood, French, Phillips, Doherty, Cotton, Dean, and Cole—to consider a proposal for appointing associates and a system of registration. The Master (Mr. J. G. Crace) expressed the satisfaction of the Court at receiving the deputation, and, after adding that the company was very ancient and formerly the Royal Academy of this country, that it had large charities, but limited corporate funds, and that the Court had, by exhibitions of trade work and giving prizes at various times, endeavoured to promote technical education, stated that the Court was very desirous to assist the trade in any way in its power, requested the views of the deputation. Messrs. Shipton, Pickering, Matthison, French, Cotton, and Phillips addressed the Court, and, at the suggestion of Mr. Shipton, it was moved by Mr. Treasurer Monnery, seconded by Mr. Naylor, and carried unanimously, "That this Company would be willing to receive a committee, elected by the trade in its own way, to consider the arrangement of lectures on the aims and principles of decorative art, on colour, and on other portions of the painting trade, and also to consider any other matters which may be deemed to be for the benefit of employers and employed in the trade at large." Mr. Shipton, on behalf of the deputation, expressed their thanks for the reception they had met with, and the deputation withdrew.

THE Bernese papers announce the death of the sculptor, Raphael Christen, at the age of 69, after a long and painful illness. Christen inherited his considerable artistic talent from his father, Joseph Maria Christen, whose career was singular and romantic. Engaged in the studio of the painter Wursch as a mixer of colours and carver of wooden crucifixes, he imbibed so great a love for art that, though almost destitute of means, he threw up his employment and accompanied a Swiss soldier of the Papal Guard to Rome, where he attracted the attention of Canova, who gave him instruction and work. At a later period he received many commissions from King Louis of Bavaria and the Court of Austria. In the Walhalla of Regensburg, among other works executed by the elder Christen, are the statues of Hans von Hallwyl, Pestalozzi, and Johannes von Müller. He spent the last years of his life at Berne. Joseph Maria Christen had two sons, both of whom became, like their father, sculptors. The elder, Daniel, died young. His most highly-esteemed work is a bust of General Dufour, executed in 1847; but he is best known by his colossal statue of Berna, which surmounts the monumental fountain of the Federal Palace at Berne. He gave all his spare time to the study of natural history and physical geography. From 1845 to the time of his death he occupied the position of Quæstor of the Natural History Society.

AN exhibition of building appliances and manufactures is to be held in London in April. Many interesting novelties in labour-saving machinery are to be shown, and American and Continental productions are promised. The collection will be divided into five sections, viz.:—I. Architecture; II. Construction; III. Engineering; IV. Decoration; and V. Furniture—each under the charge of a Steward of Department. The section of Building Construction is in the hands of Mr. Henry Reid, C.E., the author of the standard works on Portland cement, concrete, &c., while that of Engineering will be arranged by Mr. Powis Bale, C.E., M.I.M.E., &c. The subdivisions are arranged so as to include nearly every appliance of house-building and furnishing, and many exhibits prepared for the Melbourne Exhibition are expected, so that they may be seen here before their despatch. Particulars as to present and prospective arrangements may be obtained of Mr. John Black, manager, 161, Strand, W.C.

DR. DUNCOMBE, the late Dean of York, who died on Monday last, did more personally on behalf of church-restoration than perhaps any other clergyman of his day. His first effort, after his appointment in 1858, was towards the restoration of his magnificent cathedral. He inaugurated a subscription in favour of this object, which reached large proportions. By large individual liberality, he restored the chapter-house, spent a large amount of money upon the improvement of the organ, introduced a new organ and services in the nave, and more recently restored the southern transept. Besides the cathedral, he spent some thousands of pounds in the restoration of the Castlegate Church in York, and there was not a church-restoration subscription list in the county which did not contain his name. The hemmed-in cathedral, as he found it, he speedily opened out, in conjunction with the corporation, by the widening of what is now known as Little-Blake-street, and the formation of what is now known as Duncombe-street.

MR. G. W. WIGNER, the well-known chemist, writes that the method described by Lieut-Col. Hale in the *Times*, and reproduced by us last week, should not be allowed to pass without comment. Ether is not only a dangerous liquid to use for such a purpose, and likely to increase any injury which may have occurred to an existing drain, but, by reason of the great density of its vapour, it is likely to cause erroneous conclusions when applied to any good and well-ventilated drain. In such cases the vapour of the ether, which is much heavier than atmospheric air, will escape and fall from the top of the ventilator, and so delude the experimenter. More than this, the vapour will injure, if not destroy, any red-lead or similar joints which exist in the drain, and even if they were sound will probably make them leaky. It will thus do permanent harm without even discovering a temporary leak, and all this will be done at a wasteful cost, and at considerable risk of exploding the inflammable vapour.

THE people of South Kensington seem occasionally to be rather at sea in describing what they have got there, as well as in doubt sometimes as to whether objects inquired for are there or not. Mr. R. Bitmead says, in the *Furniture Gazette*:—"Visiting the South Kensington Museum the other day, I naturally made my way to that part of the building containing the collections of specimens of ancient furniture. Amongst numerous objects of interest, I noticed a glass case of tables bearing the name of that great craftsman, Thomas Chippendale, the tables being made (according to the description) in the early part of the 18th century. I carefully examined them, and, to my great astonishment, found them to be of my own design and make!"

AT a meeting of the Asylum Committee of the Hull Corporation, held at the Town-hall on Wednesday, Councillor Witty presiding, a letter was read from Mr. Payton, architect, Bradford, stating the terms upon which he would examine the plans of "Lucidus Ordo" for the proposed new borough asylum, and give estimates of the cost, and information upon the following points:—Whether the asylum, if built upon the plans of "Lucidus Ordo," would accommodate 420 patients; whether it could be built at the estimated cost of £46,000; and whether it would, when complete, comply with the requirements of the Lunacy Commissioners. He asked £26 5s. and expenses, basing his terms upon the calculation that he would have to come to Hull, and spend three days in the examination of the plans. Some discussion ensued as to the advisability of having the plans of "Lucidus Ordo" examined, and the majority of the committee were of opinion that, when there was a possibility of saving £10,000 to the ratepayers, they ought not to stop at trifles. The accepted plans of "Argus" were estimated to cost £56,000, and, if they could obtain a report that "Lucidus Ordo's" plans would satisfy the requirements of the Commissioners, the Justices might be got to change their minds. It was resolved to have the plans examined, and to offer Mr. Payton a lump sum of £30 for his examination.

CINDER-SIFTING ASH CLOSETS.
Superior to Earth Closets. For Gentlemen's Houses, Cottages, Schools, &c.
NO DRIED EARTH REQUIRED.
The Sanitary Appliance Co. (Ltd.), Salford.

Holloway's Pills render delicate invalids suffering from loss of appetite, nausea, sick headache, dimness of sight, faintness, flatulency, or spasms the most essential service without inflicting any weakness or annoyance on their feeble frames. Low spirits, proceeding from congested or torpid liver, are removed by a short course of this medicine.—[ADVT.]

MARBLE MOSAIC PAVING.

Among the Floors laid by BURKE AND CO. may be mentioned:—

MANCHESTER NEW TOWN HALL.
NATURAL HISTORY MUSEUM, South Kensington.
PERSIAN COURT, S. Kensington Museum.
THE ART UNION OF LONDON, Strand.
BANK of ENGLAND, Burlington Gardens.
CLARENCE HOUSE, St. James's.
EATON HALL, Chester
TURF CLUB, Piccadilly.
DEVONSHIRE CLUB, St. James's Street.
CONSERVATIVE CLUB, Manchester.
WANDERERS' CLUB, Pall Mall



CORK CATHEDRAL.
St. MARK'S CHURCH, North Audley Street.
St. MARY'S CHURCH, Whitechapel.
STUDLEY CHURCH, Ripon.
St. MARY'S CHURCH, Brighton.
St. PAUL'S CHURCH, Manchester.
CHEADLE CHURCH, near Manchester.
S. SEPULCHRE'S CHURCH, Snow Hill, E.C.
CHURCH OF THE ASSUMPTION, Warwick Street.
WEST LONDON SYNAGOGUE, Bayswater.
The CENTRAL SYNAGOGUE, Great Portland Street.

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MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Society of Arts. T. Bolas on "The Manufacture of Indiarubber and Guttapercha." Lecture I. 8 p.m.
Society of Engineers. Inaugural address by Joseph Bernhays, the President for 1880. 7.30 p.m.
Institute of Surveyors. 8 p.m.

TUESDAY.—Society of Arts. "Social and Commercial Prospects in the Transvaal," by Rev. G. Blencowe, late of the Transvaal and Natal. 8 p.m.

WEDNESDAY.—Society of Arts. "Trade and Commerce with Siberia, viâ the Kara Sea," by Henry Seebohm. 8 p.m.
British Archæological Association. John Brent, F.S.A., on "Dozmare Pool, Cornwall." 8 p.m.

THURSDAY.—Civil and Mechanical Engineers' Society. "Corn Mills," by H. Ellis Hill, A.M.I.C.E. 7 p.m.

FRIDAY.—Royal Institution. Dr. Huggins on "Photographic Spectra of Stars." 9 p.m.

Lamplough's Pyretic Saline is refreshing, most agreeable, and the preventive of FEVERS, BILIOUSNESS, SMALL POX, SKIN DISEASES, and many other spring and summer ailments. Sold by chemists throughout the world, and the Maker, 113, Holborn Hill. *Use no substitute.*—[ADVT.]

Trade News.

WAGES MOVEMENTS.

LEEDS.—The master-builders of Leeds have resolved to give notice to the masons and bricklayers that from August 1st next their wages will be 7½d. per hour, and labourers to be paid at the rate of 5d. per hour.

THE WELSH SLATE TRADE.—Notices were posted on Friday last at Penrhyn Slate Quarries, North Wales, that full time would be at once resumed. These quarries, like those at Llanberis, have been working four days weekly for many months.

Doulting Freestone and Ham Hill Stone of best quality. Prices, delivered at any part of the United Kingdom, given on application to
CHARLES TRASK,
Norton-sub-Hamdon, Ilminster, Somerset.
Agent: Mr. E. CRICKMAY, 4, Agar-street, London, W.C.—[ADVT.]

Penrhyn and Dinorwic Slates supplied direct from the Quarries. Prices, free in trucks at Bangor, or delivered at any Railway Station, may be had upon application to
R. NEWTON & CO.,
Slate Merchants, Castle-square, Carnarvon.

McLACHLAN & SONS, 35, St. James's-street, S.W. Builders, Decorators, and House Painters.
Designs and Estimates.
General Repairs and Alterations Executed.
Experienced Workmen always in readiness, and sent to any part of the country.—[ADVT.]

Westwood Quarries, near Bradford-on-Avon. (Established 150 years.)
WILLIAM GODWIN can supply best FREE STONE (from the original Westwood Quarries) in any quantities. Prices on application to the above, or to Gerrish and Co., Limited, Redcliff Backs, Stone Shipping Wharf, Bristol.

TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate of the accepted tender—it adds to the value of the information.

CAMDEN TOWN.—For the erection of stabling for thirty horses at Camden Town. Mr. George Edwards, architect. Quantities by Mr. Henry Lovegrove, 30, Budge-row, E.C.:—

Wall, Bros.	£2,291 0 0
Gould and Brand	2,050 0 0
Lidstone and Son	2,000 0 0
Martin, Wells, and Co.	1,999 0 0
Nightingale	1,934 0 0
Richardson	1,925 0 0
Drew	1,900 0 0
Scrivener and Co.	1,888 0 0
Cullum	1,834 0 0
Green, Hackney (accepted)	1,688 0 0

CAVERSHAM, OXON.—For a new house and offices, Caversham, for George May, Esq. Mr. William Ravenscroft, architect, Reading. Quantities supplied by Messrs. Henry Cooper and Son, Maidenhead:—

Sheppard, Reading	£5,993 0 0
Woodroffe, Reading	5,810 0 0
Higgs, Reading	5,778 0 0
Jarrett, Croydon	5,521 0 0
Rider and Son, London	5,448 0 0
Staines and Son, London	5,384 0 0
Silver and Son, Maidenhead	5,006 0 0
Filewood, Reading	4,988 10 0
Kimberley, Banbury (accepted)	4,580 0 0

CAVERSHAM, OXON.—For a new infirmary at Amersham Hall Schools, Caversham, for Alfred West, Esq. Mr. William Ravenscroft, architect, Reading:—

Grover, Reading	£499 0 0
Filewood, Reading (accepted)	485 0 0

CHELMSFORD RURAL SANITARY AUTHORITY.—Messrs. Chas. Pertwee and F. Whitmore, joint engineers, Chelmsford. Quantities by Mr. J. Kennard, Devonshire-square, E.C.:—

Drainage works for Springfield:—
Young and Nicholson, Skegness* £2,257 0 0
* Accepted.
Drainage works for Great Baddow:—
Young and Nicholson (accepted) £1,964 0 0
Water supply for Springfield, Great Baddow & Widford:—
Dennis & Co., Chelmsford (accepted £2,201 10 5
Water lower for Springfield and Great Baddow:—
Wood, W., Chelmsford (accepted) £2,259 0 0

FUNTLEY.—For the erection of board schools, Funtley, Hants, for the Fareham School Board. Messrs. Davis and Emanuel, architects. Quantities supplied by Mr. H. P. Foster:—

Futtle, E.	£2,059 11 0
Blackman, G.	1,967 5 0
Fullford, W.	1,060 10 0

HASTINGS.—For alterations, new shop-fronts, repairs, &c., at 39 and 37, Bohemia-road, Hastings, and erection of stabling at rear, for Mr. J. N. Foreman. Messrs. Cross and Wells, architects:—

	House.	Stable.
Harman	£300 0 0	£403 0 0
Vidler	290 9 0	392 0 0
Weatherseed	219 0 0	389 13 0
Cruttenden	247 0 0	355 0 0
Neve	244 0 0	344 0 0
King, A.	190 0 0	360 0 0

KILSYTH, N.B.—For sewering the burgh, for the Commissioners of Police:—
Scott, Hamilton (accepted).

PECKHAM.—For the erection of Sunday-schools adjoining the Wesleyan Church, Barry-road, Peckham. Mr. Chas. Bell, architect. Quantities by Mr. Henry Lovegrove, 30, Budge-row, E.C.:—

Colls and Sons	£3,670 0 0
Staines and Son	3,649 0 0
Toms	3,623 0 0
Bowyer and Son	3,520 0 0
Woodward	3,500 0 0
Hobson	3,484 0 0
Tyerman	3,484 0 0
Shepherd	3,448 0 0
Nightingale	3,362 0 0
Jerrard	3,267 0 0
Thompson, Camberwell-green*	3,240 0 0

* Accepted.

READING, BERKS.—For a new Baptist chapel, King's-road, Reading. Mr. William Ravenscroft, architect, Reading. Quantities supplied by Messrs. Henry Cooper and Son, Maidenhead:—
Filewood, Reading (accepted) ... £2,910 0 0

LIVERPOOL.—For house, Hington-park, Hington. Mr. R. A. Busby, architect, Lord-street, Liverpool. Quantities supplied:—

Hughes, E.	£2,156 0 0
Readdie, J.	2,045 0 0
Brown and Backhouse	1,996 10 0
Urmsom, T., 60, Soho-street (reduced and accepted)	1,842 0 0
Boundary wall:—	
Burrows, W. (accepted)	163 0 6

READING, BERKS.—For a new house, King's-road, Reading, for James Boorne, Esq. Mr. William Ravenscroft, architect, Reading. Quantities supplied by Messrs. Henry Cooper and Son, Maidenhead:—

	Bricklayer, &c.	Carpenter, &c.	Plumber, &c.	Total.
Filewood, Reading	1,096 0 0	707 0 0	190 0 0	1,993 0 0
Higgs, Reading	1,088 0 0	580 0 0	195 0 0	1,863 0 0
Winter, Reading	1,111 3 6	529 4 2	179 12 7	1,820 0 3
Grover, Reading*	905 0 0	525 0 0	152 0 0	1,582 0 0
Harries, Reading	—	—	195 0 0	—
Lisley & Goodall, Reading	—	—	157 9 0	—

* Accepted, subject to a few reductions.
Note.—Smith's work will be executed by Mr. Boorne.

ST. LEONARD'S.—For new roads and drains on the Eversfield Estate, St. Leonard's-on-Sea. Messrs. Fowler and Hill, surveyors:—

Hughes	£765 0 0
Gasson	750 0 0
King	625 0 0
Cruttenden	610 0 0

STRATFORD.—For the erection of a semi-detached villa residence in the Hamfrith-road, Stratford, Essex, for Mr. W. Escreet. Mr. J. T. Newman, architect. Quantities supplied by Messrs. Curtis and Sons:—

Webb, J.	£1,290 0 0
Morter, J.	1,290 0 0
Reed, A.	1,284 0 0
North, Bros.	1,282 0 0
Norton and Son	1,264 0 0
Gentry, M.	1,198 0 0
Hearle and Son (accepted)	1,175 0 0

BATH STONE OF BEST QUALITY.
WESTWOOD GROUND BOX GROUND, CORSHAM DOWN, and COMBE DOWN.
RANDELL, SAUNDERS, & CO., LIMITED,
Quarrymen and Stone Merchants.
Prices, delivered at any part of the United Kingdom, furnished on application to
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Bath Stone.—Every description and the best quality supplied direct from his own Quarries by
ISAAC SUMSION, NEWARK STREET, **BATH.**
Quarryman and Stone Merchant. Established 1791. Prices, delivered to any part, furnished on application.—[ADVT.]

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FLETCHER, BERDOE, & ORR, Proprietors,
"CHARLTON PAINT WORKS," CHARLTON [BY WOOLWICH], KENT,
PATENTEES AND SOLE MANUFACTURERS OF THE
"CHARLTON" NON-POISONOUS PAINTS AND COLOURS,
For HOUSE and SHIP PAINTING, PAPER STAINING, &c.

The extensive works of the Company, on the Banks of the Thames, have been greatly enlarged and remodelled under new management, and in future the
QUALITY OF ALL GOODS WILL BE GUARANTEED.
Sanitary Science, impatient of the deleterious substances hitherto in use, called loudly for Non-Poisonous Paints and Colours, and the inauguration of these Works is the response to that demand,
NO POISONOUS INGREDIENTS BEING USED IN THEIR MANUFACTURE.
The Company's products are now largely used at home and abroad by Government Establishments, Dockyards, Arsenals, Railway and Shipping Companies, Public Institutions, School Boards, Hospitals, &c., and wherever the laws of health and economy are studied. Their comparatively low price allows of the Silicate Paints and Colours being used for the commonest as well as for the highest class of decorative work.
New Descriptive Lists and Pattern Cards are now ready, and may be had, gratis, on application as above, or to the Company's Offices and Depots,
LONDON: 107, CANNON STREET. LIVERPOOL: 32, SEEL STREET. GLASGOW: 21, HOPE STREET.

THE BUILDING NEWS.

LONDON, FRIDAY, FEBRUARY 6, 1880.

HISTORICAL BRIDGES.

THE recent disaster on the Tay recalls to mind some memorable associations connected with the history of bridges. Our examples, however, will be taken from periods long anterior to that of what has been described, whether inaptly or not, "wirework architecture." The literature of the subject is super-abounding, from the days of Vitruvius to those of Vignolles. The motto of the ancient Romans was.—"First, a highway; next, a bridge. Without it, armies were checked in their advantage; commerce was impeded; social intercourse became almost impossible. The same truth has held good in all ages; from the scheme of Darius, designed for the invasion of Thrace, across the Bosphorus; the famous structure thrown over the Danube by the Servians of the fourteenth century, to assist in the defence of Nicopolis, and those which were projected by Pyrrhus across the Adriatic, by Caligula across the Tyrrhene Sea, and by Cæsar across the Rhine. Many a tradition has came down to us concerning the bridges over the Tiber, the Ælian, and those of the Holy Angel; of the Consuls, and of the Lady, with its "symphony" arches; and their ancient chronicles, in respect of calamity and destruction, are much in accord with those of others, more modern in type, at Avignon, Ay, Bordeaux, Luzon, St. Esprit and Aveyron—with its eighteen arches, once partially wrecked by such a storm as lately swept the Tay. Similar vicissitudes have occurred in France to the "Royal Bridge," of the Tuileries; to that of Lyons, which, like the other at Aveyron, had eighteen arches; to that of Toulouse, across the wide and swift Garonne; to the Farnese, at Parma, and to many besides, which have left their relics along the Flaminian Way. Next to the temples and palaces of a country, its history has, perhaps, been most truly told by the ruin, or the neglect, of its bridges. They bespeak, moreover, something characteristic of the Government, and the manners that once held sway. Those of Rimini were approached through marble porticoes. Those on the road from Trent to Bassano, carried over stupendous gorges, from one giddy height to another, told of sudden flights, and the breaking down of an enemy's means of passage. In a modern epoch, Arcola and Lodi were the centres of tremendous battles, and in all strategy the "head of the bridge" has been regarded as a vital point. It is worthy of remark, moreover, from a different point of view, that among all the three hundred and fifty-nine older bridges of Venice, not one has ever been permitted to fall into decay. And yet, they were only built for foot-passengers, in a city where wheeled vehicular traffic was practically unknown. Those of Amsterdam and Rotterdam scarcely belong to the category. The historical structures now referred to differed, of course, in many respects, though not in all, from those with which the modern and popular mind is familiar. They had nothing in common with the fabric that lately spanned the Tay, with the Menai, or its Tubular neighbour. There was no Niagara for the ancients to bridge; but Trajan had to rear his arches a hundred and fifty feet above the flow of the Danube, and to give them an ample breadth simultaneously. But that which Trajan raised his successor levelled. "A bridge," said the one, "is the means of promoting intercourse and commerce." "A bridge," said the other, "is an invitation to an invader." But the foundation piles, to this hour, remain; and every now and then, are drawn up from the bed of the river. It is, perhaps, hardly reasonable to include, among edifices of this class, that of Xerxes, on the Hellespont, only temporary in its character and purpose, any more than that which was reported to have been thrown by Alexander across the Ganges; but it will be well for modern Europe, if it can present, after a similar lapse of time, such an illustration as the Ælian Bridge, built by Hadrian, and now known as the Bridge of the Holy Angel, at Rome. We have had examples of apparent indestructibility in England; and certainly, those of the Thames, from Westminster downwards, would seem to challenge the efforts of both tide and time. Westminster itself, Waterloo, Blackfriars, and London, suggest, in their several ways, the idea of architectural immortality; but it is to be remembered that the Roman works of this class were not all equally durable. Thus, the "Triumphal Bridge" of the Cæsars, still encumbers the Tiber with its fragments, though the Janiculan stands steadfast, while the Ostine has survived to be re-named the Bridge of St. Bartholomew. So, the classic Tarpeian is now the Caspi; the Senator's, on the Palatine, was christened the Holy Maria; the Horatian, one of the most beautiful in Rome, and of which only a few scarcely-distinguishable relics remain, would have been re-named, had not a second structure been erected above the first, more like a portico, or a triumphal arch, than a bridge, so aspiring were its proportions, and the bound of its central arch. The bridges of Avignon—long ago a ruin—of Lyon, on the Rhone, and of St. Esprit, were all designed in imitation of these.

Among Italian historical bridges, that constructed by Alexander Farnese, Duke of Parma, was, perhaps, the most architectural, nothing of this character being claimed by the celebrated one "of sighs" at Venice. Palladio, in his day and generation, was great in the design of these structures, as witness that of Rimini already mentioned, on the Flaminian Way; that of Vicenza, on the river Bachiliogni, and that of Verona. But his grandest conceptions were never carried out. One among them represented a bridge which should be composed of several streets, along which no vehicle should ever be allowed to pass, of lodges, porticoes, and statues of marble and bronze. At Madrid there is an edifice—that of the Marzanani—which may almost be described as at once a bridge and a gate, while in the little town of Munster, on the Navante, was formerly constructed a bridge of a single arch, far surpassing in boldness that of the Rialto, at Venice, though this latter has often been eulogised as a masterpiece of Michael Angelo's genius. Palladio bore in mind, as a bridge architect, the necessities which have to be encountered in different regions; ice and long winters in one, snow-meltings and floods in another, tempests of wind in a third; and he has made use of the most accurate calculations available in his time of the conditions represented by the Royal Bridge on the Seine, at Paris, that across the Tiber at Rome, that across the Rhone at Lyons, that across the Garonne at Toulouse, and that across the Thames in London. Those flung over the Tiber have had to withstand, excluding the current century, no fewer than thirty overwhelming inundations and swellings of the river, and it is certainly a remarkable circumstance that any one of them should have been left with one stone standing upon another. The Bridge of Caersau, in Languedoc, though constructed, as its builders thought, exactly on the Roman plan, gave way to the first assault, and even the enormous piles upon which it was reared were rooted out of the depths to which they had been driven. The Emperor Trajan, in building his bridge over the Tiber, would not trust to the bed—artificial or natural, whichever it might have been—of the stream, but excavated another and thence commenced his constructive operations, and the renowned Blondel, at Xaintes, on the Charente, stipulated for a deep foundation of concrete, as concrete was understood in those days, before he would put a cubic yard of either timber or masonry into his work. Many of these ideas, no doubt, were not less crude than they were old-fashioned, yet they exemplify how the science and practice of bridge-building have grown up in various parts of the civilised world, and the uncivilised also, since long before a suspension bridge was thought of in Europe, it had been a familiar principle among the wildest tribes inhabiting the jungles of Asia, who found in the flexible and elastic bamboo the materials of such edifices ready to their hands, and who elaborated them with a marvellous instinct as to weight, balance, and capacity for resisting the variable temper of the weather and the attacks of floods. It is true that no human precaution can always suffice to prevent danger to such, or similar edifices, from hidden causes. Michael Angelo Buonarotti himself, though he laid the foundations of St. Peter's, at Rome, with every conceivable precaution, did not reckon upon the subterranean percolations down from the summit of the Vatican and Janiculan hills. The great Corderic of Rochefort, also, was thus undermined, and so with the foundations of many ancient bridges; there were rivers under rivers, streams under streams, never taken into account by the architect, yet, nevertheless, fatal, in the long run, to his work. There was a long controversy, at one time, concerning the materials to be employed, stone, marble, or timber. Timber, clearly, would not suffice for enterprises of the first magnitude, constituting the prolongations, or junctions, of Imperial highways. The Romans and the Gauls, as a rule, pronounced in favour of the hardest stone, rising above buried forests of oak or pine, while the Italians, generally speaking, declared for marble, at once their favourite and their most familiar product. "A bridge," said Michael Angelo, "ought to be built as though it were intended to be a cathedral; with the same care, of the same materials," and he only repeated the words used by the unknown architect, a Roman, of the apparently imperishable Pont du Gard, in which the mason and the mathematician would seem to have had an equal share. The bridge of La Guillotiere, on the Rhone, was built on precisely the same system, and is a ruin; but it was not destroyed by time or ordinary wear and tear, it was blown up in time of war; and to its architect was attributed the blame properly due to a company of French sappers and miners, with whom, as they themselves say, "nothing is sacred"—nor to their architects either, in another sense, because there was once a project for bridging the Nile, a river which never yet has known a bridge, in the proper sense of the term. The French, however, during their occupation, conceived the idea, ransacked the entire valley for stone, cast predatory eyes upon the pyramids, and were only deterred from their undertaking, one never dreamed of, even by the most magnificent of the Pharaohs, by the exigencies of war. Had they not discovered a sufficiency of stone, their engineers, it was announced, would fall back upon the bricks, in the supply of which Egypt has never failed. Why not? it was asked. The beautiful structure at Toulouse was originally brick-built from base to parapet, though its elaboration approached that of sculpture. Among other edifices of this class, however, must not be forgotten those

which were expressly designed to break the force of torrents and descending masses of ice—solid, yet complicated, arrangements, all traces of which were long ago swept away, but which once were famous in the valleys of the Alps and Pyrenées. In point of fact, since bridges have, in all civilised times, been found essential to the mutual intercourse of populations separated by rivers, it is not surprising that they have equally, in all civilised and artistic times, engaged the utmost ingenuity of mankind, in order that they might be, if possible, at once safe, splendid, and commodious.

WORKS IN HAND.

RESUMING our notices of art works and manufactures,* we may at once say that the general depression felt in all branches of art industry has not been altogether without its compensation, in some respects at least. In busy times manufacturers turn out quickly, the artists have little time to expend in elaborating their conceptions, and there is often as the result an appearance of hurried manufacture and want of invention in the objects. In periods of great activity there must be a ceaseless endeavour to change and vary the types in use, but even so luxurious and prolific a period of art as that of the Fourteenth Louis could not produce anything better than the meaningless repetition of forms we are accustomed to regard with abhorrence. What with Jacobean and Hanoverian revivals in our furniture and decoration, tendencies which appeared to run riot in some instances, we might have anticipated a very similar apostasy in art manufacture; but it is satisfactory to notice that in the better houses the tide has rather turned in favour of a freer and less mannered style, the basis of which is more of the Italian Renaissance than simply Queen Anne or Georgian. Within a short radius of Oxford-circus we may take a few of the leading manufactures. In Mr. Helbronner's establishment in Oxford-street, an establishment replete with every convenience and facility, and whose new buildings and improvement in lighting, warming, and ventilation, we lately described in this journal, a large number of hands, both male and female artists, are engaged in the production of textile fabrics of a high class. Carpets are one of the largest branches of manufacture carried on at Helbronner's. Of these we noticed a few choice specimens in Brussels and velvet pile, remarkable for admirable design and harmony of colouring. They are nearest to the Oriental carpets in these respects. One with green flowers on a dark Indian-red ground, designed, we believe, by Mr. Norman Shaw, was a good instance of correct carpet-design, combined with the quiet colouring and subdued tints so conspicuous in colour-decoration of the period in which that artist usually works; but the carpet would be equally well suited for any large dining-room in any modern style of art. The pattern is perfectly simple and thoroughly English. The proprietor of this establishment is now turning out some superb curtains. Two of these, intended to furnish the apartments of well-known historic castles, drew our attention for sumptuous design and colour. They are made of the richest silk plush, a speciality in the manufacture being that both sides of the fabric are finished alike. One of the curtains we saw is of a rich Indian-red or crimson, with embossed pattern of conventional kind; nothing can be more beautiful than the velvety shades in the folds. The curtains, of which we shall give further particulars, are intended to fold into the recesses of the windows, so that when closed they will present the same face to the room. The workshops of Messrs. Barkentin and Krall, of 291, Regent-street, remind us rather of the real art-craftman's atelier, than the show-rooms of wholesale manufacturers, who turn out spick and span metal work of the pseudo-Mediæval kind. The show-rooms of this firm are quiet and unostentatious in their display of bright metal; but as we scan the collection we feel that there is thoroughness and artistic feeling in the articles. We see no long array of highly-polished coronæ and candlesticks, crosses, and chalices; but what there is looks genuine. In one of the rooms we notice two fenders of quiet Jacobean design, in brass of a pleasing yellow colour, also some fire-irons of equal merit, of a thorougly unique Queen Anne pattern. These are made in brass, and steel and brass, and are of excellent manufacture, all hand-wrought. A small brass shovel and tongs we particularly noted for their sensible decoration, which consisted of open twists or whorls in the handles or limbs. A brass coal-scuttle, of nautilus shape, is unique in its way; and we also note a few artistically-designed brass door-knockers and finger-plates, many of them copied from old examples. The latter are simply engraved in diapers or scroll patterns, or, the pattern is perforated; but the shapes and patterns strike us as much for their fitness as their elegance. All the works of this kind are beautifully beaten and engraved. Several chalices have been carried out by this firm, from the designs of Mr. Street and Mr. Blomfield, and are interesting examples of design and workmanship. The chalices from Mr. Street's design for his new church of Holmbury St. Mary's are remarkable for spirit and boldness of outline. They are early in type, the knop is of silver, and the stem is enriched with beautifully-wrought filagree in relief under a plain bowl producing a simple contrast, the more striking when we compare it with the overwrought enamelled and embossed ornamentations that destroy the effect of ordinary stock patterns. In the same gentleman's design for silver chalices in Dublin Cathedral, the form is even more severe. Instead of a curved outline the foot is bounded by straight lines forming a cone, and this is ornamented by four medallions of Evangelistic subjects. Another chalice executed by Messrs. Barkenton for Manchester, is enriched by some spirited foliage in relief round the stem, a few conventional sprigs springing from the latter round the lower part of a plain bowl. Round the base, which is exceedingly rich, medallions occur, and the whole is of Late Mediæval character. We may add the firm are engaged in executing the memorial brass to the late Sir Gilbert Scott, from Mr. Street's design, lately illustrated by us; they are also executing a brass for St. Barnabas, Pimlico, and a very handsome stove for the Drapers' Hall, in brass and steel, Jacobean in style, with rich brass panels round the grate. We must also bestow a word of praise on the exquisite gold and silver work, and jewelry of this firm. A brooch and pair of ear-drops we examined, in an old English or rather Flemish style, were particularly admirable in design and workmanship. Passing from the metal-work to ceraimc art, we notice that the Campbell Brick and Tile Company, of Stoke-upon-Trent, in their London warehouse, 206, Great Portland-street, have a large display of tiles, glazed and encaustic, of superior patterns and make. In this branch of manufacture there is, as in textiles and metal, an evident desire to avoid the extremes of fashion as regards style. A few years ago, the tiles made by Mintons, Maw, and other high-class manufacturers, were nearly all designed in the Gothic style, and old Mediæval tiles were copied for almost every purpose. Many of these were beautiful imitations, but the style was ill-suited for ordinary buildings, while the Classic patterns were too severe for modern houses. Mr. Colin Minton Campbell, the proprietor of the present works at Stoke-upon-Trent, has introduced a variety of patterns which would disarm the opponents of either style; they are generally in a sort of Renaissance, though we meet with many designs in a thoroughly Jacobean and Anglo-Italian style, suitable for a variety of purposes. The glazed encaustic tiles for hearths form an important part of the collection; these are chiefly in chocolate, black, buff, and grey, and we may refer more particularly to patterns numbered 906, 947, 955, 965, as being in darker and more subdued colours. All these are encaustic tiles, not printed—a distinction that must be kept in mind in judging of quality. In the encaustic tile, of course the colours are produced by substances added to the clay and inlaid upon face, while in the printed or imitation encaustic, the colour is applied to the surface as a transfer and glazed. The latter form of tile, however, answers for sundry decorative purposes, and for wall tiles, flower-boxes, &c., and we observe that the company manufacture several excellent patterns and designs printed from morocco leather; these are called "morocco tiles," and as they have a granular dull surface, instead of glazed, they answer well for lining the stalls and boxes of stables, to avoid reflection, so injurious to horses' eyes. These tiles are made in all colours, the greys and buff (plain) are admirably suitable for walls. We also observe several new designs in printed and hand-painted tiles that would be well adapted for dadoes, pilasters, etc. One or two good foliage designs, printed in low tones of green, drew our attention. A conventional rendering, consisting of stem and long green leaves, and a horse-chestnut pattern, are particularly good. Tennyson's "Idylls of the King," Æsop's fables, and Shakespeare's plays are introduced as subjects in some of them: the former are from designs by J. Moyr Smith, and may be used in nurseries and for borders. We must not omit to mention a mantel-piece in teak, designed by Mr. Norman Shaw, with inlaid glazed tile panels or encaustic slabs. The design is in thoroughly Jacobean taste, an upper series of panels with flat cusped heads being filled with slabs having figures in buff upon an Indian-red ground representing various countries. Below and on each side of the mantel-piece are two other panels, one representing moulding clay and the other the furnace. This piece of furniture was exhibited by the firm at the Paris Exhibition. Kerbs for fireplaces, made of glazed ware or majolica, dadoes and borders, form a useful class of manufacture to which special attention seems to have been given. The majolica tiles, with raised patterns in a variety of colours, are very rich, and exhibit perfection in manufacture, though we should prefer to see the colours less bright than they are in some of the patterns. We believe the firm are supplying tiles for the Army and Navy Supply Stores.

Turning from art manufacture of an inventive kind, we may give a word of praise to the work of a firm who have contributed much by their skill to embellish many recent buildings with scagliola—an imitation marble they have carried to perfection. We allude to the work executed by Messrs Bellman and Ivey, of 95, Wigmore-street, in many late buildings. Scagliola is, as our readers are aware, not a new process, but the art so entirely depends on artistic manipulation and taste, that we may observe few have achieved success in it. It is made chiefly of plaster of Paris, mixed with fragments of alabaster and various colouring matters, and its beauty entirely depends upon the mixture and the polishing. We lately spoke favourably of Messrs. Bellman and Ivey's scagliola columns, &c., in the vestibule and decoration of the Reform Club House recently carried out from the designs of the late Professor E. M. Barry. We have now to mention a very

* See p. 605, Vol. XXXVII.

successful application of scagliola by this firm to the adornment of the Art Union premises under the same architect. We find the inner hall and vestibule on the first-floor landing are decorated with columns and pilasters of scagliola. The four large lower columns, with their antæ, are in a sort of porphyry, and the small Corinthian columns in upper vestibule of a rich red imitation. Few could distinguish it from the real marble. The same firm have also executed scagliola columns and pilasters for the Criterion Annexe under Mr. Verity, and have been engaged in the decoration of the Holborn Town Hall, under the architects Messrs. Isaacs and Florence. It is intended to adorn interior of the Grand Hotel at Charing-cross with 22 scagliola marble columns or pilasters to imitate Sicilian marble, and we understand Messrs. Bellman and Ivey are to execute this work. The columns and pilasters for the outer and livery halls of Carpenters' Hall, recently erected in London-wall from Mr. Pocock's designs, have been supplied by this firm, and represent porphyry and verd-antique. For pedestals, plinths, and dadoes, the use of scagliola is largely employed, and we may call attention to the number of pedestals for marble busts and statues made by the firm. For actual resistance to crushing forces and for durability this material may be said to vie with marble itself, while the advantage it possesses over marble in casing iron stanchions is an important consideration in its favour.

LUMINOUS PAINT.

ATTENTION has been recently attracted to the luminous paint which was patented in 1877 by the late Mr. W. H. Balmain, and which has been lately employed for rendering clock-dials self-luminous in the darkness. The present invention is the outcome of the life-study of Mr. Balmain, who, unfortunately, has not lived to see his discovery brought into general use. Possessed of ample means, it appears that he was in no hurry to make his process known, and as a matter of fact, after he had brought it to such perfection as justified him in patenting it, little if any effort was made to introduce the paint. Although the invention is a patent, the actual process by which the paint is prepared remains a secret, though other inventors have introduced a compound by which the clock-dials are painted, and for the license to use which they pay a royalty to the representatives of Mr. Balmain. The luminous paint is to a certain extent based on what is known as Canton's phosphorus, a sulphide of calcium, which has the property of phosphorescing in the dark; but the modern compound is made principally from that cheap substance chalk, and, if we may judge from the specimens we have seen, is a long way in advance of any of the phosphorescing powders known in the laboratory of the chemist. Messrs. Ihlee and Horne, of 31, Aldermanbury, E.C., are the agents of the late Mr. Balmain, and have devoted considerable time to devising methods of practically utilising the paint, although until a syndicate is formed (in consequence of the death of the inventor) the paint will not, we presume, be brought into the open market. That, however, will shortly be done, and, meantime, the paint is being experimented with in various ways. It is in use on more than one man-of-war for lighting up magazines and dark passages, and one of the London Dock Companies is about to introduce it into its spirit and wine-vaults. The compound is made into a paint by the addition of a varnish such as copal, and is then ready for coating the surface it is desired to render luminous, or the dry powder may be dusted upon a previously-varnished surface. The powder may be also mixed with substances employed in forming solid objects, such as cellulose, papier-mâché, artificial ivory, and other similarly-manufactured materials, which are capable of being worked into designs suitable for various purposes of decoration and ornamentation; and they can also be mixed with ether and collodion, and rolled into sheets for cutting up. Mixed with stearine, paraffin, glue, or the water-glasses, the phosphorescent powders may be used for many purposes, and can be combined with glass itself, and worked up into the various forms which that substance is capable of taking.

Painted on cardboard about 18in. by 10in., and framed, it forms the Aladdin's lamp, supplied to H.M.S. *Northampton*, by Messrs. Ihlee and Horne. Painted on glass through stencil-plates, it is used for illuminated numbers to house-doors, for notices of apartments to let, and it can of course be employed for the name-plates of streets, for use in coal-mines, and for warning-boards in all dark passages where it is not desirable to introduce a gas-jet. Match-boxes are coated with it, and their position rendered visible in the darkest room; while photographs can be supplied with a luminous background. For railway-carriages which, having to pass through a tunnel or two, are necessarily furnished with lamps during the whole journey, the luminous paint will yield all the light that is needed. Experiments are being made to ascertain the effects produced by different grounds and vehicles upon the powder, and these necessarily occupy considerable time; but sufficient has already been done to disclose the fact that the luminous paint has a wide field of usefulness open to it. Sheets of cardboard placed in a window and exposed to the daylight will absorb sufficient to give a pleasantly luminous effect for five or six or more hours, while half a minute's exposure to such a light as that of burning magnesium will charge them to saturation. When produced on a manufacturing scale the paint will be comparatively cheap, and will no doubt have an extensive sale, for although many uses have been already found for it, they are only a percentage of the possible number.

THE SUNDAY SOCIETY EXHIBITION.

THE efforts of this Society to promote the taste of the working classes for works of high art deserve encouragement, and we have, on previous occasions, spoken favourably of the exhibitions that have been thrown open with the end in view the Society have at heart. Some years ago, a Select Committee of the House of Commons, composed of members of both parties, took steps to urge the opening of the National Gallery and British Museum on Sundays, and quite recently, a proposal in the House of Lords to open our national museums was lost by a small majority. The question still remains in abeyance, more from a desire, perhaps, not to disturb a custom that has almost grown into a settled habit, than from any real conviction of danger likely to accrue from granting this privilege to the less-favoured members of the community. Museums and picture-galleries afford instruction and moral and religious teaching of the highest kind, and the Society appear to be using every effort to secure for the working population these means of rational recreation, so as to loosen the bonds of other obvious and more pernicious influences open to that class. We are glad to be able to inform our readers that the Committee, by an arrangement with the proprietors, have secured the opening, for a few Sundays, of a gallery of valuable pictures in Piccadilly, next door to St. James's Hall, known as the Piccadilly Gallery of Paintings. The pictures are displayed on the ground-floor, which is an advantage, and include many works of the Old Masters, chiefly of the Italian and Dutch schools. We have glanced round the galleries, and find several pictures reputed to have been painted by Raphael, Titian, the Caracci, Paul Veronese, Rembrandt, Vandyke, Rubens, Pordenone, and other leading masters. For example, we find in the back gallery a fine picture of the Virgin, Child, and St. John, by one of Raphael's pupils (No. 104); another of the "Infant Christ in Joseph's Workshop wounded by a carpenter's tool" (135), said to be by Murillo, rich in grouping and colour; and a painting of large size, by A. Caracci, showing Bathsheba and her Maid (112), the composition and colour of which are equal to some of the best works of the Bolognese school. "Innocence," attributed to Andrea Vaccaro, is a finely-conceived and drawn figure of a female, nude, though delicate in treatment and colour. No. 211, a picture representing Venus, is remarkable for its bold-carved frame of Italian design. A small, but richly framed-picture, the most important in this gallery, is "The Virgin and Child, with St. Agostino and St. Antonio de Padova," by Raphael. It is painted with softness and delicacy, and is said to be probably this artist's first attempt at portraying his favourite subject, it having been executed between his seventeenth and twentieth years, for Cardinal Piccolomini, for whom he made designs for the fresco decorations of the palace. We find it stated that "this example has remained in the same family up to the commencement of the present century, when it was sold at Sienna in the year 1828, by Signor Petrucci Bargagli, who inherited it from his celebrated ancestor, for whom it was painted." It is said to be painted in 1503. The frame to this picture is interesting as an example of wood-carving, designed upon an architectural model in the style of the sixteenth century. A large fine gallery work, ascribed to Titian, is another picture of merit. It represents "Danaë and the Shower of Gold," and belonged to the Malmesbury Collection. The only comment we need make about it is that the treatment of Danaë, as she reclines in perfect nudity on a couch, may offend a few of the strait-laced among sightseers. On this account curtains have been provided, so that the picture can be revealed only to those who are disposed to look at it. As a work of art, it certainly takes a high place. Whether by Titian or one of his school, it is a fine study; the face of Danaë, and the drawing of her eyes, the shading and richness of colour, are characteristic of the Venetian school of painters, of which Titian was the acknowledged head. The picture is surrounded by another carved frame, in a bold Renaissance style, and, we hear, the canvas was torn in many pieces, and has been restored. A few works by Giorgione, P. Veronese, and Rubens are seen. We note No. 599, "The Queen of Heaven," by Giro. da Santa Croce, a composition of much beauty and richness of colour in the red and blue drapery, and the perfect shading of the face; a striking portrait by Vandyke (414) of Paul du Pont, a handsome face; a Dutch Shepherdess, by Jordaens, bright in colour; and several pictures, more or less authentic, ascribed to Giotto, the Early Italian and German schools. We notice a few other works by Flemish masters, an animated scene by Teniers, and a few pictures by Gainsborough, Opie, Hogarth, Stothard, &c. Generally, we are afraid the class of works exhibited are not those best fitted to instruct or interest the working man; the subjects are, with very few exceptions, taken from heathen mythology, and the obscure pages of ancient or ecclesiastical history, and there are too few paintings founded on the incidents of modern history or on the popular and social themes of every-day life to awaken much interest. It must not be forgotten that the majority of

those who will frequent these exhibitions are people who are more touched by homely and common incidents, plots, and passions, than the abstractions of the greater artists; and that they prefer pictures that appeal to nature and human feelings, and that closely render nature, to the classical, enigmatic, and idealistic works of the masters of the Italian school. Pictures illustrating English history, and especially incidents of the day, like those of Leslie, are more suitable for popular purposes. We must, however, congratulate the Society on having obtained such a privilege as that we have mentioned, a boon that was acknowledged by the attendance of more than fifty persons last Sunday, the opening day, and we recommend the collection to all as worthy a visit on either of the next two Sundays. Tickets can be obtained on application to the honorary secretary, 19, Charing-cross. At a resolution passed after the close of the exhibition by the committee, under the presidency of Professor Corfield, the valuable services rendered to the movement by the late Mr. John Locke, M.P., were acknowledged. We may add the committee of the Sunday Society invite those who believe that the opening of museums and art galleries would increase the value of Sunday to the community, to form local committees, and they also ask trade and other societies to appoint delegates to represent them in the National Council of the Society.

ARCHITECTURE: ITS AIMS AND OBJECTS.*

By David Thomson, F.R.I.B.A., I.A.

If by a knowledge of Architecture, we simply mean a knowledge of the forms and features which have in various past times been characteristic of their buildings, and are commonly referred to as the styles and orders, then I should say, that, the acquisition of such knowledge, though useful to the Architect and Historian, will be comparatively profitless to the non-professional man. He may visit and examine with more interest, some work of a bye-gone time, and be pleased when able to fix approximately the date of its erection; but it will be far otherwise with him, if in addition to his ability to recognise the peculiar features, which are characteristic of the style and period, he has the further knowledge and ability to discern the measure of artistic excellence attained, the embodiment of the essential principles of all art, the mental characteristics of the designers, the stage of civilisation reached by the community of the time, and those prominent feelings and aspirations which distinguish and characterise the various races and generations of the past.

Unfortunately, it is true, that much of our modern architecture, and even many of our public buildings display but little of the minds of their Architects, or of our national characteristics; and the cause of this has been the subject of much debate. It appears to me, that, one of the principal causes of this state of things, is the ill use to which our increased knowledge of architectural history has been put. Since the revival of letters, great reverence has been paid to the remains of ancient art, and the forms and proportions observed in them have been too slavishly imitated, whilst the principles of art embodied in them, have been too often overlooked or misunderstood.

If you compare the works written upon architecture before Ruskin, with those he has given us, you will observe, that prior to him the whole aim of the authors seemed to be to set forth the proportions, measurements and detail of the structures, with a view to supply materials, from which more accurate reproductions might be made, whereas in Ruskin's works, the *grace and beauty* embodied in the works, the loving thoughts and aspirations of the designers, their harmony with all the better instincts of our nature and with the exterior world around them, are the themes of his discourse.

I remember hearing the late Sir Archibald Allison discoursing to a meeting of this Society, or the Architectural Institute of Scotland, I forget which, but the subject of his address, was, "the suitability of several styles for the various kinds of public and private buildings." For Ecclesiastical Structures, he recommended Gothic, for Halls and Courts of Justice, Classic, and for Mercantile buildings, Rennaisance. Whether some such mode of allocating the various styles would be fruitful of good may be doubted, and much may be urged with at least a show of reason, for and against such a course, but the subject I submit, is one well worthy of thorough consideration and debate.

Then, again, it might with advantage be discussed, the propriety of reproducing works of art, closely resembling those of any past time, and how far the lessons to be gained, by the study of any past phase of art, may properly influence and govern the works of to-day.

Whilst the history of architecture will naturally take a prominent place in our considerations, a very large share of our time should be given to the study of the history of art generally, and especially of those of the Fine Arts allied to and incorporated with architecture.

I know of no better way to study and imbibe a true feeling for, and appreciation of the artistic qualities, of any past style of architecture, than by careful delineation of its ornament and decorations; and I would suggest, as the subject of a series of papers, the harmony which subsists between the architectural forms and expression of the styles and their ornamentation.

In "the Fine Arts applied to Architecture," we have a wide field for much fruitful observation, reflection and discussion, they present to us subjects of great and pleasing interest, and I trust that as in the past, so in the future, we shall be favoured with thoughtful papers on these subjects by many of our members who are so well qualified to instruct us in these matters, both practically and theoretically.

On all such subjects it is very desirable that we should have clearly set before us, the true principles and limits of each art, and examples given showing us how in the best works of the past, each, working within the limits prescribed by the nature of its materials, ample scope was given for the exercise of the best talent of the time.

Many useful papers might be given us on the painted and sculptured decorations of the Ancients and Mediævalists, exhibiting the close harmony which subsisted between them and the Architectonic forms by which they were encompassed, and showing also to what extent natural forms had influenced their design, and how far the prevailing characteristics of the time and people were reflected in them.

It seems to me, that we are still in need of enlightenment, on the true principles and their application to the arts of painting and sculpture and to those of glass painting, enamelling in glass and metals, decorations in mosaic, tiles and tapestry. We often see designs, in all of these arts, which overstep their natural limits; take for instance, the great work of Ghiberti, the bronze doors to the Baptistry of Florence, which Michael Angelo is said to have declared to be fit for the gates to Paradise.

To me, the treatment of the subjects, has always been a bar to my enjoyment of their other wondrous excellences; I felt that, notwithstanding their surpassing beauties of delineation, their spirited execution and sparkling effects, the mode of their sculpture overstepped the just limits of the plastic art, they appeared to me pictures in sculpture. Ghiberti was a silversmith (though afterwards he became an accomplished Architect), and in much of the silversmith work of the present day we see the same attempt to realise effects, that more properly belong to pictorial design. Increased interest would, I think, be given to papers on these subjects, were we always to have due consideration given in them, to the modes of treatment which are most in harmony with each of these arts, and most fully comply with their natural limits and restrictions.

Again, many of the art products of the present day might be more truthfully classed as works of imitative art, rather than as works of design or fine art; take for example many of the more expensive tiles, sent out for walls, mantel-pieces and fire-grates, wherein we have depicted, with much elegance of form and richness of colouring, birds, beasts and flowers, "all as like as life, and quite as natural." You all know how difficult it is to get the popular untrained mind to see, that no matter how beautiful the objects in nature may be, or the great ability by which their loveliness is displayed, they never can become works of fine art, till they have been transformed and arranged by the artist, so as to express some sentiment he feels, and that they are quite unsuited for architectural decorations till he has furthur assimulated them with the character and qualities of the architectonic forms, in which they are to be incorporated. It was once suggested to me by a gentleman, who was a great buyer of pictures and had good taste in their selection, that a fine waterfall in his grounds would form an excellent subject for a painted window; and this I mention, to show how necessary it is, that, the limit of each art should be clearly understood and observed, and how desirable it will be to give prominence to their consideration in all our discussions on these decorative arts.

No less interesting than any or all of these subjects, dealing with architecture as a fine art, will be the series of subjects which come under the head of science; for architecture to be pure, must be permeated with the true principles of natural science, clothed in graceful forms, and having the impress of a generous cultivated mind.

We live in an age in which science has greatly extended our knowledge of the laws of nature, and in which the chemical and mechanical arts have opened up for us ways to success in overcoming difficulties insuperable to the ancients, and it will always be fitting and profitable for us to have papers and discussions upon the science of construction, and upon the modes of construction adopted in other times and countries with their relative merits and defects.

I need not enlarge on this head, but simply express the desire that, as in the past, we shall have, in the future, many valuable papers on the true principles and practice of masonry, and building in brick, concrete, and other materials; on carpentry, joinery, plumbing, plastering, and slater work; with descriptions of all the materials and processes employed, and how the best qualities may be recognised and tested; and, if there be one in our midst, knowing in all the arts, by which the worse may be disguised, so as to appear the better article, he will confer on us a benefit, by enlightening our darkness in these matters; and I would suggest as a subject of deep intrrest the prevailing mal-practices of the present day, and how they are to be prevented.

Another series of subjects of a scientific nature will claim much of our attention under the heads of heating, lighting, ventilation, and accoustics, and, in each of them, will be found ample scope for investigations into natural laws, and the application of their principles. When dealing practically with these subjects, we experience great difficulty in apportioning the just relative quantities, and the every varying changes in the atmosphere, and the infinite variety of the circumstances affecting the action of the natural laws, render their successful application, among the most perplexing difficulties with which an architect has to contend; and every contribution to our knowledge on these matters will, I am sure, meet with our best consideration and hearty thanks.

The great improvements lately made in applying electricity to lighting, and gas to heating, will, in the near future, be fruitful of great results, and we will do well to give much of our attention to these subjects, encouraging in every way we can every effort to develop and improve their useful arts.

Another subject of increasing interest in our day is sewage, and quite a series of instructive and useful papers should be devoted to the setting forth of all the various systems by which the sanitary condition of our cities, towns, and dwellings, urban and suburban, may be rendered sweet and salubrious.

Turning now from matters affecting buildings, as architectural, structural, healthful, and desirable, I would call your attention to yet another group of subjects, well worthy of our earnest consideration; these are contracts, specifications, and the various modes of estimating and measuring up the work.

These subjects have already been well set before you, and the great interest evoked by their discussion, and the diversity of opinion which was found to exist, show the need there is for more extended inquiry and debate.

* Part of an inaugural address delivered Jan. 28, by the President of the Architectural Section of the Glasgow Philosophical Society.

Of late years the practice of drawing up detailed specifications has fallen greatly in abeyance, and with it the practice of estimating in a slump-sum for the completion of the work; and as one result of this I hear it often stated, that, good skilled men have to compete at a disadvantage with others, who know but little of their business, and are quite incapable of reckoning up the value of their work, by computation of the materials and workmanship required. These are dependent on the measurer, or his clerk, for their knowledge of the prices current, and, thus directed, they blindly stumble on, lowering the price and character of the work. The experienced, prudent, and skilled contractor is the architects' best friend, and every assistance should be given by us to lessen or remove all just cause for complaint in the modes of estimating and measuring up the work.

It will be proper for us also to consider how far the present mode of estimating has had to do in producing that miserable exhibition of incompetence and reckless folly which was disclosed in our bankruptcy Courts during the late commercial crisis. To all connected with building, the state of things disclosed must have brought a feeling of shame, and ought to rouse us to the consideration of the causes which led to so much discreditable speculation, and the means best calculated to prevent a renewal, or mitigate the evils, to which unscrupulous speculations leads.

Then, again, I would direct attention to the faulty and misleading ideas which prevail on the subject of valuations, believing as I do, that they were at the root and exerted a most pernicious influence in the inflation of the property-market, and I would strongly impress it upon someone conversant with the true principles of valuations, to bring up this matter at an early date, whilst the general public and the investors in property, are yet willing to listen to reasonable and moderate views.

It might also be fitting that, while a season of tranquility in speculation prevails, we should consider how far the influence of speculative building has been hurtful to trade generally, and to what extent it has helped to lower the character of the tradesmen and their work, for it seems to me that workmanship has deteriorated, more through the influence of this class of building, than through the action of trades unions.

I have never been able to see just grounds for condemnation of these unions, in the abstract, though I have often grieved to see the foolish suicidal courses they have pursued through the evil advice of unworthy leaders, and the giving way to low desires by the unthinking mass.

These institutions are now too firmly rooted to be abolished by any external influence, and I think that, instead of denouncing them, we should endeavour to devise means by which their energy might be developed in a wholesome direction. I have not thought sufficiently on the matter to be able to point out and judge of the uses and abuses of the system, but it seems to me, that were the workmen to devote less of their thought to the question of wages, and more to the qualiiy of their work, great good would be the result to the community and to themselves. Were they to combine to put an end to bad workmanship, and the many mal-practices which now prevail, the value of their labour would increase, and more interest and satisfaction would be felt by them in their work. They are now strong enough, if so disposed, to take in hand with their own regeneration; and one means by which this might be done appears to me by insisting upon all apprentices serving a proper length of time as such, and passing an examination as to their qualifications, before being allowed to work as journeymen. This duty would naturally devolve upon the unions, and if properly performed, would have a most beneficial effect on themselves, and would elevate them greatly in public estimation.

Whilst advocating the adoption of means for the improvement of our artizans, we should see that the education and training of youths entering our own profession be properly cared for. These youths enjoy many advantages which were denied to the last generation of architects, but no one acquainted with the subject will deny that yet much remains to be done, to supply the means for their systematic teaching in science and art, and the application of scientific knowledge to the practical details of the building art. Without a competent knowledge of the technichal arts, an architect will be but poorly equipped for the practice of his profession.

A proposal for establishing technical schools has been started by many of the best friends of education in Glasgow, and already some progress has been made, and it would be of much service in furthering the movement, were we to consider how best a department might be formed and organised for the teaching of those technical arts, necessary to the proper training of the architect and builder

At a recent meeting of the parent society a very carefully-prepared paper was read by the secretary, giving an ample and clear description of the system pursued in Germany for the teaching of the technical arts, and we trust that one result of Mr. Dixon's paper will be to give an impetus to the movement for establishing similar schools in this city.

I am specially desirous of pressing this subject on your attention, believing, as I do, that we can adopt no better means for raising our profession in public estimation than by providing the means, whereby succeeding generations of architects will be liberally educated and thoroughly trained in science and the technical arts.

I have expressed my belief in the ability of trades unions to deal with the present deficient training of apprentices, and in like manner, I would say that the architects of Glasgow, if they earnestly desire the advancement of their profession, have it very much in their own hands, to see that the young men entering the profession are educated up to the highest elementary standard, and that whilst serving a proper apprenticeship they continue their studies of the more advanced subjects, acquiring proficiency in the drawing of ornament and figure, in the knowledge of geometry, natural science, and the technical arts more immediately connected with building.

ARCHITECTURAL COMPETITIONS.*

(*Concluded from p.* 144.)

DURING the last twenty-three years the number of competitions annually advertised had not materially increased or diminished, those advertised numbering about forty or fifty per annum. Most of these had taken place in the provinces, except the large Government competitions. The latter, as a rule, had been eminently unsatisfactory. He would instance, in the first place, that for the Great Government Offices in 1857—an example of such a conspicuous failure that even the Government had only once ventured on an open competition since, for in the cases of the Law Courts and National Gallery a selected number of distinguished architects were chosen to compete, each being paid a substantial honorarium. The number of designs sent in was 218, comprising 2 to 30 drawings in each set. A public exhibition of the drawings took place at Westminster Hall in May, 1857, and created great interest not only in the profession but with the public. The "Instructions to Architects" were prepared with the greatest care as to detail, and the judges appointed to select the best designs were all men of the highest integrity and of distinguished position, and they were assisted in their labours by two eminently practical professional advisers whose duty it was to examine the drawings and report how far the "Instructions" had been sufficiently complied with. Notwithstanding this, some of the very worst evils of competition were conspicuously brought out; for although the "motto" system was adopted, the authorship of a large number of designs were so well known that the anonymous was altogether abandoned, and men of distinction felt that their interests would have suffered had they not acknowledged without reserve the designs of which they were represented to be the authors. It would have been but fair to the less distinguished competitors to have at once placed the real names on all the designs, so as to have given them the benefit that might have accrued to them for taking honourable positions side by side with the highest men in the profession. The speaker disbelieved in the "motto" system, as being utterly delusive and demoralising, fraught with every disadvantage both to the competitors and to the promoters of competitions. The competition was especially characteristic in the development of designs having Italian Gothic features, and some of the Pure Classic designs were of very high and conspicuous merit. No guarantee was given that the successful competitors should be employed to carry out their designs. Indeed, "being an open competition and under the motto system," the Government were too well aware of the risk in making any promise that such a course would be necessarily followed; and in a report of a Parliamentary Committee in July, 1858 (more than a year after the competition), in considering the whole question of the Foreign Office construction, the report stated that:—

"Your Committee have come to the conclusion that in the erection of a new Foreign Office a preference should be given to the successful competitors; but, at the same time, your Committee feel bound to express their opinion that there is nothing in the terms of the competition which necessarily binds the Government to select the architect of the Foreign Office or of the other public buildings from the successful competitors, and that it would be contrary to the interests of the public, where the principle of unlimited competition has been adopted, that the choice of the Government should be thus restricted. Public competitions must necessarily be either limited or unlimited In the case of limited competition a selection is made from men of known ability and competence who are invited to send in designs, and then security is given to the public that whatever difference there may be in their comparative merit, they will all be the designs of men of acknowledged talent, and the execution of the work may then safely be entrusted to one of the competitors. No such security can, however, be given where the principle of unlimited competition is adopted, for until the designs are actually sent in it is impossible to form any idea as to the amount of talent which the competition is likely to call forth, and it would be therefore most impolitic to enter into any previous agreement or understanding which would confine the execution of the work to the competitors in an unlimited competition."

These certainly appeared, on the whole, very sound principles; and, if so, they proved beyond a doubt that open and unlimited competitions under the motto system, as generally practised, were unsound and fundamentally wrong. The Government offices were really three distinct competitions—viz., the block plan, the War Office, and the Foreign Office. It was argued at the time how unwise it was to attempt to settle the detailed buildings until a general plan of the whole was first determined upon, and the wisdom of this opinion was proved by the result that a French architect obtained the first premium for the block plan; an English firm of architects the first premium for the Foreign Office; an English architect the first premium for the War Office. The premiated design for the Foreign Office in the position arranged for by the Government was unable of being worked in with the block plan, and the premiated design for the War Office was equally unadapted to be worked in either with the block plan or with the Foreign Office—a complication resulting in the whole of the designs being abandoned, and the work of rebuilding a part of the Government offices being eventually given in the ordinary way of commission to Sir G. G. Scott, who, although a third premiated competitor in the competition, was ultimately engaged to carry out, not the design for which he obtained a premium, but an altogether new design prepared by him in a style for which, it was generally believed, he had no great liking. The result was the new offices at Whitehall, upon which it would be unbecoming for him to offer any criticism beyond sincerely lamenting (that once it being settled as to the architect) that Scott was not permitted to carry out his own beautiful competition design in the Italian Gothic style, which would have given much more light and cheerfulness, and was far better adapted in the scale and size of its rooms for official purposes than the present building. This Government Office competition was not only disappointing from the fact that not one of the premiated designs was ever carried out, but that the block plan was also set aside, and the opportunity of making Whitehall and Westminster the site of a magnificent group of Government offices, that might have been built by degrees, was perhaps for ever lost. The award of the premiums, varying from £800 to £100, to the seventeen selected designs really ended this greatest of all national competitions, the Houses of Parliament only excepted. Following soon after the Government offices, an important provincial competition took place in April, 1859, for the Assize Courts at Manchester, in which the leading provincial and several London architects took part. The cost of the buildings was set down at £70,000, including fittings. The number of designs submitted was

* A paper read by THOMAS PORTER, F.R.I.BA., before the Royal Institute of British Architects, on the 25th January. (For the subsequent discussion, see report on p. 126.)

109, some of them comprising as many as 30 drawings; indeed, one competitor sent in six designs or modifications, and several of the competitors sent in two designs. The designs covered an area of 8,400 square feet, the competition was an open one, and under the "motto system," but, as in the case of the Government offices, the authorship of many of the designs was at once recognised, and the style of the drawings of the Manchester architects was so well known as to leave no doubt as to their designs; and, moreover, it was publicly asserted that the handwriting in the reports was familiar to most of the judges. The result, however, of this competition was really satisfactory, and the magnificent building did the greatest credit to the architect, tended considerably to increase his reputation, and had given general satisfaction to those competent to judge of its good planning. It was almost needless to add that the successful architect was Mr. Waterhouse, who carried out the works, and who was now as well known in London as in Manchester. The second premium of £150 was awarded to Mr. T. Allom, of London, known to all for his wonderful artistic power in depicting in colour an architectural subject. The third premium of £100 was awarded to Mr. John Robinson. The cost of the drawings in this competition must have been considerable, and involved an immense amount of labour; and, indeed, it was estimated at the time that the drawings of the 109 competitors cost £10,000, and, from experience of that competition, the author thought this was not an exaggerated estimate. In carrying out the work, the successful architect would have had to prepare a complete set of working drawings (in addition to his competition designs), and the cost of office expenses and assistance in working drawings, taken at, say, one-third, left him two-thirds as nett profit on 5 per cent. on the £70,000, the cost of the buildings, or equal to, say, £2,350. The profession, as a body, then having spent £10,000 on the preparatory drawings for this building, not only lost all their labour, but £7,650 in absolute money paid out of pocket, say nothing of the time and thought of the principals who were engaged upon this important work. In 1863, the next really important competition took place, that for the Liverpool Exchange. The premiums offered were considerable, being £1,000 for the best design, £250 for the second, and an equal sum of £350 for the third. The problem to be solved was that of realising a fair rate of interest for the capital invested, and as the land cost £80 per square yard, it was necessary, in designing these buildings, to utilise every inch of space. Forty-four designs were submitted, only three being of Gothic character; and about fifteen elaborate drawings were required to properly depict each competitor's views. The successful competitor was Mr. T. H. Wyatt, who carried out the work. The second premium was awarded to Messrs. Conningham and Audley, of Liverpool. The third premium was awarded to Mr. Parnell, of Newcastle-on-Tyne. Another great Government competition took place in 1864, with the customary ambitious programme of covering an enormous area of ground with magnificent buildings; indeed, so large was the area embraced, that it included the whole of the site of the Exhibition of 1862, on which a new museum was proposed to be built. Thirty-three designs were submitted, and they were mounted on 248 straining frames; some containing as many as a dozen drawings on one frame. This competition was also under the "motto system," but again many of the designs were at once recognised. The labour was enormous, and the results most disheartening and disappointing; for although something had been done, and the Natural History Museum, now being carried out from the designs of Mr. Waterhouse, was the outcome of the competition, the extent and area of even that important building were small compared with the extent of the buildings which the Government desired to be embraced in the competition. The first premium of £400 was awarded to Captain Fowke, the second of £250 was awarded to Professor Kerr, the third of £100 was awarded to Mr. Brodrick, of Leeds. Exactly ten years after the Government offices a town-hall for Manchester was the subject of an open competition. The designs sent in were 136 in number, and out of these ten were selected (Mr. Godwin being the referee) for further elaboration; and the authors of the designs, eight in number, were invited to a second competition. In February, 1868, the matured designs of the eight gentlemen were sent in, and each set comprised more than twenty elaborate drawings. Professor Donaldson and Mr. Street were appointed the professional referees to advise the Corporation in the selection of the best design. It was to be regretted that their award caused some complication (as more recently in the case of the London Law Courts) from dividing the artistic merit of plan and elevation; but as they were of opinion that the design to which they awarded the fourth *place* was one excelling all others in regard to plan, and was worthy of premium in respect of elevation, it was a pity that it was not at once awarded on its whole merits the first premium, and thus have saved very natural disappointment to the three other competitors who stood higher under the head of "excellence of elevation." There could be no doubt, however, that the distinguished referees were quite warranted in recommending for execution the design highest in merit as regards *plan*—especially as it must have been well known how capable the author of that plan (Mr. Waterhouse) was to modify his elevations and to make them perfectly suit the requirements of his clients. At a glance the simplicity of the plan impressed one with the complete arrangement, reminding one of the masterly treatment in a similar way of the Houses of Parliament. The cost of the designs in this competition must have been very large, as the drawings were numerous and of the most elaborate character, the building having four façades—all highly important—to be artistically treated. Probably not less than £15,000 was spent on the drawings, but at least the profession had the satisfaction of knowing that it is one of the very few competitions that have been successful so far as the executed building is concerned. Mr. Porter here remarked incidentally that he had endeavoured to ascertain the opinion of the promotors of competitions on the system after their experience of having obtained designs and employed the successful competitor to carry them out, and had addressed over 100 persons on this subject with a view to finding out if they had to do the work over again and obtain designs for similar buildings, which of three courses would they follow, whether (*a*) To select an architect at once in whom they had confidence; (*b*) To select a limited number of architects to compete, giving each a sufficient honorarium to cover out-of-pocket expenses; or (*c*) to again advertise for designs in open competition; but he had not been able to get very definite replies, some expressing themselves as incompetent, and others as unwilling to commit themselves officially as to the course they would adopt had similar buildings again to be erected. If the system of competition were not so freely opened, and any number of designs to be had for the mere asking, country authorities would most probably be led to place the work direct in the hands of local architects, or restrict a competition to a few of them. It was especially the small competitions that were bringing discredit and loss to our profession, and country architects had reasonable ground for considering that they interfered materially with their legitimate field of practice, and that architects away from the neighbourhood, although perhaps possessed with more power of making pictorial and highly-finished drawings could not be so well fitted to know the practical requirements of the locality. As an example of the costliness of competitions to the profession, he would take a recent one, that of Droitwich Free Hospital. The cost was to be only £800, and the premium offered was one of £5; twenty-three architects responded to this appeal, involving, say, at eight drawings to each set, 184 drawings, and putting them down at only £2 per drawing, would be £368, or nearly half the absolute cost of the building wasted on preliminary drawings. The Maidenhead Cottage Hospital was another instance of the wastefulness of competition, resulting after all, too, in the employment of a local man (who, Mr. Porter rather thought, was not even an architect). Here the proposed cost was also £800, and two premiums were offered, one of £10 and one of £5. No less than eighty architects responded to this appeal, so that taking the designs at only two drawings to a set, and the cost of them, at £2 each, would amount to £320, or again nearly half the absolute cost of the building, and eight times the commission paid on the work. Basingstoke Hospital, costing £1,200, was competed for by 32 architects; number of drawings, say, 256, costing £512; commission on building, £60; loss to the profession, at least £450. Llandudno Board Schools, costing £4,000 (and for which the premium of only £10 was offered), called forth 19 designs. Leek, Staffordshire, Hospital, costing £1,700; 17 designs, which at eight drawings each equals 136, or costing £272; commission on building, £85; loss to the profession, nearly £200. Ashford Board Schools, proposed cost, £2,700, calling forth no less than 29 competitors; cost of drawings, say, £464; commission on building if executed, £135; dead loss, at least £329. Jarrow Corporation Hospital: cost, £4,500; 24 designs submitted; number of drawings, say 192; value, £384; commisson on building, £225; less office expenses, say one-third, £75; net loss to the profession, £234. A lychgate at Carmarthen: cost, £250; absolutely called forth 36 designs in competition for a premium of £20. A drinking-fountain, to be erected opposite a suburban railway-station, and for which the liberal premiums of one guinea and half a guinea were offered, called forth 40 designs. A drinking-fountain at Bath was competed for by 29 architects, Mr. Goodridge, of that city, being successful. Sutton Public Hall, costing only £2,000, drew forth 30 designs. Here again the drawings must have involved much labour, and have been numerous—taking 8 for each set, would be 240 drawings—costing £480. Commission on building, £100; dead loss to the profession, £380. Bolton Infirmary, with premiums of £50, £30, and £20, resulted in 36 sets being sent in, Mr. Freeman, of Bolton, taking the first premium. Putney Baptist Chapel, to cost £3,500, engaged the attention of 53 competitors, involving at least 254 drawings, and perhaps one or two perspectives—cost not less than £528 as against £175, the commission on the building. The instances quoted were all from competitions between the beginning of 1877 and the middle of last year. Now he would consider the more important and costly competitions during the same period. Scarborough Spa Buildings competition was one of enormous labour, as it involved the laying-out of the estate as well as the buildings. £480 was the aggregate sum offered in premiums, and £40,000 was the contemplated outlay. Thirty designs were sent in; it was difficult to assess the cost of such designs. The commission on the work would reach £2,000; but even on this important work the profession were but small gainers, if, indeed, it was not an absolute loss. Wakefield Town Hall was a costly competition, in which 35 architects took part, and which would require at least 10 drawings to each set, or in all, say, 350 drawings. No one of these, even by a rapid draughtsman, could have been made in less than three days, even after the studies of the design were completed, so that no set of drawings were of less value than £50; to this total of, say, £1,850, time and travelling expenses in visiting Wakefield would have to be added, so that nearly £2,000 might, at a moderate calculation, be considered the cost of this important competition. Mr. Collcutt was the successful competitor, and was now carrying out the works. The contract price is £43,700, yielding a gross commission of £2,175, and deducting office expenses at, say, one-third, gives £1,450 nett. Manchester Baths and Washhouses—£19,600—drew forth 31 designs.

Reading Town Hall was a most unsatisfactory competition, which ended in all the premiated designs being set aside, and the referee was afterwards employed to make a design—the one now being carried out. As part of the group of buildings had been designed and beautifully carried out by Mr. Waterhouse, it would have been the right and proper course to have called in his professional aid to carry out the extension. Brompton Oratory was competed for by 30 architects, and the designs in this case were very costly and elaborate. Mr. Gribble was carrying out the work.

Aston Free Library was the next competition of importance—£18,000 being the proposed expenditure; 19 architects competed. Yarmouth Town Hall, £26,000. Forty architects competed. The drawings could hardly cost less than £30 a set, or £1,200; and the commission on the building would not exceed £1,300, and not more than about £900 nett after all expenses.

Over-Darwen Town Hall and Market Buildings, £50,000. Twenty-four architects competed, Mr. Charles Bell, of London, taking the first premium. Gloucester Lunatic Asylum, £94,000. Twenty-eight architects competed. The drawings

in this case were full of labour and of great size, as the buildings involved an enormous frontage. One competitor had given the author full particulars of the cost of his designs, and allowed him to see the drawings. The ground-plan measured, out to out of walls, 6ft. 5in., to a 1-16th scale equal to 1,232ft. frontage. The set of drawings embraced 3 plans, 3 elevations, no less than 6 sections, and a large perspective, in all 13 drawings. The absolute cost out of pocket, without the least regard for the competitor's own time (who personally worked hard at the drawings), was £150. If all spent the same (and some must have spent even more) the cost of this competition would be £3,920. The result of the competition had been that only £12,000 was at present to be expended, which meant a mere commission of £600; thus the profession, as a body, had already lost £3,300 on this one competition. He could quote several more examples of all sorts of competitions; and, if any one cared to take the trouble to investigate the results of all the competitions during the last two years and a half, it would be found that the following summary was substantially correct. The number of competitions advertised in one professional journal during the two and a half years, from January 1877, to Midsummer, 1879, amounted to 119, or equal to, say, 48 annually; but as some would be only advertised in other professional papers, at least one competition weekly was advertised, making 52 in the year.

The average number of competitors careful investigation showed to be 28. The average number of drawings was not easy to arrive at, but the minimum ought not to be taken at less than eight, say, at least, two plans of the floors, one block plan, two elevations, two sections, one perspective view. Most important competitions would have 12 or 14, and some more; but assuming only eight as the average, would give 224 for every competition, or 11,648 in the year. If it were conceded that the average cost of a competition, including all expenses, could be less than £2 at the very lowest computation, this gave the outlay annually on competition drawings as £23,296. Taking the same calculation as applying to the 23 years since the Government Office competition, gave £535,808, or more than half a million sterling expended on preliminary drawings, for works executed through the medium of competition. This estimate was, however, really very much below the absolute fact; the cost of competition drawings considerably exceeded an average of £2 each, and, moreover, the above calculation takes no account of any limited competitions, or any mere local competitions in the country. In round numbers, every competition was an absolute loss to the profession of £500, without reckoning anything for principal's time, and the profession loses £25,000 per annum by the system. He believed, also, that to be constantly, or even principally, engaged on competition drawings, was the worst possible training for a young man, because difficulties of construction were not entered into by the majority of competitors, and should problems of arrangement occur they were slurred over and avoided, under the plea that it would be ample time to consider such points when the competition was obtained, and the working drawings had to be prepared. He would say nothing on the point of loss of dignity to the profession, or of all the concomitant evils of the system, as they were too well known to need comment. The competition system had not at present gone beyond what might be called buildings of a public character, or for public use; but, considering the large number of men employed constantly on this work, it was necessary to face the possible danger of its being some day extended to works of a private character, resulting in a scramble for every commission, in which case the profession would be certainly ruined both artistically and financially. He believed the members of the profession had the whole evil quite within their own grasp, and that the public generally were supremely indifferent as to competitions. If the general public could obtain any number of designs by merely advertising for them, they were pleased to see the *pictorial* results of their appeal; but if the profession determined as a body not to compete except on honourable and reasonably remunerative terms, the public would soon be educated to see the wisdom of such action; and business men would also see that what was fairly paid for was better worth having than the work obtained for nothing.

THE HAYMARKET THEATRE.

THIS theatre has been entirely rebuilt internally, from the designs and under the superintendence of Mr. C. J. Phipps, F.S.A., architect. The auditory is arranged in five divisions, all approached from the frontage in the Haymarket, and special attention has been paid to the various means of ingress and egress for the public. The stalls, balcony, and private boxes are entered by three doorways under the portico, opening into the vestibule, in which are the booking-offices. A wide flight of stone stairs leads from the left of this vestibule down to the stalls, and there is a corresponding staircase on the right side from the corridor of the balcony. This corridor is three steps above the vestibule, so that the balcony, which occupies the same position as the dress-circle in the old theatre, is still kept on the same relative level from the street. The first-circle, on first floor, is approached through a separate doorway under the portico by a wide flight of stone steps. The second-circle is approached from the upper doorway outside the portico by a stone staircase. The gallery is approached from the lower doorway outside the portico, also by a stone staircase. The various staircases are entirely rebuilt, of easy ascent, with level landings and without winding steps. The auditory still retains the distinguishing feature of the old theatre in having the balcony nearly level with the stage, but it has been advanced considerably nearer to the proscenium, consequently lessening the centre area, which now only admits of the requisite number of stalls being placed in it. The two doorways to the stalls are adjoining the pillars of the proscenium boxes, and are made features of the design. The first circle tier recedes so as to leave several rows of the balcony seats free and open. Behind the balcony are five private boxes and two large boxes at the sides. The second circle also recedes a little from the tier below, so that in every case the occupants of the first rows of seats have nothing between them and the main ceiling of the auditory. The scheme of the auditory is original, and unlike any other theatre in the country. The proscenium is a gilded frame complete on all sides, the lower part forming the front of the stage, and concealing the orchestra which is placed underneath. On either side of this frame are the three tiers of proscenium-boxes inclosed between columns surmounted by Corinthian capitals. The same arrangement of columns is repeated at the angles of the square furthest removed from the proscenium, forming three boxes on either side of the three tiers. From these columns a series of vaulted arches support a circular ceiling, and in the tympanum of each arch are figure-subjects, the most important, over the proscenium (painted by F. Smith), exemplifies lines from Milton's "Comus." The four lunettes in the arches on either side are filled with subjects from Shakespeare's plays.

In the five lunettes immediately over the proscenium are figures of Terpsichore, Euterpe, Thalia, Erato, Melpomene, painted by Mr. T. Ballard.

The style adopted for the interior is Renaissance. The general tone of the decorations is an ivory white, with all the mouldings and ornamentation gilded. The upholstery, seating, and carpets being crimson, and the walls of rose-colour, the pattern specially designed, the curtains to the private boxes are of ivory colour satin, trimmed with gold fringe. The painted ornamentation by C. Campbell upon the ceiling and round the lunettes is gold upon a delicate fawn-colour ground, with grey sparingly used on the ceiling. The front to the second circle has the panels filled with a series of small allegorical figure-subjects, by T. Ballard, on a gold ground, representing Dancing, Satire, Tragedy, Dressing, Painting, Going to the Play, Comedy, Coming from the Play, Poetry, Farce, Authorship, Music.

The panels of the first circle front are filled with recumbent Shakesperian figures, seven painted by J. D. Watson, viz: Touchstone, Caliban, Launce and his Dog, Orlando, Cleopatra, Imogen, Hamlet; and six by F. Smith, viz.: Timon, Malvolio, Ariel, Ophelia, Titania, Desdemona, all on gold ground. The front of the balcony is ornamented with the acanthus-leaf gilded.

Below the entrance vestibule and balcony there is a foyer from which, on either side, a wide corridor leads to the stalls. Adjoining the foyer is a refreshment saloon, painted and fitted up in the Oriental manner, and cloak-rooms. Both these apartments have been decorated by Mr. C. Campbell (Campbell and Smith). All the floors on the level with the stalls are laid, by Messrs. W. H. Burke and Co., with marble mosaic. The floor of the entrance vestibule is of marble mosaic, in an elaborate design. The centre formed by the imperial crown, surrounded by the rose, shamrock, and thistle, and the name of the theatre in a border. The vestibule has also been decorated by Messrs. Campbell and Smith, the prevailing tone being olive-green with ornaments in gold and blue, and the panels in doors and fanlights filled with stained-glass in gilded lead frames.

On the levels of the first-circle, second-circle, and gallery are refreshment-saloons and retiring-rooms.

The new stage has been fitted with the usual machinery, and this part of the building has been separated from the auditory by a solid cement concrete wall, taken from cellar to roof.

Among the contractors who have been engaged upon the works and not previously mentioned, are Messrs. D. Laing and Son, for the builder's work; Messrs. Geo. Jackson and Sons, for the columns, box-fronts, and other ornamental plaster-work; Messrs. C. Drake and Co. for the fireproof concrete; Mr. Edward Bell for the painting, decoration, and gilding; and Messrs. Jeffrey and Co. for the wall-papers. Mr. W. Browne has been clerk of the works.

On the day previous to the opening the theatre Mr. and Mrs. Bancroft presented to Mr. Phipps, the architect, a very beautiful antique silver tankard, suitably inscribed, in remembrance of the occasion, and in appreciation of the way the works were designed and brought to a satisfactory completion.

TRAVERSE TABLES.*

WE have received a large quarto volume under the above title, prepared by Mr. Richard Lloyd Gurden, "Authorised Surveyor for the Governments of New South Wales and Victoria," and published by Charles Griffin and Company. From the author's preface to the volume, which contains 270 pages, thickly crammed with figures, it seems the work is the creation of a necessity experienced by the author while engaged on the Government Survey of Victoria. He found the published computations insufficient for his purpose, and he determined on preparing a set of traverse-tables. These are calculated to single minutes, and to 100 of distance, and are given to four places of decimals, so that the sines and cosines for a distance of 12 miles can be ascertained to within half-an-inch. At the top of the pages the angles 0 to 45° are given, while at the bottom the angles 45° to 90°, and the distances from 1 to 100 in the side columns. By this arrangement the required angle is first found, and the intersection of this column with the required distance gives the quantity sought for. By the examples furnished, it is easy to see that these tables possess advantage in simplicity over logarithms: they require less labour, and will be found a valuable aid to surveyors and engineers. Thus, in finding sines and cosines of angles by the traverse tables, only one opening of the book is required, while a table of logarithms has to be opened in four places, and several calculations are necessitated. Having tested the accuracy in one or two instances, we have much satisfaction in according our belief that the work of Mr. Gurden will be a valuable acquisition to the engineer employed in extensive surveys, and we trust that the immense labour entailed in its computation will be well repaid.

The foundation-stone of the new church of St. Alban the Martryr, Birmingham, which is now being erected in Conybere-street, was laid on Saturday last. The building will be constructed principally of red bricks, with Bath stone dressings, and the style will be Early English, the plan being cruciform. The length will be about 135ft., the width of the nave 24ft., and the height of the interior 50ft., and accommodation will be provided for 1,000 persons. The architect is Mr. J. L. Pearson, A.R.A., and the contractors are Messrs. Shillitoe and Morgan, of Doncaster.

* Traverse Tables; for the use of Surveyors and Engineers. By Richard Lloyd Gurden. London: Charles Griffin and Company, Stationers' Hall-court.

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ILLUSTRATIONS.

DESIGNS FOR ST. MARY'S CHURCH, WOOLWICH.—HOUSES AT AXTOWN, NEAR PLYMOUTH.—HOUSES NEAR LEICESTER.—MONUMENT OF AYMER DE VALENCE IN WESTMINSTER ABBEY.—NEW PREMISES, 89, FARRINGDON-ST.

OUR LITHOGRAPHIC ILLUSTRATIONS.

ST. MARY'S CHURCH, WOOLWICH.

IN the Christmas number of the BUILDING NEWS last year we illustrated fully the selected design for this important church by Mr. James Brooks, the architect. To-day we publish the two designs sent in in competition for the same building by Mr. E. F. C. Clarke.

SEMI-DETACHED HOUSES, AXTOWN ESTATE, NEAR HORRABRIDGE, S. DEVON.

THESE houses are the first in course of erection on an estate recently laid out for building, situate about midway between Plymouth and Tavistock, and having extensive views over Roborough Down, Dartmoor, and the Tamar. They are intended to supply the increasing need of inexpensive summer residences for the inhabitants of those towns, and are of the plainest possible description; those we illustrate to-day being of a type the smallest proposed to be erected. Built of local stone, with a fair external face on the ground-story, they are covered with rough-cast on the story above, and the roofs slated. The architect to the estate is Mr. W. H. Powell, of Mecklenburgh-square, London, W.C., and the builders, Messrs. Dockett and Moses, of Buckland.

HOUSES, STONEYGATE-ROAD, NEAR LEICESTER.

THESE houses are being built for Alderman Chambers on an excellent site in the best suburb of Leicester. The walling is of local red brick and the roofs are tiled. The architect is Mr. Tait, of Leicester.

TOMB OF AYMER DE VALENCE, WESTMINSTER ABBEY.—ROYAL ACADEMY PRIZE-MEDAL DRAWING.

WE offer no apology for again illustrating this well-known and beautiful example of monumental art which was this year chosen by the Royal Academy authorities as the subject to be measured and drawn by competitors of the silver medal. This subject was also chosen in 1872, when Mr. H. G. W. Drinkwater carried off the prize, and his drawings will be found in the BUILDING NEWS for August 22nd, 1873. To-day we are enabled to reproduce the prize-drawing of the same subject, for which the silver medal was awarded last December to Mr. F. Miller, and we refer our readers for descriptive particulars of the Tomb to the number of the BUILDING NEWS above alluded to, where a rather lengthy note is given.

BUSINESS PREMISES, FARRINGDON-STREET AND ST. BRIDE'S-STREET.

THESE premises, of which the Farringdon-street front is shown in our illustration, have just been completed for R. D. Dickenson, Esq. The fronts are executed in picked red facing bricks and Portland stone. The works have been satisfactorily carried out by the contractors, Messrs. Colls and Sons, of Moorgate-street and Camberwell, from the drawings, and under the superintendence, of the architect, Mr. George Vigers, of 4, Frederick's-place, Old Jewry.

THE FORTH AND TAY BRIDGES.

AT the fourth general meeting of the twenty-third session of the Institution of Engineers and Shipbuilders in Scotland held in the hall of the Institution in the Corporation Buildings, Glasgow, last week, Mr. St. John V. Day, C.E., F.R.S.E., read a paper on "The proposed bridges for carrying the North British Railway across the Firth of Forth, with some remarks on the structure and cause of the fall of the Tay Bridge." On the latter subject, he rejected the theory that the fall of the bridge was due to the pressure of the train upon it when the gale had reached a point of high intensity. Nor could he give any credit to Sir T. Bouch's theory that the overbalanced train tore down the eastern girders. After having examined the bridge for himself in its present state, and having collated the facts relating to the fall of the bridge, it seemed to him the cause was in the pillars. The structure of these columns was singularly at fault. They had to carry the permanent "dead load" of the bridge and its transient "live load." In the case of the higher piers each of the sets of legs or struts forming the boundaries of the elongated hexagon was straight throughout its entire length, the outer leg or strut having a batter of 1 to 41, or two feet in the eighty-two feet columns. Then these legs or struts carried at their top a triangular box girder, and the main girder rested midway between them. It would therefore be seen that the single outer column of the three at each side of the hexagon had the same load to carry as the two inner legs carried together. One half, therefore, of the "dead" and "live" loads of that part of the bridge was carried by the two outer endward columns of the hexagonal towers, while the other half had double the number of columns—these, furthermore, being vertical to carry it. A more erroneous distribution of the load it would be difficult to produce, for the two outer raking columns had twice the work of carrying the girder to do of each of the four inner ones. It was true that the outer columns were 18 inches in diameter as compared to the inner ones, which were 16 inches; but not being perpendicular, they were in a less favourable position to resist the downward stress of the load. Had the load been placed on the four intermediate columns, and the two outer ones been used for shoring-up the structure against lateral wind pressure, the bridge would have had a much higher moment of stability; but the original design having been departed from, it became impossible, with the floorage over which the braced columns were ultimately erected, to provide a proper distribution of the load, for in constructing them no other form than a hexagon could produce sufficient width of pier-head for carrying the highest girders when founded on the ashlar caps of the dimensions with which the submerged portions of the piers were finished. It was not to be forgotten, either, that the triangular box girders on which the main girders rested were not tied together, and that if they had been connected with other cross girders, so as to form a continuous box girder hexagonal top to the columns, the stability of the bridge would have been enhanced. He noticed, in examining the columns, that provision had been made for the introduction of three ties of deep iron girders at about equal intervals in the height of the columns, which would have added to the stability of the structure. These girders were shown *in situ* in a model in the Dundee Museum, and they might well ask why they were omitted in the actual structure. With regard to those piers which carried the girders on either side of the highest portion, there also was a glaring oversight in the use of material to the best purpose. The six columns or struts were all vertical, excepting the upper ten-feet lengths of the two outer columns, which were inclined inwards until their heads came in line with the heads of the two other columns, and a straight box girder rested upon the whole. It would be evident that nothing could be worse than this arrangement of these outer struts to resist the pressure of the wind, that being further aggravated by the absence of any direct cross-ties at the angle, the weakest portion of these columns. The bracing of the columns was defective, and the holes in the flanges of the columns were much too large for the bolts. Another source of weakness was the insufficient length of the holding-down bolts by which the iron columns were attached to the pier-heads, as they only extended through the first two courses of ashlar. They were told that these cast-iron tubular legs, were filled with concrete, and it was next to impossible that such a cast-iron tube with a hard concrete core would resist the stress of contraction to which it would be exposed. It appeared to him, from an examination of the concrete placed in some of these tubes, that there could hardly be a doubt but that a number of these tubes were burst. If so, then during the last twelve months the iron superstructure of the bridge must have been in a rickety condition, ready to break off and topple over as soon as a gale occurred. The filling of such columns with concrete for the avowed purpose of protecting them from rust without the use of paint had been a fatal mistake. Then, care did not seem to have been taken to insure uniformity in the thickness of the metal of which the legs of the piers were formed, while it was clear that they had been cast on their sides in place of on their ends, under the pressure of a high column of fluid metal, to insure their solidity, so that it was not even probable, therefore, that all the columns were sound. He was inclined to the opinion that it was the northern end of the bridge which first gave way. They must not forget that these 245 feet girders were jointed together in sets of fours, that at the middle joint they were bolted down to a pier-head, and that the northern end simply rested without an attachment on a box girder at the end of the northern section of of the structure. With a strong wind blowing he had observed the floor of suspension bridges lifted, and in view of that with a gale acting on the western side of the girders, as well as beneath them, with a leverage from the fixed middle joint of 490 feet, it was reasonable to suppose that the lifting effect thereof on the under side of the floor of the girder would so reduce the insulent weight thereof on its resting points that the friction by which it resisted lateral movement was thereby much reduced, and facility afforded for turning it off the north-end resting surface. He then proceeded to discuss the best form of a bridge for the Forth.

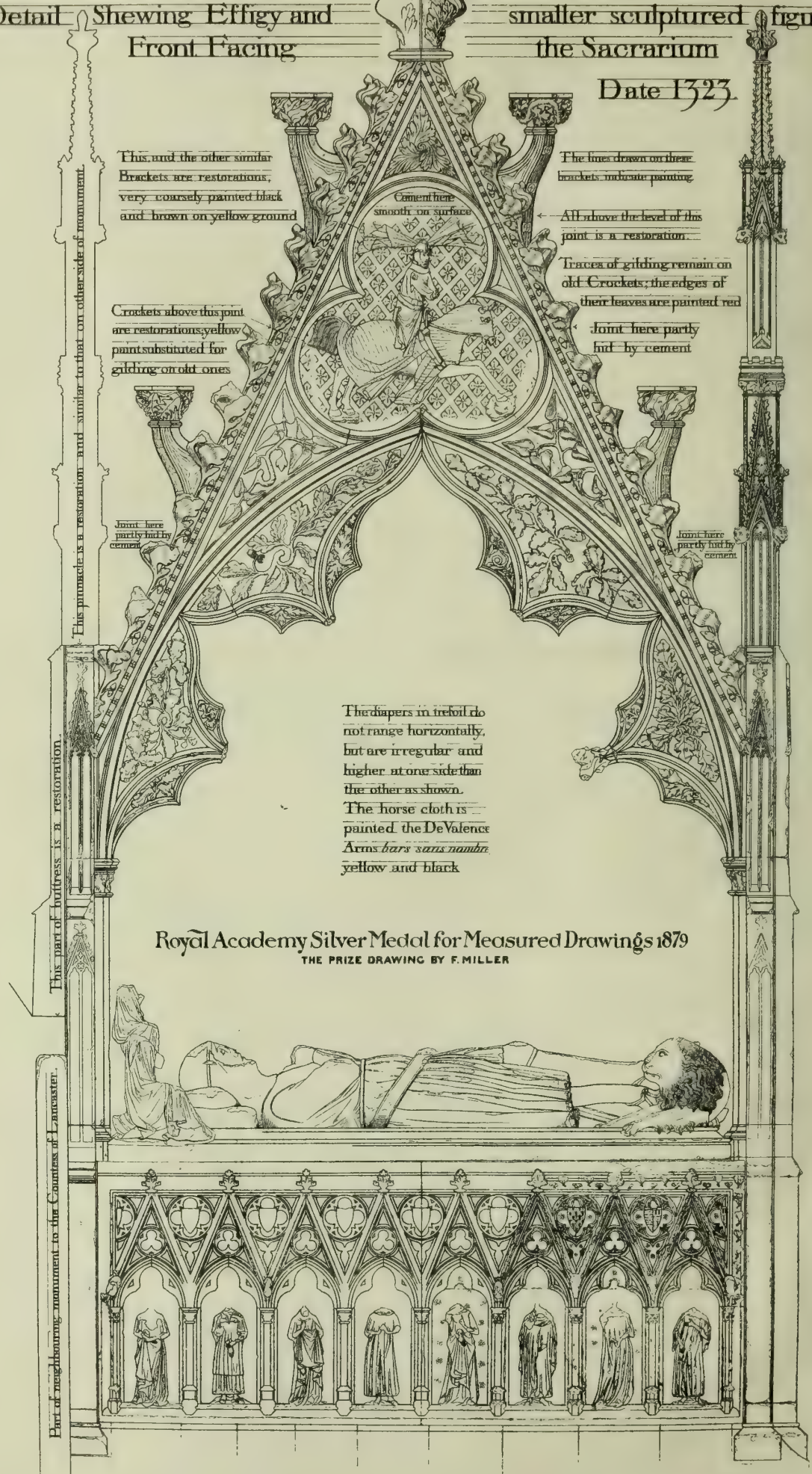
A PAPER on the Sepulchral Monuments of the Middle Ages, was read on Monday evening before the Rotherham Literary and Scientific Society, by Mr. E. Isle Hubbard, of Rotherham. The lecturer divided his subject into the following classes—pillar stones and crosses, incised slabs, raised slabs, altar-tombs, &c., and monumental brasses, and showed the various changes as architecture progressed, the modifications in armour and ecclesiastical vestments. Allusion was made to crosses, slabs, or tombs at Thrybergh, Hooton Roberts, Conisborough, Barmborough, Darfield, Ecclesfield, Bakewell, and Tickhill, and to brasses in the churches of Rotherham, Rawmarsh, and Sprotborough. The lecture was illustrated by drawings and brass rubbings.

AN interesting lecture on "The English School of Painting" was delivered by Mr. Comyns Carr on Saturday evening last, at the Club, Bedford Park, Chiswick. After an historical and critical review of the subject, the lecturer named Messrs. Burne-Jones, Albert Moore, and Mr. Millais as three representative painters of the three leading styles of painting now practised among those who at present constitute the English school. The pre-Raphaelite paintings of Mr. Jones and his followers seemed to Mr. Carr to bid fair to become the foundation of a truly-defined and national modern school; indeed, it was declared that Turner had so completely grasped and followed to the extreme limit the imaginative style of landscape as to render any further attempts in that direction comparatively unsatisfactory, so that the hope of a future of English painting must be found in a more realistic and pre-Raphaelite manner.

The Monument of Aymer de Valence, Earl of Pembroke, in Westminster Abbey.

Detail Shewing Effigy and smaller sculptured figures in Front Facing the Sacrarium

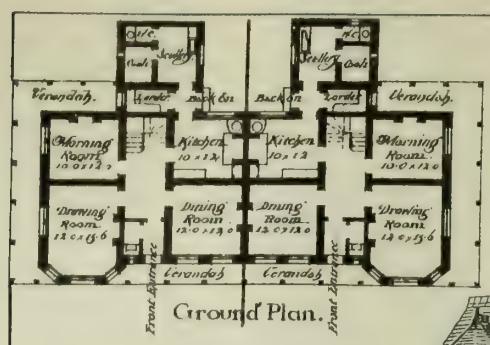
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Royal Academy Silver Medal for Measured Drawings 1879

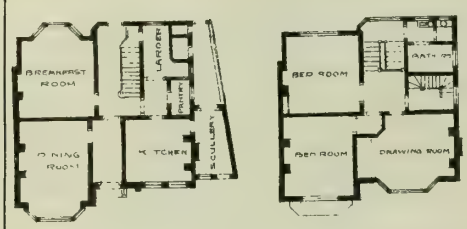
THE PRIZE DRAWING BY F. MILLER

Photo Lithographed & Printed by James Akerman, 6 Queen Square, W.C.



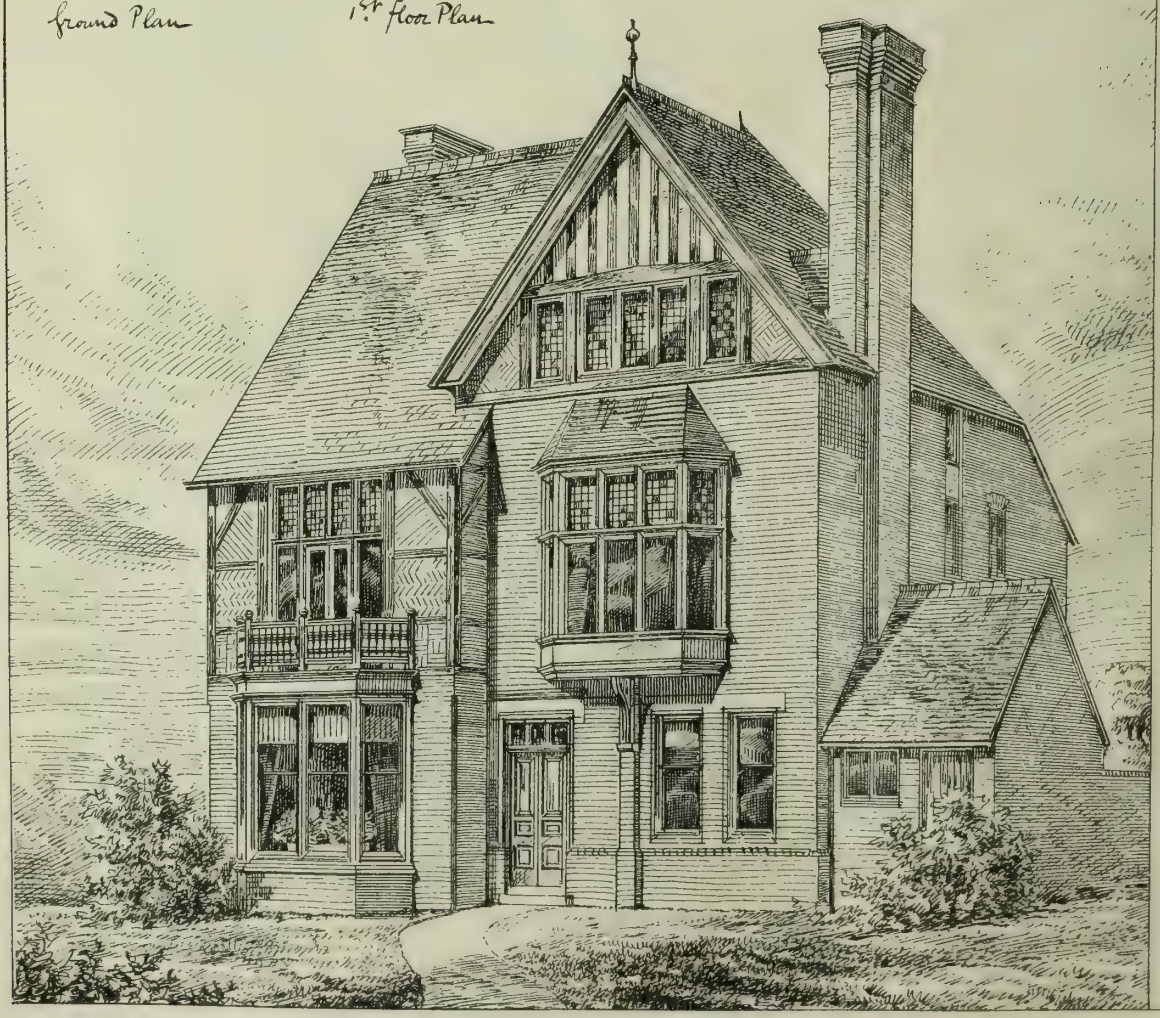
Ground Plan.

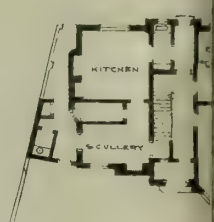




Ground Plan

1st floor Plan

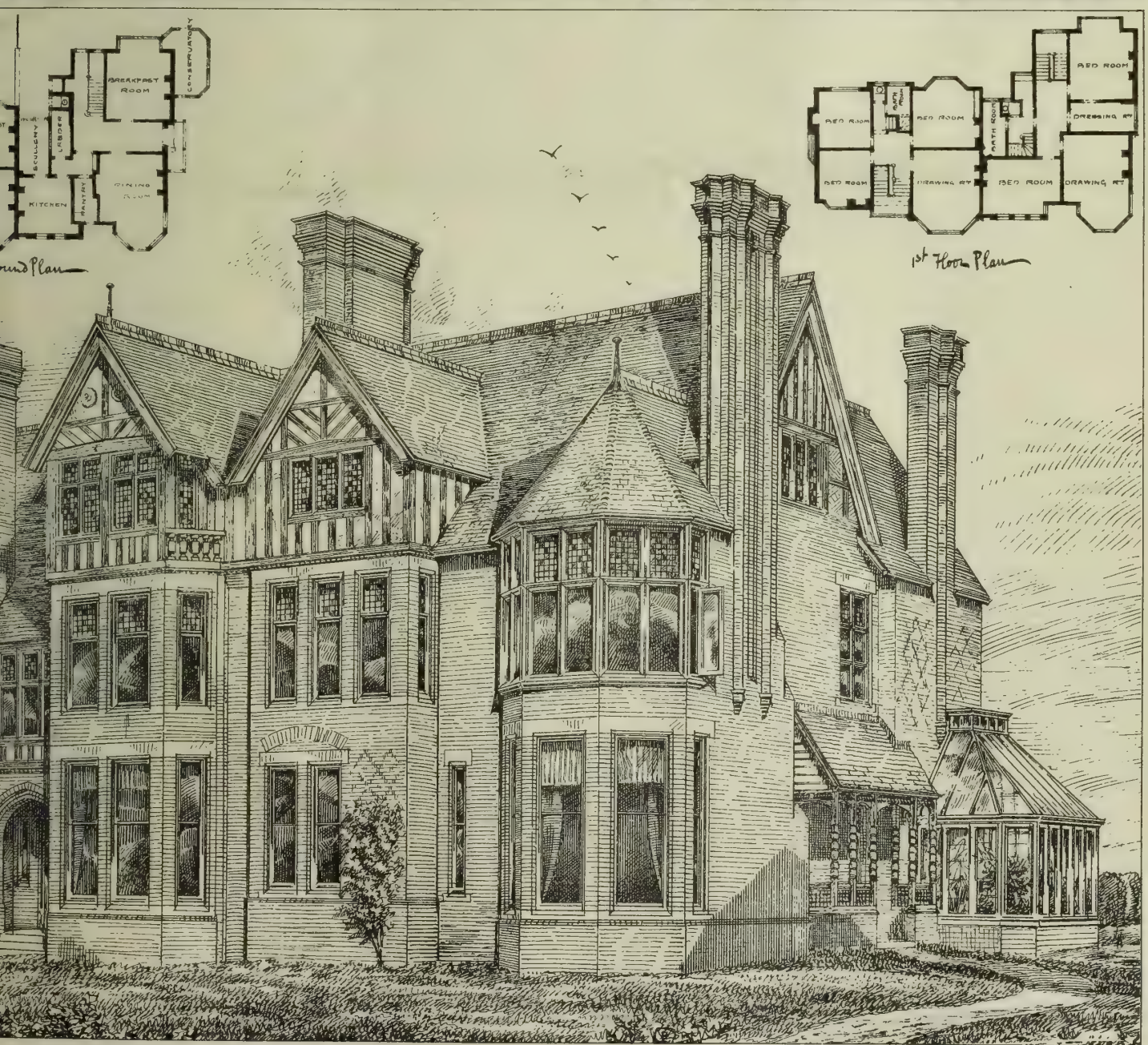






mi-detached Houses,
town near Plymouth.
H Powell Archt





J. TAIT & J. LANGHAM ARCHTS

Photo-Lithographed & Printed by James Akerman 6, Queen Square, W.C.

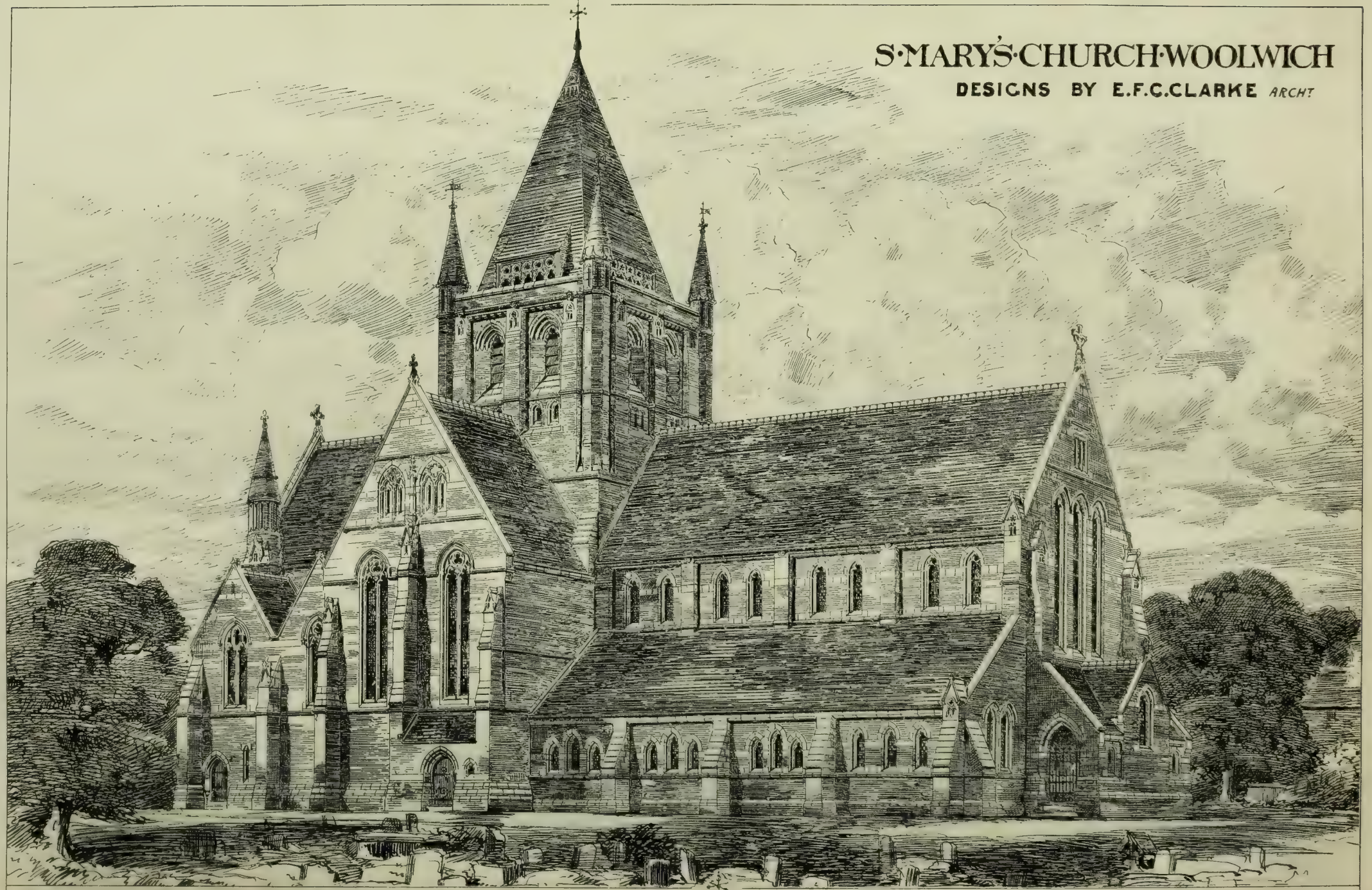
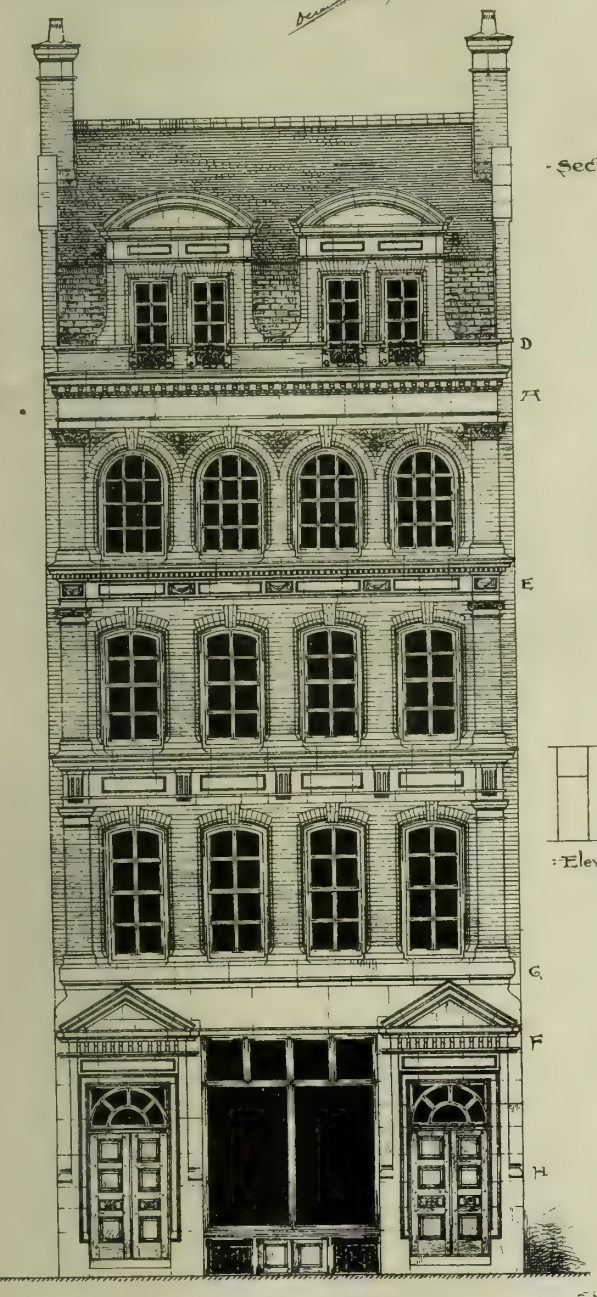

S·MARY'S·CHURCH·WOOLWICH
DESIGNS BY E.F.C.CLARKE ARCHT



Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W C

New Business Premises
No: 89: Farringdon Street E.C.

George Sigers
Architect

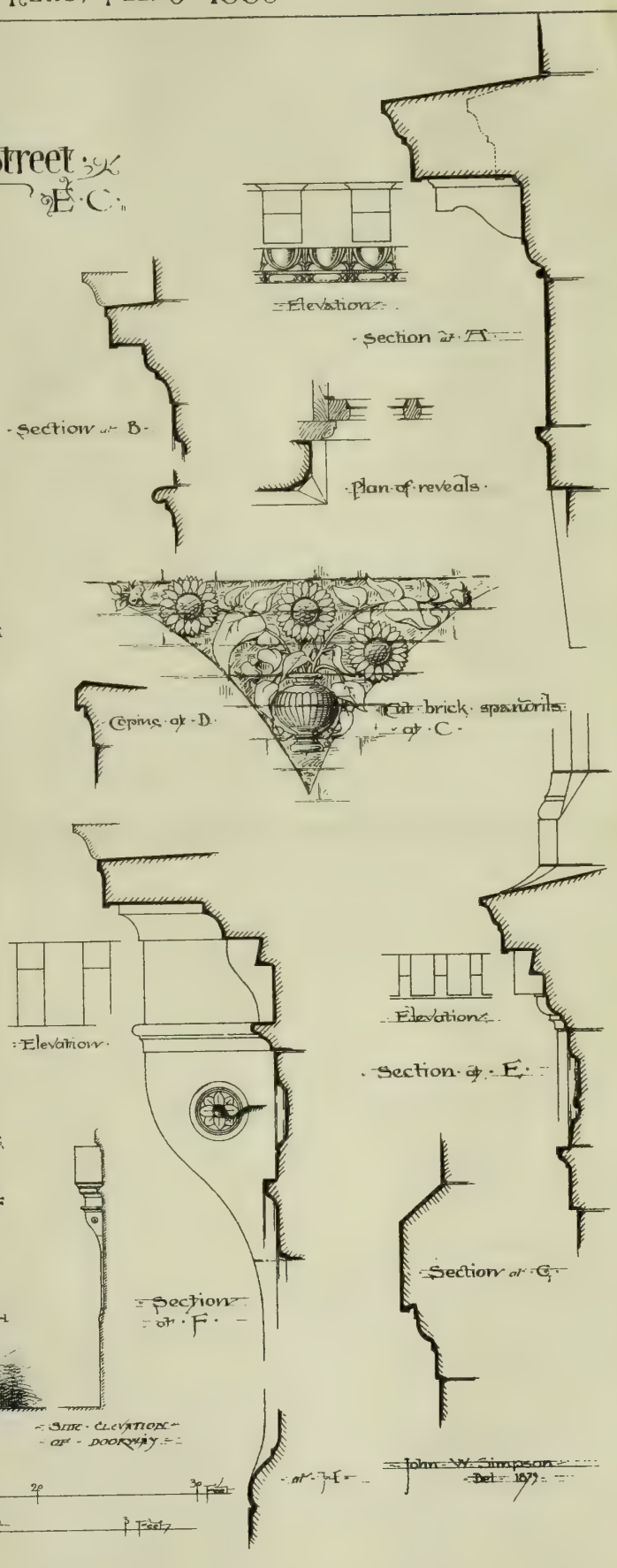


FRONT ELEVATION

Scale ¼ Elevation

Scale to Details

Side Elevation of Doorway



John W. Simpson
Del 1879

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

ARCHITECTURAL ASSOCIATION.

THE fortnightly meeting of this Association was held on Friday evening, the president, Mr. J. F. Clarkson, in the chair. On the motion of Mr. Page, hon. sec., votes of thanks were passed in connection with the Bedford-park estate, Chiswick, to Mr. R. N. Shaw, the architect, to Mr. J. T. Carr, junr., the freeholder, for personally conducting and entertaining the visitors; to Messrs. Maurice B. Adams and E. J. May for explanations of the construction. The next visit will be to Mercers' Hall, Old Jewry. Mr. Page read a letter from Mr. J. D. Crace, calling attention to the opening of the West London School of Art as offering facilities to Architectural Associations, and intimating that should the members feel interested in the building he would arrange with Mr. R. W. Edis for a visit. The president alluded in feeling terms to the sudden removal by death from the professional world of Professor Edward M. Barry, R.A., which had given a shock to all. Mr. T. Blashill moved that the president and secretary be requested to write to the family, expressing the condolences of the Association. Mr. J. S. Quilter seconded the motion, and it having been adopted, Mr. ROBERT WALKER read his paper upon

COMPETITIONS.

Having referred to the present unsatisfactory state of competitions, and quoted the remarks of Dr. Johnson on the competition in 1759 for the erection of Blackfriars-bridge, Mr. Walker said: Probably every member of the profession present can in his own experience adduce instances of the singular way in which architectural competitions are sometimes decided. Some years ago I submitted designs for a large hall and other buildings connected therewith for a public association, but in total ignorance of every one connected with the society; I ultimately received my drawings back with a cheque for the second premium, and the plans, by the pin-holes in the strainers, had evidently been traced. Some time afterwards I was informed by one of the committee that my drawings were nearly selected, but that the successful designs were adopted in preference to mine by the casting vote of the chairman of the meeting, who was my rival competitor and also deputy-chairman of the society. He was an auctioneer and market-gardener, but his designs I subsequently found had been prepared by a brother-architect, an old fellow-assistant. About eight years ago designs were invited for laying-out some twelve surplus estates belonging to a metropolitan railway company. I submitted a separate design, without any perspective views or showy drawings, for each estate, but took the precaution of sending them in from six different addresses, under assumed names, in the envelopes on which the mottoes were affixed. In no single case did I draw a first premium, the designs premiated being showy perspectives of impossible execution; but out of my twelve designs ten of them were selected as worthy of second additional premiums on the condition that they did not become the property of the company, but were to remain on view and in their possession to submit to intending purchasers of the estates. I instantly rejected the offer and removed my plans. I find that my ideas have been substantially adopted for most of these estates. On another occasion, submitting designs for a large provincial building, I was surprised to find myself, though entirely unknown in the town, successful, but was, on visiting the secretary in response to his letter (in confidence), informed that the committee had mistaken my motto for another man's, and I ultimately, at their suggestion, made an arrangement to carry out the building in conjunction with him. Our deliberations this evening are materially assisted by the fact that the most important paper on architectural competitions that has yet been written was read at the Royal Institute of British Architects, by Mr. Thomas Porter, on Monday last. In his paper, Mr. Porter asks, "What has been the history of the men who have been engaged in the preparation of the 267,000 waste drawings made in competition since the time of that for the Government offices in 1857?" and he also calculates the annual outlay on competition drawings to the profession to be £23,269, and that since 1857 the loss to the profession in preparing competition drawings has been half a million of money. I do not altogether agree with Mr. Porter to the full extent of his estimate of the annual loss suffered by the profession from the preparation of useless competition drawings, but there can be no doubt whatever that the loss of time and money is extremely heavy; but, in my judgment, even far worse than the mere money loss is the damage which the abuse of the system has done to the *esprit decorps* of the profession. The need for the alteration of the present system being, then, admitted on all sides, the important questions for us to to decide are, first, should architectural competitions be abolished? or, if not, is it possible to reform them?

(1) Should architectural competitions be abolished?

In order to answer this question we must decide (1) Is this possible? (2) Is it desirable?

Is it possible? I think a careful consideration of all the circumstances of the subject will tend to prove the negative.

It is all very well to say that if we could we should give the work without competition to builders in whom we have confidence, and that our clients would be better served; but how many of us can do this, or will our clients let us do so? Again, architects may object to the competition system, but the decision as to its continuance rests not with them, but with their clients and the public; and I submit we shall be as much out in our calculations if we discuss the question without looking at the way in which the public it, as the West-end tradesman would be in opposing the co-operative stores without considering the views of the consumers. Though some few architects may pledge themselves not to compete, the public will not, I think, for that reason abandon the system. But then is it desirable to do so? In an important case not long ago, what was virtually a professional-man competition was adopted, that is, the committee chose a gentleman in competition with a number of others, in consequence of the previous works of the same character he had successfully carried out; but it is evident this would shut the door to all rising talent, except that from the particular offices already engaged in the class of works required; besides which, it is most unfair to local men and others who may know far more of the special requirements of the town than the so-called class-architect. But beyond this there is another point, involving a question of abstract right. It is, I believe, a generally-understood rule in all well-ordered communities, that other things being equal in every town where the taxes for local rates are collected, that those who pay them should have a share by open tendering, at least, to supply commodities which are paid for out of such rates. Are local architects to be the only persons to suffer in this respect? Local solicitors and barristers, at least, do not fail to assert their claims, and architects have an equal right with them, at any rate, to submit specimens of their skill. It is beside the point to talk about the dignity and glory of the profession in this matter; the real issue is one of public wants, and those who live by supplying them. Would, for instance, the local builders and contractors in any provincial town consent to allow only London or outside firms to tender for the work, and their own claims to be ignored? and architects, as *local ratepayers*, have as much right to insist on their claims being considered as builders and contractors. Young but rising men of obscure position (but undoubted talent) have also a fair claim to ask that they should have an opportunity of exercising their skill and talent, at least in competition, for public works; but were the system of man competition backed up by the testimony of works of the special class required already executed by the candidates to become the rule, the public buildings of our country would, I venture to think, soon sink into a regular stereotyped conservative class of structures, such as town-halls, markets, and baths and wash-houses, or other buildings, being each of them erected in a settled crystallised type of art similar to the metropolitan police-stations, or the London School Board schools. I think, therefore, a consideration of the foregoing facts will prove that for many years at least it will be impossible to abolish the system of competition. But, in the second place, can the evils, which on all sides are admitted to exist, be remedied? In order to answer this question fairly, we must examine how they have arisen, their gradual growth, and who are responsible for their existence. Architecture has been defined to be the history of a nation, written in stone or brick, and it is principally by its literary and architectural remains that the record of each succeeding generation is stamped on the page of time. The choice, therefore, of the architects who are to erect our public edifices becomes to every citizen of a country a matter of some considerable importance. Since the days of Dr. Johnson, the practice of determining this by competition has been continually on the increase, and practically, with a few remarkable exceptions, the majority of the leading architects, both of the past and present generation, owe their success in their profession to a great extent to public competitions. The competition for the Houses of Parliament perhaps first gave the great impetus to the principle, which was considerably increased by the Government Offices Competition in 1857. It is unnecessary for me to allude to those for the Manchester Assize Courts and Town Hall, the London Law Courts, and the numerous other important ones which have followed in succession, the results of them being familiar to all of us. With the growth of the architectural competition system, the evils associated with it seem to have increased rather than otherwise, and they were probably never so powerful as at present, and as they are seriously detrimental both to the progress of good and sound building and architecture, they must be most injurious to our clients and extremely prejudicial to the progress of true art. I think you will agree with me that the main causes of these evils are the following. I have endeavoured to class them under two heads: 1st. Those for which committees are mainly responsible; and 2nd. Those for which architects are themselves principally to blame. Under the first head are insufficient instructions, improper regulations, and restrictions as to scale, size, number of drawings, &c. The practice of committees assuming to be judges of the various difficult and technical matters involved in considering designs for the erection of large buildings without taking the evidence and advice of some competent independent assessor who has had both the special training requisite to understand architectural drawings and constructive details and a sufficiently high reputation to ensure the confidence of the competitors; the mistake of not determining before the competition in what style of art, whether Gothic or Classic, the building is to be erected; the attempt sometimes made by members of committees to canvass for particular designs, or even, in some cases, to settle the award as a foregone conclusion; and, lastly, insufficient care in settling the cost in the first instance, or ascertaining whether the selected design can be carried out for about the sum named. The evils for which architects have mainly themselves to thank are the following:—The abuse of the motto system; touting and canvassing for votes; submitting highly-coloured, falsified perspective views from unattainable points of view; submitting drawings in excess of, and not required by, the instructions; false estimates; preparing elevations with features and architectural ornaments never intended to be inserted in any practical contract drawings; making designs without viewing the site. It will be at once apparent that in order to put a stop to these evils, it can only be done by bringing a moral influence to bear on the committees regulating the competitions and judging the designs, and proving to them the necessity of drawing up strict regulations in the first instance, and then rigidly enforcing them. Every architect who has competed for a number of years must know how frequently and heartily committees are abused; but I desire, however, to give it as my deliberate opinion that in most cases I have met with the committees, if they are only left alone, and no undue influence brought to bear upon them, endeavour, as far as their lights go, to act in an honourable and fair manner. The great difficulty commences the moment pressure is put on a committee by any urgent competitor; and when once mottoes are divulged and canvassing commences, honour and fair play are frequently flung to the winds; the committee and outside public begin to look upon the whole affair as a farce, and practices, which any one individual member of the committee in his private business would denounce as unjust and dishonest, are complacently winked at, whilst the competitors never attempt to justify their individual acts, except on the criminal plea that others do the same. The question is, How are these practices to be stopped? and are the competitors compelled

to keep the law to each other as well as the committee to show their determination to enforce it? I submit that a few simple rules honestly laid nown and adhered to would seen effect this. Were the name of a well-known assessor in all architectural competitions announced in the first particulars, it would be a guarantee of good faith, and compel all parties to abide by the regulations issued; but assuming this to be done, architects should bear in mind that they have no right whatever to ask committees to bind themselves to let such assessor determine the competition as judge. Gentlemen who are elected to administer either the public or charity-funds are the trustees of such money, and they, and they only, have the duty as judges to decide how it shall be spent; but the competitors, though bound to loyally leave the decision to the judges, have a right to insist that they, as judges, shall take the evidence, on all scientific and technical matters, of competent experts to guide their judgment before coming to a conclusion, and I also submit that the report of such experts ought in all cases to be printed and sent to all the competitors, whether the committee adopt it or not. Assuming this scheme is carried out so far, I submit that the present plan of sending in coloured perspective views should be sternly put down. As to the number and scale of the drawings: these should be reduced to the smallest possible limit by the assessor, whose word, in this respect, should be law; and any competitor breaking this rule, or sending more drawings than asked for, should be at once disqualified. As regards the question of cost: the assessor should, of course, assist the committee; but here, I am afraid, gentlemen, as in our own private practice, we are much in our clients' hands. I am not prepared to say whether the motto system should be abolished or not; perhaps in some cases it might be abolished and in others advantageously retained, but all attempts to canvass either the assessor or committee should be firmly punished by disqualification. Let such a plan as I suggest be adopted, and the assessor or assessors appointed when the instructions are first issued, and the requirements of the proposed buildings, or, in other words, architectural quantities, so to say, be properly issued to all competitors, the drawings being drawn to such small scale only as to explain the general design, and I venture to assert that, at a fair and moderate cost, we should be able to adequately set forth our ideas, and the result would be the advancement of our art, as well as an immense saving of time and money to ourselves and benefit to the public. It is quite time that the present game of architectural perspective competition beggar-my-neighbour was stopped. Of what use, for instance, were all the magnificent perspective sepia drawings submitted in the Law Courts competition, except as so much wasted effort? In no point, perhaps, has architecture been so seriously injured as a fine art as in the matter of *competition perspectives*. Perspective drawings, for instance, are frequently prepared, the point of view of the building, in order to make a good picture, being taken where no living being could stand or see it, and, in order to complete the picture or help the sky-line, some wholly incongruous architectural feature is inserted in the perspective, and when the building comes to be erected the architect is compelled, in order to be consistent and to prevent cavilling on the part of some of the committee, to erect features which in his heart he knows are entirely out of place. In this respect tricky competition drawings have done much to degrade and injure architecture as a fine art. As regards the question of architectural assessors, two recent cases aptly illustrate the necessity of the rule that the assessor should be appointed when the conditions are issued. I refer to the competitions for the Reading town-hall and the City of London schools. The first was an extremely unsatisfactory competition; the particulars were loose, vague, and insufficient. The building was to cost about £30,000. Some thirty competitors submitted designs, and some very elaborate sets of drawings were sent in. An architect from another distant provincial town was called in as assessor, who reported that none of the designs were suitable for the proposed buildings, or could be erected for the money, and ultimately the same gentleman who had acted as the assessor was intrusted by the committee to carry out the buildings. Great care was taken to explain that this was *the committee's act*, and not the assessor's wish, but this case evidently proves the necessity of the assessor's name being announced with the first particulars, and that there should be at least a tacit understanding that umpires are not, after the premiums are awarded, in future to come in as the successful architect to carry out the works. The City of London School Competition caused a considerable amount of discussion, and as I personally took a leading part in a deputation which waited on the Corporation of London with reference to it, I may, perhaps, be permitted to state a few facts concerning it. The building was an important one, and to cost nearly £50,000; the instructions were clear and comprehensive, and the premums liberal. Nothing whatever was said as to an assessor being appointed to guide the committee, but it was known that in all previous City competitions the City architect had acted in that capacity. Before the report of the committee was presented to the Corporation it transpired that they had settled the awards without any practical aid to assist their labours beyond that of an assistant in the City architect's office, who had already worked on two sets of rejected designs prepared under his eye. The competitors naturally felt *disappointed*, and ultimately the majority of them being *citizens and liverymen*, it was resolved to petition the Court of Common Council to call in a competent assessor of high standing to guide the committee's labours. On the first day, when the petition was presented, the petitioners attended at the Bar of the Court, and an attempt having been made to put them down by one of the members, the Court very honourably determined to give them full hearing, and adjourned the discussion to a later day, when the petitioners were fairly heard and most courteously treated. One member of the Court, Mr. Edmeston, F.R.I.B.A., endeavoured to get the prayer of the petition granted, but it became evident from the first that the petitioners were too late in their efforts, as the Court could not grant the petition without seeming to slight their own committee, and the petition therefore fell through. At the same time there can be little doubt that the effort then made by the competitors was not without its effect both on the Corporation and the public at large. I think I may assert that had it been announced at the commencement of the Reading Town Hall competition that the umpire would himself ultimately carry out the building, few would have competed; and had it been stated at the outset as regards the City schools, that no assessor would be called in to guide the committee except the City architect's assistant, few of the eminent architects who submitted designs would, I think, have done so. Having thus given my views as to the proposed reforms which, I think, might and ought to be carried out, the next question is, How are we to commence them? Our first duty is to commence with ourselves. I see no reason why this Association, for instance, should not appoint a standing committee on the subject of competitions, for the purpose of getting together information, and doing their best to enlighten members of competition committees; in any case, I think we have sufficient confidence in each other to make an effort by a mutual understanding to remedy some of the evils for which the profession are mainly responsible. Secondly, I think we can bring the moral weight of public opinion to bear on the daily and provincial press, as well as the professional journals, in order to let competition committees know that their acts are carefully watched and scrutinised. Thirdly, we can come to some general understanding amongst ourselves on the subject of assessors; and I believe assessors themselves, at least, can be brought to see that they must look more carefully into the actual practical merits of designs, and less into the mere question of showy drawings. As regards the question of the amount of premiums, this must, of course, depend upon circumstances; they should, however, be adequate in amount, at least, as laid down by the Institute in their suggestions for competitions. In all cases where designs are invited in open competition there should, I think, be public exhibition of the drawings. No motive can possibly exist except a sinister one for secrecy, and competitors who have spent a large amount of time and trouble on their designs have, at least, a right to insist on having the opportunity of examining their fellow-competitors' work; in fact, one of the main advantages of competition to a young architect is that he is thereby enabled to see how older and more experienced men than himself treat a similar problem. In limited competitions the right to see the drawings is frequently denied. This is so obviously unfair that too much stress cannot be laid on both the moral and legal right of every competitor to see exactly what has been done. A word or two is necessary as regards *sham competitions*, for such proceedings are sometimes unfortunately carried out. My experience is that, though these *sham competitions* are by no means uncommon, yet that no committee, as a body, is ever answerable for them, the fact being that it is generally one or two members of the committee who manage the rest, unknown to them, in these matters; and I submit that if we were only to act fairly among ourselves, any committee of Englishmen on which this kind of manipulation is attempted would, in the event of its being properly exposed, be only too grateful to us for our assistance. In any case, sham competitions, if the system is to be ever purified, must be exposed and rendered impossible.

Mr. POTTER, in proposing a vote of thanks to the lecturer, said Mr. Walker, nothwithstanding his industry and skill in setting out the facts, had not been able to add anything to the controversy, although in his paper, as at any time for the past five-and-twenty years, the architects' side of the question had been very well made out. This being so, he considered an Act of Parliament should be obtained to compel those arranging competitions to act in the manner suggested by the lecturer, namely, to appoint an assessor. He happened to go into a competition for a Foresters' Hall in the metropolis, the conditions for which were very vague, but the hall was to cost £4,500. The plans of an estate-agent and auctioneer at Hammersmith were selected by the committee, and he happened to be the chairman of the meeting. This was accordingly carried out, and ultimately cost £6,500, and for certain reasons, a few years afterwards, it was decided to pull down the hall and rebuild it. Designs were again invited: as none of these were estimated to cost less than £6,200, they were all set aside, and another architect appointed with the result that the expense of the two buildings was £20,000. It was said that only architects were interested in the competition question, but he thought this showed that the public had also some interest in its working.

Mr. BLASHILL said it was quite true that Mr. Walker had said nothing new; he himself read a paper in that room seven years ago, in which also no fresh arguments were advanced, and he held in his hand an article published 32 years ago on the subject which he had purposed reading until, on reflection, he found that it also contained nothing original. A practical question for architects was, Did competitions pay the profession as a whole? and on this point Mr. Porter's statistics brought before the Institute on Monday evening were conclusive in proving a negative. He had heard an architect, very successful in this class of work, say he only expected to win one competition in twelve. But from another and less mercenary point of view the system could not be said to pay. A man acquired a certain skill in draughtsmanship, but he often thereby lost the opportunity of actual work, and, of course, could spare little time for study, or examining buildings in course of erection. He must differ from Mr. Walker as to the analogy between builders' tenders and competitions. The builder could, at the expense of a few pounds, estimate the cost of the job; whereas an architect had to devote more than half the time required for an actual building-work, worth at least 1¼ per cent., on the mere chance of gaining £50 or so. The conclusion he had come to was that there should be no open competitions whatever; that the motto system should be abolished, and each man's name made public; that only a small number of men should be invited to compete, and that these should be paid for their work.

Mr. PORTER, having thanked Mr. Walker for the practical way in which he had stated the question, supported at some length the views upheld in his paper read at the Institute, and said architects owed it to themselves not to enter into unpaid and unlimited competitions. If the system were abolished the profession would save £25,000 a year, and there would be exactly as much work for architects without the scramble. He did not agree with Mr. Walker's suggestion to abolish perspectives; he thought most committees could not understand eleva-

tions, and competitors were entitled to introduce trees or foliage, or whatever would show the design to the best advantage; in fact, if they entered into competitions at all, let them make a thoroughly good job of it. It was a mistake to suppose that the big men won all the competitions; the little men obtained a considerable share of the work; and if competitions were restricted, as he suggested, this would be altered, and those who had shown skill in construction would be selected. In conclusion, he related the following story as told to him by the architect who was one of the actors in the scene: A large maker of boots came into an architect's office and invited him to send in competition drawings for a church a committee thought of building. He explained that the committee did not yet know whether they would actually build or not, and in the latter case no premium would be paid. The architect replied, "I will put a parallel case to you. If I were to come into your shop to-morrow, what would you think if, after looking over all your stock and putting you to much trouble, I were to invite you to make me a pair of boots 'on trial' within three weeks, and I were to add that I was just about to call on twelve other gentlemen in the trade to make boots in competition against you for the order, but that I had not made up my mind whether to have a pair of boots, and if I didn't I should not pay any of you? I think you would kick me out of the shop in sharp time." The bootmaker, added Mr. Porter, took the hint, and speedily left the architect's office.

Mr. POWNALL said, the "Rules" drawn up by the Institute in 1872 were too numerous and not sufficiently known. If some one rule were promulgated as the condition under which members of the Institute, the Association, and the leading provincial societies would compete, it would do much to rectify the evils complained of. This primary rule should be, he thought, that a professional assessor be appointed. By this means the decision would be, to a large extent, taken out of the hands of the local committees organising a competition, and the assessor ought to have a hand in drawing up the conditions. It might be objected that committees would say, What was the use of taking double trouble—if they had such confidence in the assessor, why not appoint him to carry out the work? He did not think this would often occur, for the assessor who took the work once showed a very low estimate of his profession, and would be looked upon afterwards by his professional brethren with a certain amount of suspicion.

Mr. J. DOUGLASS MATHEWS had been much surprised to hear the unpractical remarks of Mr. Blashill. They could not, if they would, do away with competitions as he proposed; the custom had become part and parcel of professional work, and it had certainly been instrumental in bringing forward many men who would otherwise have remained unknown. The system had been misused, not only by the public, but by the architect, and a high tone of honour was needed in the profession to remove the evils complained of. Unless action were taken by the profession, there was no reason why private houses to cost £1,000 should not as well be made the subjects of competition as churches to cost £3,000. All would agree that an assessor should be appointed to consider designs, and that his name should be announced beforehand. This course was taken in the case of Union Chapel, Islington, Mr. Waterhouse being appointed assessor, with most satisfactory results.

Mr. COLE ADAMS thought architects should combine, and decline to enter into a competition unless a professional assessor were appointed to adjudicate on the designs, and he urged that the decision of the assessor ought to be final.

Mr. JOHN JOHNSON was convinced that nothing would result from these discussions unless the profession took the matter into their own hands, and agreed to terms under which alone they would compete. He suggested that the Institute circular, or some amendment of it, should be sent to the committee of every competition as soon as it became known. As it was, committees began, and went on, in ignorance. One rule architects should agree to was, that all drawings in a competition should be exhibited in fairness to all parties; but the whole question turned on the appointment of an assessor.

Mr. R. C. PAGE concurred in the last remarks, and suggested that cost should not be made one of the conditions of a competition; committees should explain what they wanted, the inference being that they expected to get the work done as cheaply as possible.

The vote of thanks having been carried,

Mr. ROBERT WALKER, in replying on the discussion, said that the grand point to aim at was: There is something to be done that can be done; therefore, let it be done. He believed we lived in a time of jobbery and corruption, and that there never was such jobbery and corruption as existed in connection with architectural competitions. Mr. Blashill appeared to be the only speaker who wanted to put down competitions altogether—perhaps because he had never had much necessity to take part in competitions, or because, when he had done so, he had never succeeded in pulling down a big plum. As to an Act of Parliament to regulate competitions, we could not get Acts of Parliament to make people make their houses safe, and he did not think they would get an Act of Parliament to make committees honest. He certainly had not intended to make any reflection upon Mr. Murray, for Mr. Murray and he were old personal friends. The competitors in the City of London school competition did not get their due, but the Corporation thought all the more of them as architects for the stand they made. He differed from Mr. Adams as to the demand that the award of assessor should be final. They would never get public bodies to accede to that. Let such bodies take that competent evidence which should guide them in their judgment. If the profession insisted upon that they would get it conceded. There were two points which had long been dear to him in the profession. One was to see houses safe, and the other was to see competitions fairly conducted. There was another question which must come on, and it was this: Architects at the present time needed to band themselves together more closely. It was of no use their going to the Institute for such a purpose; the Institute was a learned society. They wanted something more—they wanted a trades' union of their own. Lawyers had it, barristers had it, and architects must have it. They wanted something by which to let the public see their *locus standi*. He intended to devote himself to the subject, and to read a paper upon it during next session. The articles which had appeared in the press lately as to the way in which houses were built would form a public opinion which would demand that architects must have certain qualifications, and once that was recognised and enforced, to whom would competition committees go to get their buildings carried out? In conclusion, Mr. Walker said he proposed shortly to bring a resolution before the Association on the subject, which resolution could be discussed upon its merits.

ART LEGENDS AND SYMBOLS.

MR. JOHN RODDIS delivered the following lecture to the members of the Birmingham Architectural Association last week:—

There are probably few difficulties presenting themselves to the modern architect more perplexing than the choice of sculptured subjects suitable to commercial and domestic architecture. In structures designed for religious purposes this difficulty does not appear, for we have inherited such a vast legacy of symbolism in that direction that almost any thought, action, or emotion could be personified. But in civil life—"in the world," as the old friars would say—our means of expressing suitable ideas in sculpture are few, and those few hackneyed to the verge of imbecility. In these rapid days it is by no means an unusual thing to see the work of one decade render that of its immediate predecessor almost, if not entirely, obsolete. Ten years ago, the subjects in vogue for street-sculpture, if I may use such a term, could be counted on one's five fingers. Justice, Ceres, Minerva, Britannia, and the Royal Arms. To-day there are unmistakable signs that this somewhat exclusive list will have to be extended, not only a little wider, but a little higher, in order to meet the growing intelligence of the age. The architect of our day who is abreast of the time—and we need not to-night, perhaps, discuss the ideas of those who are in advance or behind the time—the architect who is abreast of the time having, not unnaturally, become somewhat nauseated with that wild and over-abundant crop of vegetable matter known as "modern ornament," decides to put his pen through a good deal of it in future, and spend the money on something with a meaning. For instance, if he be designing a china-shop front, he will cut out a few hundred few of foliage, crawling about cornices, windows, jambs, and arches; he has grown sufficiently master of his mouldings by this time to know that he can get such-like effects by other and better means, and in place of all this, without a fraction of additional cost, he will give us a statue of some master of the ceremic art, perhaps Luca-della-Robbia, or Palissy, or better still for an Englishman, Wedgwood, as a symbol of the wares his client produces. Ten years ago, there would hove been some difficulty in getting such work done at a reasonable cost—to-day the difficulty is considerably reduced; ten years hence it will be a more easy matter still. It may be urged that the general public know very little about Luca, Palissy, or Wedgwood. So much more honour, then, is due to the architect for prompting those who do not know to inquire. But I am proud to believe that when the lads and lasses, at present graduating in the board schools throughout the country, have grown to be young men and women, they will probably be able to give a little information on this and many other subjects, making the task of those who wish to appeal to the brain through the medium of the eye much easier to be understood. There can be little doubt that this introduction, or rather re-introduction, of symbolical sculpture into modern architecture will grow. And it is only natural to believe, since we are human, that the growth will be from the same seed that has hitherto supplied the human family with the article—that is, the myths and legends of the poets. To speak of introducing poetical emblems into street-architecture with the hope of meeting an appreciating public may seem a little wild at first sight; therefore, the short time at our disposal this evening may not be wasted altogether, perhaps, in taking a general review of such legends and symbols as may have found favour in the past. Though it is by no means probable that we shall find the same images fitting our case, a study of them may, in some measure, assist us in evolving a better and more elastic system than we have at present. We should probably derive little real profit in surveying the symbolical sculpture of Egypt and Assyria, though such a research would doubtless reveal to us one of the most perfect systems known in history. It should be borne in mind that in the remote history of mankind—in the morning of the world, as it were—the reign of man over the animal kingdom was not so firmly-established as now, and it is easy to see how, in outlying districts, the denizens of the forest may, at times, have scored a startling victory. Even in our time, the villagers bordering on the great Indian jungles are sometimes sorely put to it to hold their own, and we may be sure that their opinion of the power of the tiger from experience of him as an actual foe, and our opinion of the brute after pleasantly and safely making his acquaintance behind the bars of a den, differ very widely. To us he is merely a noble-looking fellow, labelled "dangerous." To them his image suggests the stealthy prowl at midnight; the sudden spring; the terror of surprise, and the missing comrade. Thus we find in the arts of the oldest nations beast playing an important part as symbols of strength, evil, and of wisdom. For instance, when Layard excavated the mound covering the palace of Sardanapalus, he found the images of two immense animals stationed as guardians of the portal. The body was that of a lion; from the shoulders powerfully-expanded wings grew, and the head was that of a bearded man in his prime. What, in such an age, could be a more true and noble emblem of watchful guard? Here we have the terrible strength and dauntless courage of the lion, to which is added the speed of the eagle with its dominion of the air, all governed and directed by the reasoning intellect of man. But, as I have already intimated, such symbols lose their meaning in our age, and we shall do better to examine the mythology of the Greeks, who, while borrowing their arts from the Egyptians, utterly repudiated the beast-worship of Asia and Africa. Their emblems took the form of gods and goddesses, with Zeus as "father of gods and men." Ares, a symbol of valour; Aphrodite of love; Hermes of speed and physical culture, patron of runners, boxers, and wrestlers; Artemis of virginity and the chase; Apollo of light and music; Pallas Athené of wisdom; and so on. Then, as they wished to venerate things in nature, Poseidon became a

symbol of the sea; Pan of the forests; Ceres of the fields; and Hades of the inner parts of the earth. Then the poets and priest-kings—for the early kings of the Greeks combined with their civil and military rule the functions of the priest—in order to impress the people with nobler aspirations, and a just gratitude for the bounty of nature, invented fables, or myths, purporting to explain the doings of these gods, and in the course of time wove a complex system of symbolism, known to us as the mythology, which eventually grew to be a settled form of religious worship. The tales they invented of the warrior god, Ares, and the love he bore the brave, inspired the soldier with martial daring. And the protection of Ceres brought a due share of honour to the husbandman. Indeed, there was no man in the state, from the very highest to the very lowest, that was not under the immediate protection of some particular deity, and all were taught to believe that as they honestly did the task of life, or neglected its performance, so would they please or offend a presiding power able to reward or punish. In order to show how nearly men could imitate the actions of the gods, secondary symbolical personages were invented, called Heroes, such as Perseus, Hercules, and Jason. Men who had crushed the enemies of mankind, grappled with and overcome great natural evils; or sailing out into unknown seas, exploring unknown regions, had made the Greek name famous. It would be impossible to measure the vast influence this hero-worship had in forming the character of the people. It was the chief aim of the moralists and elders to keep such images ever before the eyes of the nation. Perseus with the head of the Gorgon Medusa; Hercules, with his giant form—symbol of physical strength and its allotted labour—bearing his mighty club, the skin of a dead lion thrown about his loins; Jason, the ideal navigator and adventurer, bearing the Golden Fleece, trophy of the far-off Colchis. These, together with a dozen others and their legends, were as well known to the humblest Greek as St. George and the Dragon are known to Englishmen, and a great deal better: the difference being that the majority of Englishmen do not know the legend of St. George, and if they did know it they would not believe it, while the Greeks knew their legends well, believed them, loved them, and gloried in them—nay, sacrified the greatest man their nation ever produced, Socrates, for daring to say they were untrue. In order that the various personages of the mythology should have an unmistakable individuality, certain attributes were given to each. Zeus was crowned with oak-leaves; Apollo with laurel; Ceres with wheat-ears; Hercules with poplar; Fauns and Sylvans with twigs of fir; river-gods with reeds and bulrushes; Cybele, and statues representing cities, wore the turreted crown. Crowns were also given to victors in the national games. At the Nemean, parsley; Olympic, wild olive; Isthmic, pine twigs; in short, the Greeks reduced signs and emblems to a science, and could express almost any thought or action with them. If the gods were represented riding in state, the car of Apollo would be drawn by griffins, Aphrodite by swans or turtle-doves. Artemis by stags, Pallas by owls, Hera by peacocks, Hermes by rams, Cybele by lions, Dionysus by panthers, and Poseidon by sea-horses. To these may be added a few emblems contributed by the Romans. They gave a coronet, wraught in imitation of palisado, to the soldier who first entered the enemy's camp; one formed of battlements to the hero who first scaled the walls of a city; another made up of the prows of galleys to the one first aboard an enemy's ship, and a crown of oak was awarded the man who saved the life of a citizen. It should be borne in mind that, despite the protests of Cato and his school, the Romans, after the conquest of Greece, adopted the Greek myths wholesale. Zeus became their Jupiter; Artemis, Diana; Hermes, Mercury; Poseidon, Neptune; Dionysus, Bacchus; Pallas, Minerva; Aphrodite, Venus; Hera, Juno; Ares, Mars; Hades, Pluto; and so forth. Indeed, this system of compelling thought by means of symbols seems to have taken possession of the very genius of the people. The noble deeds of the heroes, the wisdom of the gods, and the beneficence of Nature, were personified everywhere; not always as a means of worship, but mostly as a means of civil instruction. In their temples, in their streets and public places, in their dwellings, on articles of ornamental and domestic use, wherever space could be suited, there was found some scene from the myths. The people themselves said such general use was one of the surest proofs of the truth of the legends. But I think we shall be inclined to say it was a singular proof how deeply the noble dreams of the poet, realised by the skill of the artist, may strike the minds of a great progressive nation. The early Christian fathers knew this well, and deftly used the knowledge with a wise purpose.

(*To be continued.*)

THE ST. PAUL'S ECCLESIOLOGICAL SOCIETY.

THE first annual meeting of St. Paul's Ecclesiological Society was held on Saturday afternoon at the Chapter House, St. Paul's Churchyard. The Chairman, the Rev. H. C. Shuttleworth, M.A. read the annual report, which congratulated the members on the successful statement that had been made; 245 members had been enrolled, including not a few of the most eminent authorities on the wide range of subjects covered by the term "Ecclesiology." At the Society's meetings, papers had been read by Messrs. A. J. Beresford Hope, M.P.; G. H. Birch; G. E. Street, R.A.; J. P. Seddon, and E. B. Ferrey, and Major Heales, and visits had been made to the Temple Church, St. John's gate, Clerkenwell; St. Bartholomew's, Smithfield; Lambeth Palace and its chapel, and the Abbey Churches of St. Alban and Waltham, under the guidance of Messrs. Seddon, Birch, St. Aubyn, G. Gilbert Scott, and W. De Grey Birch. After expressing thanks to the Dean and Chapter of St. Paul's for active support, and the free use of their rooms, the report added: "Full reports of the society's proceedings have appeared from time to time in the BUILDING NEWS and other professional papers." The accounts showed a balance in favour of the society, the receipts having been £61 16s. 6d., and the outgoings £33 12s. 8d., but printers' accounts yet outstanding would swallow up most of the money in hand. As against preliminary expenses a larger number of life subscriptions had been received than could be expected to recur in any one year, and it became a question how to place the society on a firm financial footing. For the coming session papers had been promised by Dr. Stainer, Rev. Dr. W. Sparrow Simpson, and Messrs. F. C. Penrose, F. Dollman, E. Walford, G. H. Birch, and J. P. Seddon. The report was adopted. It was suggested that the additional funds required could be raised in one of three ways—by raising the subscriptions, by a whip-round, or by charging members 6d. or 1s. for the "Transactions." The latter plans were shown to be undesirable, and on the motion of Mr. Ambrose and Major Heales, it was unanimously decided to alter Rule III., raising the annual subscription from 2s. 6d. to 5s. Mr. R. Howard Wall was re-elected secretary, with hearty thanks for past services, and Mr. W. H. White was appointed as his assistant. It was decided to change the night of meeting from Wednesday to Thursday, and the following gentlemen were elected as the council:—Messrs. H. C. Shuttleworth, M.A., F. C. Beatley, G. H. Birch, A.R.I.B.A., W. H. Dunn, H. R. Gough, F.R.I.B.A., A. Leslie, A. Paxon, J. P. Seddon, F.R.I.B.A., J. S. Tomkins, and J. Grimshire.

THE funeral of the late Professor E. M. Barry, R.A., was solemnised on Tuesday, at the Paddington cemetery, Willesden. The Rev. Canon Barry, brother of the deceased, officiated in the cemetery chapel and at the grave. The six pall-bearers were Sir F. Leighton, the President, and Mr. Pickersgill, the Keeper, of the Royal Academy; Mr. Whichcord, the President, and Professor Hayter Lewis, Vice-President of the Royal Institute of British Architects; Mr A. B. Mitford, the secretary of Her Majesty's Office of Works; and Mr. W. H. Barlow, the President of the Institution of Civil Engineers. The mourners who followed the coffin from the house in Oxford-square were Mr. L. E. Barry, the only son; Messrs. C. and J. W. Barry, the brothers; Mr. W. H. Barry, the cousin; and Mr. C. E. Barry, the nephew of the deceased. Other members and associates of the Royal Academy would doubtless have attended had it not happened that the funeral of the wife of Mr. Frith, R.A., was being solemnised at Kensal-green on the same day and at the same hour.

Building Intelligence.

BETCHWORTH, SURREY.—A new transept has just been completed to this church, as a memorial to the late Frederick Goulburn, Esq., C.B., who was for many years chairman of the Board of Customs. The chapel has been erected at the cost of the late Mr. Goulburn's brother, Col. Goulburn, of Betchworth House, and other relatives. In the new transept, the three lancet lights have been filled in with stained glass by Messrs. Clayton and Bell, as a memorial from many of the deceased gentleman's friends in the Custom House, who contribute this as a token of esteem and respect for their late chairman. The work has been carried out by Mr. Batchelar, builder, of Betchworth, from the designs and under the supervision of Mr. Robert W. Edis, F.S.A., architect, of Fitzroy-square, London.

BIRCHENCLIFFE.—The chancel to St. Philip's Church, Birchencliffe, near Huddersfield, was opened on the 24th ult. by the Lord Bishop of Ripon. The work, consisting of a chancel, 23ft. by 18ft., with organ-chamber and vestries on the south side, about 20ft. 6in. by 11ft 6in., was executed by local contractors, under the direction of James N. Crofts, architect, 7, Cook street, Liverpool. The work is finished in the same style as the other portion of the church, which was opened about two years ago. Owing to a depression in the building trade at the time, the work has been executed for an exceedingly low sum—the whole, including ornamental pitch-pine stalls, and marble pavement inside of Communion-rails, has been done for about £550.

BIRMINGHAM.—The following is a return of new buildings either erected or for which plans were approved by the borough surveyor during the year 1879, together with the returns for the previous years:—

	1879.	1878.	1877.	1876.
Houses and shops	1,197	1,205	2,700	2,903
Churches	—	—	1	1
Chapels	—	1	3	5
Schools	—	4	6	6
Manufactories and Warehouses	102	64	86	107
Miscellaneous	101	96	90	43
Alterations, &c.	225	290	167	52
	1,625	1,661	3,053	3,117

Among the miscellaneous are included two mission-rooms, Board school, addition to schools, addition to Free Libraries, police-station, and many large buildings for offices. There was a falling-off of thirty-six in the total number of new buildings, &c., as compared with 1878, and only a decrease of eight in the houses and shops.

BRISTOL.—The new building of the London and South-Western Bank, on the site of the ancient Church of St. Werburgh, in Corn-street, Bristol, has been completed. Though the carrying out of portions of the original plan of the architect, Mr. James Weir, of 67, Strand, London, has been suspended, the contractors, Messrs. E. C. Howell and Son, of Bristol, have brought the remainder to completion. The whole of the building is of Bath stone. Around the ground-floor, used as the bank, the frontages in both thoroughfares are enriched with a series of lofty Corinthian columns. Columns of a similar character are carried up to the first and second floors, the cornice being repeated at every stage. The whole frontage is surmounted by a parapet enriched with vases and carved figures. The floors are of fire-proof construction, with wrought-iron girders and Dennett's patent arching. Mr. W. H. Williams has been the clerk of the works. The exterior stone carving has been done by Mr. Seale, of London, and the wood-carving is the work of Mr. Sheppard, of Paul-street, Bristol.

GLASGOW.—New premises have just been completed for the Glasgow Fine Art Institute. A site having been acquired in Sauchiehall-street, to the east of the Corporation Galleries, several architects in the city were invited to send in designs for the new building, and that prepared by Mr. John Burnet having been selected, the erection of the new galleries was commenced in the autumn of 1878. As the architect himself says, to designate the style of architecture would not be easy; but, according to his own account, the aim has been to combine the Greek with modern French Renaissance. The sum for which designs were directed to be prepared was £14,000, with a margin of 10 per cent. exclusive

of painting and furnishing. It is expected, however, at present that, even including these items, the ultimate cost of the whole will not exceed £15,000.

LEEDS.—The Hook Memorial Church, Leeds, was consecrated on the 29th ult. The church is a simple one, in plan consisting of nave and chancel with their side-aisles, a south porch, and eventually a tower to the north-west, forming a baptistry. The style is the Transition preceding the Early English. The whole is of stone, varied slightly in colour. The church has a clerestory of lancet windows throughout. The reredos, the gift of the late Dr. Hook's family, is at present incomplete, only the central portion about the altar having been erected; it is to occupy the whole breadth of the chancel. The pavements all through the church are of mosaic, Sir Gilbert Scott's death occurring very soon after the church was begun, it has been carried on by his son, Mr. J. Oldrid Scott. The builder has been Mr. Whiteley, of Leeds, who has not lived to see the completion of his work. The estimated cost of the church is £20,000.

MILNTHORPE.—A cottage-hospital, to accommodate about 20 patients, is about to be built at Milnthorpe, near Kendal, in memory of the late John Kitching, M.R.C.S., Eng., L.S.A., who, after practising at 61, South Audley-street, Grosvenor-square, London, retired to Milnthorpe, his native place, where he practised for 30 years, and died, May 26, 1879, aged 83 years. The hospital is to be built by his daughter, Mrs. Wm. Bindloss, and his sister, Mrs. Thompson Bindloss, as a memorial to him. The building will be built with limestone of the neighbourhood, with freestone dressings, and, when completed, will form a neat and compact block of building with suitable accommodation for the purpose it is intended for. The situation is one of the best in the neighbourhood, a good view being obtained of Morecambe Bay and the Lake Mountains from the front elevation. The plans have been prepared by Mr. Eli Cox, architect, Kendal.

"SURVEYING BY PHOTOGRAPHY" was the subject of a lecture delivered at the Plymouth Athenæum on Thursday, the 22nd ult., by Mr. W. G. Tweedie. The lecturer proposes to use for the purposes of surveying a camera by which a cylindrical projection of the objects is taken on a flat plate. Two such photographs, taken from the extremities of a measured base-line will, he declares, supply all the necessary data for making a map of the whole of the country in front. From these two photographs, by means of two scales of simple construction, the surveyor's work hitherto done in the field will be equally well performed in the office, and by the use of dry plates, the operator is relieved from all chemical operations in the field. The plates can be bought ready-prepared, and sent to the professional photographer to be developed. The lecturer exhibited several remarkable instantaneous photographs he had taken, and explained the nature of the camera used, and the *modus operandi*. In the subsequent discussion, Mr. Spence Bate suggested that Mr. Tweedie should practically test his invention and benefit the institution at the same time, by surveying on his new method some of the ruined castles on the moor, and Mr. Tweedie, in replying, promised to accede to the suggestion in more pleasant weather.

A LITTLE before Christmas, the "Society for the Protection of Ancient Buildings" deputed Mr. J. J. Stevenson, F.R.I.B.A., to make a careful report of the present condition of the west front of the Basilica of St. Mark's. The report has now been laid before the committee, who state that from Mr. Stevenson's conclusions they cannot see that any occasion exists for anything but slight repairs. Mr. Stevenson was nevertheless informed at Venice that it is intended to spend £100,000, at the rate of £5,000 per annum, on the west front. Such a sum of money, the committee state, could practically only be spent in the complete rebuilding of the façade, and it seems that part of the scheme includes the entire renewal of the mosaics in the vaulting of the portico. The committee again insist on the utter impossibility of restoring such works of arts as these, and such attempts, they say, can be studied with advantage in the interior of the church. The report is to be printed in full.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

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A. B. C. (Cassell's and Lockwood's both publish good works, but they hardly deal with the higher branches. Artists' colourmen will afford all the rest of the information you ask for.)

Correspondence.

TERRA-COTTA.

To the Editor of the BUILDING NEWS.

SIR,—Having read the letters published in your journal the past few weeks under the above heading, and having been engaged in the manufacture of architectural terra-cotta for the past 21 years, I think I may venture a few remarks upon a material which if well made and burnt, and judiciously used, forms such an important and pleasing feature in our modern architecture.

I fully endorse the condemnation of your correspondents of the practice of washing or coating over clays, so as to produce either a better colour, or a different colour entirely, to the actual ware itself, but which I regret to say is still being done in many districts. It is bad in many ways, as every slight chip or graze in transit is seen, every easement in fixing is noticeable, and it is only a question of time when the action of the weather will peel all this coated surface away; but I am bound to add that I think this deleterious practice is only carried on by those manufacturers that are not masters of their clays.

It is a well known fact to manufacturers generally, and to those more especially who make both red and buff ware, that the red ware is the more difficult of the two to manufacture, on account of the generality of red clays not being so strong as the buff, and greater care and attention being required in the firing. It is also perfectly correct that some red clays can be burnt with some buff clays, and both be thoroughly well burnt. Mr. Pulham tells us he is doing so, and I am also doing so at Wilnecote for Messrs. George Skey and Co., and I can also readily believe that some red clays can be burnt with some fireclays, as some of the fireclays that I have dealt with are, to speak truly (although advertised and accepted as fireclays), only bastard clays containing a large percentage of iron, and which of course have to be burnt at a much lower temperature of heat to that required for "a good strong silicate of alumina, with only a small percentage of iron," as mentioned by "the Writer of the Article on Terra-Cotta," but I am perfectly well assured that, as a general rule, fireclay goods and architectural red terra-cotta, cannot both be burnt together perfectly.

Architects, and those not practically acquainted with the differences of clays, may fall into error through this correspondence on terra-cotta, as one writer says he can burn his red clay with his fireclay; but that does not show that red clay as a rule can be burnt with fireclay. His red clay and his fireclay is only one out of a hundred or more different beds of red and fireclays in the kingdom, and the fact of a red clay being able to stand a firebrick heat, does not make it any the more valuable as a building material. Each respective clay requires burning at its own respective heat, whatever that may be. I can produce a fireclay that would require such a heat as would distort any natural red clay, also I could produce a natural red clay from some of the Lincolnshire beds, that would run down at a good firebrick heat. Then again, another writer says, "a blue brick runs into slag when placed in a kiln of fire-goods." Possibly some might, but because in this particular instance it was so, it does not follow that all clays should do the same. I have seen good blue bricks made out of both buff and red clays, and there is no doubt whatever but what blue-brick earth can be produced that will stand the fire-brick heat without running to slag. Your correspondent is not aware, I am afraid, that the "running to slag" of blue ware is oftentimes due to the neglect of the fireman in the last stage of firing, though blamed to the clay. I have experienced this, and have burnt blue bricks perfectly clean and harder than a regular burner who has run his top courses to slag.

The question of the manufacture of terra-cotta for architectural purposes is a most important one, and calls for the earnest attention and study of manufacturers (many of whom know very little about building detail), as there is nothing that requires more care and attention than the manufacture of architectural terra-cotta, as not only is uniformity of colour required, but truth of outline, and lastly, and the most important, precision and accuracy of dimensions; and to do this perfectly, nothing is better than a "mixed body." I can give 21 years' verification of it, and I see Mr. Pulham can give 40 years, and, if I mistake not, all the Lambeth potters use "mixed bodies."

Architects should study to adapt their buildings more to the materials they use, especially, in the case of terra-cotta, and not the material to the building, as is so often done, and only use terra-cotta where it can be done perfectly and effectively, and not make it a competitive material against all others, thereby running the risk of inferior work at inferior prices; and, above all, study convenient-sized blocks, such as a man can readily handle, as this will insure greater truth and accuracy, and less time in manufacture.

As a specimen of large terra-cotta blocks, I might mention the large gate-piers, recently put up at Hatfield for Lord Salisbury, manufactured by George Skey and Co., of Wilnecote, and which have been mistaken for stone by many people.

Dulwich College is a fine specimen of terra-cotta, both as regards truth, uniformity of colour, and excellence of the modelling, all of which was made of a "mixed body."

Apologising for thus trespassing on your space,—I am, &c., J. JOINER.

Manager of Terra-cotta department,
George Skey and Co. (Limited).

Wilnecote, Tamworth, Jan. 28.

RESTORATION OF SS. PETER AND PAUL, ALDEBURGH, SUFFOLK.

SIR,—I do not know the above building, which, I see by the BUILDING NEWS of to-day, is to be restored by Mr. Barnes, of Ipswich; but, I have visited Orford, close by, where the same architect altered, and almost rebuilt, the old Inn

near the castle, for Sir Richard Wallace, and, judging from the way in which the old moulded-brick chimney-stack was treated, as well as the old house generally, I cannot but take this occasion of expressing a hope that a more conservative spirit will be employed in the restoration above referred to than was shown at Orford. I measured the brickwork to which I have alluded from the scaffold, while the new work was being finished, and so, am quite clear in my estimate of the merits of both the ancient and new building. This is the only restoration by Mr. Barnes which I have seen, while any remark here on his new buildings would be beside the mark. He is quite a stranger to me; but we are both members of the Institute, and—I am, &c.,

Jan. 31. AN OLD TEE-SQUARE.

A QUEEN-ANNE SQUARE.

SIR,—Your description of the Bedford Park Estate has amused me greatly, and, while this Queen Anne Mansion lasts, and is doing its best to bewilder "the coming New-Zealander," and the freak pays, why can't some enterprising quack of this school (would that they would go to school and learn common-sense) build a Queen Anne square round the preposterous, but stately, St. John's Church, Westminster, with a debouche to the river? That would pay, and be picturesque. I would try to do it myself; but pitch sticks, and I can't dabble with dirt. Pace, Queen Anne's ghost and her crew,—I am, &c.,

JOHN P. SEDDON.

1, Queen Anne's-gate, Wertminster, Jan 20.

WYNN v. FENWICK—LEEDS WINTER ASSIZES.

SIR,—I beg to call your attention, and that of surveyors generally, to the above case to-day, in which Mr. Justice Lush has decided that an umpire is not responsible for the arbitrators' costs, and that the arbitrators must get their costs "where they can." If this is law, then all I can say there is an end to umpires in all matters of dispute. The opinion of Mr. Banister Fletcher on this point would much oblige.—I am, &c.,

WM. N. WYNN, A.K.C., C.E.

Leeds, Feb. 4.

NEW PUBLIC BUILDINGS, READING.

SIR,—With respect to the notice of these buildings which appeared with your illustration last week, I am obliged to draw your attention to one or two points which I must request you to rectify. Your notice says that—

"Mr. Lainson was consulted as professional referee, and advised, if we remember rightly, that the total sum of the three premiums combined should be equally divided among the authors of the three selected designs, all of which were thought too costly. This was done, and subsequently the present architect was appointed to the work."

I object to the above as being wholly incorrect. I was not consulted as referee, neither did I advise the apportionment of the premiums as you state, or in any other form. I simply had nothing to do with the arrangement, and the first intimation I had of this was from your own columns.—I am, &c., THOS. LAINSON.

170, North-street, Brighton.

[Mr. J. C. Edwards, of Ruabon, writes us that his Pen-y-bont terra-cotta is being used for the dressings, &c., in the above building, and not stone, as stated last week.—ED.]

THE GREAT TOWER OF THE CHURCH OF THE MITRED ABBEY OF ST. ALBAN'S—IS IT NORMAN OR ROMAN?

SIR,—Paul of Caen, the first Norman Abbot of St. Alban's, has so long and generally been reputed to have entirely rebuilt the earlier church erected in honour of Britain's proto-martyr that anyone who ventures to ask the question at the head of this article may expect to be condemned off-hand as rash, or in more depreciatory terms. But it is worth that risk should it lead to a re-reading of the story, and haply draw forth from skilled practical men information which would justify the carrying back the age of the great central tower from the 11th to the 3rd or 4th century, and thus to recognise it as a unique possession (which it would undoubtedly be) of Imperial Rome.

It was by the (comparatively) recent stripping off the rough-cast coating from the exterior of the tower that it became capable of being fully appreciated and understood by all, with its regular tiers of thin layers of Roman bricks or tiles one above the other to the height of 150ft.; and surely few who stand and survey the great mass of bricks welded into a tower of such grand proportions of height, breadth, and substance but must say to themselves (as did the writer of this article), "Can this be a Norman work?" Knowing the old story of the building, one looks at it with the sort of puzzled feeling of the aged patriarch of Scripture—"The hands are the hands of Esau, but the voice is Jacob's voice": the ornamental details of pillar and capital (though surely even not all of these) are Norman, but the great height, massive character, and proportions, the whole contour, are not Norman but Roman.

I reserve for a future letter any examination of the historical parts of the story dependent upon the notices and answers which may be drawn forth to the two practical questions with which I now conclude, viz.:—

1. What, upon a rough calculation, is the number of Roman tiles of which the tower is constructed, taking it as a rectangular building, 47ft. by 45ft., with 7ft. as the average thickness of walls, and 150ft. high?—the tiles being 17in. by 12in. and 1½in. thick, the joints of mortar being almost as thick as the tiles.

2. Having special regard to the composition of Roman mortar and its intensely hard concrete character, would it be possible to clean and free from mortar and preserve whole and fit for relaying in a new building such a mass of tiles taken from older Roman buildings."—I am, &c.,

ANTIQUIOR.

CONCRETE BUILDINGS.

SIR,—In reference to the note you attach to Mr. Drake's letter in your number of 30th ultimo, I must admit that it is not the duty of editors of public journals to settle the claims of rival inventors; but I submit that common justice demands the insertion of a brief reply after the publication in your columns of Mr. Drake's letter containing statements which are damaging to my interests if they cannot be refuted.

My reply is, that whereas Mr. Drake's patent of July 9, 1877, is for ordinary plain concrete slabs having indents or grooves formed in them, and for a framework of wood and iron to form encasing panels to keep the slabs in position during the process of construction, my patent of October 29, 1877, is for a peculiarly-shaped slab without indents, and requiring no encasing panels or framework of any description, thereby allowing the use of brick, stone, or terra-cotta as a facing material if desired.

There are many other points of dis-similarity, and I may mention that Mr. Drake had ample time to oppose my application for letters patent if he thought he had a good case. As stated in my letter which you have already published, fifty thousand of these slabs have been used in a single building, and two buildings are about to be commenced on the same principle. Mr. Drake can have the name of the proprietor of the completed and proposed buildings, and, if he wishes, the locality in which they are to be erected.—I am, &c.,

THOMAS POTTER.

MORE DESTRUCTION AT EXETER.

SIR,—Absence from home, and other matters, have recently somewhat interrupted the spare time I have to read your paper, and not until to-day did I observe in the BUILDING NEWS of the 16th ult. a statement which rather surprised me. A correspondent writes, expressing his sympathy with the Old Grammar School; others, probably, share the same feeling; but circumstances, at times, require the removal of old buildings, to wit, the feeble old shop at the corner of Goldsmith's-street, in this city ("curious old house and quaint old church" is a very ambiguous description of the "individuality and character of our ancient High-street.")

But the startling part is that there are thirty architects in Exeter. I have been in Exeter several years, and can only screw up the number to seventeen or eighteen. Not a bad number, I admit, for Exeter!

Also the statement that our diocesan surveyor is a "stone-mason," although true, in a way, reads rather highly seasoned. He certainly is a stone-mason, but he is also a surveyor, and a very first-rate general builder; see his work in the restoration of our Cathedral. He is also a *carver*, and I believe anyone who knows Mr. Luscombe as the Diocesan Surveyor and as a builder cannot but say that he performs his duties with much practical good common-sense, a quality not to be despised in these days of brag and bounce. My object is not to defend the Diocesan Surveyor, but to suggest that your correspondent be a little more explicit in his attempt to furnish you with Exeter news.—I am, &c., ANOTHER EXONIAN.

DEMONSTRATIONS OF THE USES OF SANITARY APPLIANCES.—A CORRECTION.

SIR,—In the notice which appeared in your issue of the 24th ult., of Dr. Corfield's lecture on the above subject, we observed that we are referred to in connection with a roof-ventilator, consisting of a series of mica valves, and which the lecturer said was found not to answer, as the wind frequently blew the valves the reverse way to the one wanted. As we are the only firm of the name of Boyle who manufacture ventilators, and as the words "Messrs. Boyle" were used, it might lead to some misunderstanding on the part of those not acquainted with our ventilating appliances, if we did not take this opportunity of stating that we make no such ventilator as the one mentioned, and never did, having quite as strong an objection to ventilators with movable parts liable to get out of order as Dr. Corfield himself.

The self-acting air-pump ventilator, and our other roof-ventilators are fixtures, having no movable parts whatever, and can never get out of order, as illustrated and explained by Dr. Corfield in the course of his lecture. We beg to mention that we have just received a letter from Dr. Corfield explaining that he referred to "Boyle's Mica Ventilators," and that it must have been a mistake on your part putting in "Messrs. Boyle." We shall feel obliged if you will publish this correction in your first issue.—We are, &c.,

Glasgow. ROBERT BOYLE AND SON.

[We are, of course, sorry the error occurred, but may just hint that when lecturers are describing inventions by manufacturers bearing identical names, and having similar objects in view, it would save reporters trouble and liability to error if the Christian name or the address of the inventor were added.—ED.]

Intercommunication.

QUESTIONS.

[6033.]—**Scholarship.**—Will any correspondent oblige by giving particulars of a scholarship which would be serviceable to an architect's assistant, and for which he could prepare by evening work or study at home?—ASPIRANT, London, E.

[6034.]—**School Accommodation.**—I should be glad if any of your readers would explain the following:—I find an allowance of 9ft. super. must be made for each child, and that class-rooms are in nearly every case required; but it is stated that at certain periods of the day all the children must be collected together in the main room. Under these circumstances, would the class-rooms be allowed to be counted as additional space to the main room or not? If it is counted, then when all are assembled in the main room, the space per child will be much less than the prescribed 9ft. A proper understanding of this is requisite in carrying out the requirements of the educational board.—Z.

[6035.]—**Perception of Beauty.**—Wishing to learn something on this—to me—perplexing subject of why we consider objects and things beautiful in nature or art, I should feel greatly obliged if some of your readers would give me some information or tell me in what works I may find a clear elucidation of this question. Does our sense of beauty arise or is it gratified by any particular arrangement of colours, proportion, or fitness of things, or from our association of ideas that are pleasing to us with things which cause us to admire them and call them beautiful? I trust some of your correspondents will kindly assist in this inquiry.—STUDENT-AT-HOME.

[6036.]—**Preventing Sound.**—Will some reader of the BUILDING NEWS kindly give me information as to the simplest means of preventing sound? I have a shop 36ft. × 18ft. × 12ft. high (with a boarded floor), and directly over it two rooms—a sitting-room and a bedroom. The joists are about 11in. deep, herring-boned, with about 4in. of pugging between them. The shop ceiling is ¾ match boarding, nailed to the underside of the joists, and the floor of the two rooms are of ordinary flooring boards, nailed, of course, on the top of the joists. The rooms are carpeted, but for all this every footstep in the shop, and nearly every word spoken, can be distinctly heard in the rooms above. I have determined to do something to prevent it, if possible, and should be glad if some kind friend could suggest a simple and not too expensive plan.—S.

[6037.]—**Squint Quoin.**—Any information about this term will greatly oblige—H. S. H.

[6038.]—**Catesby Abbey.**—Would Mr. Mackenzie Walcott or some other reader inform me when Catesby Abbey, in Northampton, was destroyed, and what order it belonged to? I can find no mention of it in county histories or in Dugdale's work.—LXXXIV.

[6039.]—**Iron Rooms.**—I shall be obliged for any information on the following points:—1. Are iron rooms on brick foundations landlord's fixtures? 2. If they are fixtures on brick foundations, would they still be so if the foundation were formed by running down the angle posts and principal intermediates into the ground without any brickwork? 3. May they be fixed without first obtaining consent of landlord?—DELTA.

[6040.]—**Ventilation.**—Being about to fix two Archimedean screw ventilators on the roof of a chapel and connected by tubes to ceiling line, and to improve the up-draught, I should like to have a gas-jet in each tube; but the difficulty is how to light them, the height being about 40ft. I believe there is a self-lighting gas burner, but this is done with a paper tape, and this being placed in the tubes would be liable to get damp, and consequently would not act. I should be very much obliged for any information on the subject from any one who has tried these burners or has had any experience on this matter. Also what is the best form of burner or burners should be used?—TONY.

REPLIES.

[6006.]—**Old Irish Cemetery Crosses.**—An Irish paper last year gave a lengthy account of the discussion upon the relative merits of Irish granites and limestones. Father O'Hanlon is therein reported to have referred to the white limestone of County Antrim, and Father O'Rorke drew attention to the non-lasting powers of Irish granite, and urged the use of limestone in its stead. I have carefully perused later numbers of the journal quoted, and do not find that any correspondent therein has questioned these assertions. Perhaps, however, no real Irishman lives who possesses the hardihood to contradict a couple of live priests in Ireland. If such be the case, I am sure the "Intercommunication" column of the BUILDING NEWS offers an excellent and most unprejudiced fighting-ground, and the general reader will be glad to hear what others have to say on a vindication of the granites of the sister isle, and, indeed, of granites generally. I may remark, passingly, that whereas, when Lamerton church, on the Cornish border, was destroyed by fire a couple of years ago or so, its granite arcades, &c., were entirely consumed. The grey Cornish granite offered no resistance whatever to the flames. On the contrary, when, a year or more since, Huntspill Church, in Somersetshire, fell a prey to the fiery element, the Ham Hill stone, of which the structure is built, resisted the immense heat the fire put forth with surprising strength. This latter church is now being most conservatively restored by Messrs. Hans, Price, and Wooler, architects, of Weston-super-Mare, and is well worthy of a visit if only to see the lovely warm tint the fire has left upon the Ham stone arcades, &c. The result of the conflagration is that the material has burnt into a dull red colour, very like Dumfries stone. Similar results from fire in the same material may be noted at Sherborne Abbey. It would be instructive to note the effect of a great fire upon a large place like Aberdeen, where all the buildings are of grey granite. The people of that imposing-looking city, when once they build a house, consider it is put up for all eternity; but with Chicago in our remembrance, every practical and thoughtful man knows fire would bring it down as soon, if not sooner, than towns built of much less durable material. I am writing these lines whilst absent from England, and can only rely upon memory in referring those interested in old Irish crosses to O'Neill's "Sculptured Crosses of Ancient Ireland." Amongst the many ancient crosses that author treats upon are those at Kilkieron, Moone Abbey, Clonmagnoise, Tuam, Termonfechin, Kilkispeen, Dunnamuggan, Killamory, Monasterboice, &c. The work affords instructive reading.—HARRY HEMS.

[6009.]—**Test for Bricks.**—I have made many experimental tests as to their resisting power under a crushing load. The bricks are from several makers in Stafford and Derbyshire, red kiln burnt. I built the samples two bricks thick in mortar composed of one of Portland cement and two of sand. Let them stand 56 days. The average crushing load was 114 tons per square foot. I also crushed some blue bricks under an average load of 466 tons per square foot. I placed them between deal boards 1in. thick, thereby forming a bed nearly resembling that of mortar when built in a wall, because without something of the kind the bricks receive the load unequally, thereby crushing before they had their proper compressive strength proved. They were crushed with hydraulic press and registered with a proper gauge. The red bricks weigh 8·4lb. and the blue bricks 9lb. each. Each had a frog in, which reduces the strength of the bricks. This I have proved by test of bricks from the same maker without the frog in them. The London stock will not bear anything like the above load of red brick—in fact, some of the stocks made there and south would not carry one fourth *the* load. From the above results it would be cheaper to use blue bricks in preference to any other sort where strength is the essential conditions of the structure, as they are four times as strong and only twice the cost for material, labour being nearly the same in each case. The reason for using Portland cement mortar is that ordinary lime-mortar is not so hard as the brick, therefore that would be "the weakest link in the chain." Lias lime makes a very good mortar, and with plenty of time will be nearly equal to cement, but the chalk limes used in the south are not nearly so good.—B. S.

[6026.]—**Architects' Responsibility.**—You received an order to build a wall, which was to stand on the line of an old fence. You as an architect and as an agent to your client undertook to superintend the erection. It is inferred therefore that you also undertook to give a reasonable amount of attention personally and by deputy, and if there is any loss occasioned by any neglect on your part to carry out your client's order to the letter, that loss is yours.—WILLIAM JACKSON.

[6030.]—**Timber-Measuring.**—Your correspondent William Phelps has adopted a most remarkable method of his own in calculating the contents of a log of timber 36in. × 36in. × 30ft. long. How by any possible straining of figures he can arrive at 343′ 5″ 3‴ is a mystery to me. The calculation is of the very simplest kind, as the following sum will show—

36in.	3ft.
	× 3
	9 super. ft.
	× 30
Contents	270 cube ft.

This may possibly explain to W. P. why Hoppus's tables are adhered to.—LIVERPOOL.

[6030.]—**Timber Measuring.**—The girt (string) system is in general use amongst woodmen. It would be difficult to persuade them that they are wrong, and to attempt to teach them either of the following theories would be a failure:—12 ÷ 3·1416 = 3·8197, then 3·8197 × 3·8197 × ·7854 = 11·459, then 11·459 × 30 = 343·77, or 12 × ·2821 = 3·3852, then 3·3852 × 3·3852 × 30 = 343·787ft. I have calculated upon the same dimensions as W. Phelps.—B., Lincoln.

[6030.]—**Timber Measuring.**—William Phelps must take some improper way to measure a log of timber 36in., or 3ft. on the side, and 30ft. long, if by his calculation he really finds it to contain 343′ 5″ 3‴, or 73′ 5′ 3″ more than that given in Hoppus's timber measuring tables, viz., 270ft., but he will find the latter is correct. 30ft. multiplied by 3ft. gives 90ft., and 90ft. multiplied by 3ft. gives 270ft., the proper content. It may now be unnecessary to explain why Hoppus's tables are adhered to.—KYLE.

[6031.]—**Architects' Charges.**—There are no universal and uniform rules of law on the charges of an architect, not even if he is a member of any institute which may have a schedule of rules and charges. It may be the established rule of the profession to charge the everlasting 5 per cent., but both a schedule adopted by an institute and the established rules of the profession would not be evidence to prove the reasonableness of charges. It is just and fair that you be paid in proportion to the work done. If you have done it well be paid well: you know your remedy.—WILLIAM JACKSON.

STAINED GLASS.

SUDBURY.—A memorial window to the late Canon Molyneux has just been inserted in the north aisle of St. Peter's Church, Sudbury. The stone tracery, which is in the Perpendicular style, has been executed by Mr. E. Keogh, of Sudbury. The painted glass is by Hardman and Son, and the subject chosen is one of a series to be completed as funds are forthcoming, viz., "The Lord's Supper," immediately preceding "The Betrayal and the Agony in the Garden."

LEGAL INTELLIGENCE.

BUILDER'S CLAIM—KNIGHT v. PALMER.—In this case, tried on Monday at Taunton, before Mr. Baron Pollock, the plaintiff claimed money due from the defendant for work and labour done as a builder. The defendant stated that the work was done for a specified sum, and he admitted certain extras, for which he had brought a sum into court: The plaintiff said that was not sufficient. The plaintiff carried on business as a builder in Wells. The defendant was the Rev. Joseph Palmer, at present vicar of Priddy, but at the time of the occurrences which led to that action, the incumbent of Henton. Defendant was the owner of property at Henton, and whilst incumbent there in June, 1877, he was minded to transform certain cottages and buildings into a schoolhouse, and cottage, and stable; and with a view of doing so he summoned the assistance of the plaintiff in order that some scheme might be devised by the plaintiff. The plaintiff inspected the premises on the 22nd of June, and on the 30th of June he prepared a rough estimate to the defendant, which amounted to a sum of £295 1s. 4d. After the estimate had been sent in the defendant called upon the plaintiff and suggested very considerable alterations in the plans. The plaintiff said that if he was going to make alterations on that scale the cost would be heavier, and to the best of his judgment it would be between £380 and £400. The defendant agreed to have the alterations carried out. When the old house came to be taken down the walls were found totally unfit to have windows pierced in them, and they were 6in. or 7in. out of the perpendicular, and would not bear a new roof. There was nothing for it but to erect a new building, and then the defendant said if he had known this would be the case he would not have undertaken the matter, but as the affair had proceeded so far he would give the order to make a new building. The defendant subsequently visited the place, and gave orders for different alterations. The buildings were completed in autumn of 1878. The defendant paid £340 before the work was finished, and in March, 1879, the plaintiff requested that a further sum should be paid. The defendant, after reflection, declined to do so. The defendant wrote a letter, in which he said he had paid considerably more than the estimate. There was something like £700 of work done, and the plaintiff said the work had nothing to do with the rough estimate. Since the action was brought the defendant paid £140; but the plaintiff said that was not enough, and he would ask for a verdict for £230 15s. 6d. After the learned counsel's opening, his Lordship said it was a proper case for a reference, and it was arranged that a nominal verdict should be taken for the plaintiff, subject to a reference.

DANGEROUS STRUCTURES.—The owner of No. 1, Castle-street, Leicester-square, the "Porcupine Tavern"; the owner of a building on the east side of Cooper's-court, Great Windmill-street; the owner of Nos. 5 and 7, George-street; and the occupier of No. 6, Queen's Head-court, Great Windmill-street, were summoned, at Marlborough-street on Tuesday, before Mr. Newton, by Mr. Wm. Henry Napier, on the part of the Metropolitan Board of Works, for not complying with the Act. After hearing evidence, Mr. Newton made orders for what the Board required to be carried out, and adjourned one of the summonses to give time for the necessary works to be completed.

EXTRAS.—OLIVER v. CALDER.—This action was brought last week in the Bristol County-court, by Charles Oliver against Frank Calder to recover £30 7s. 8d. for certain work done extra to a contract for building two houses. On the 12th April of last year, the plaintiff contracted with the defendant to do the mason's work of two shops situated in Lower Union-street. He was to excavate for cellars, haul away rubble, and find all material except grates and chimney pieces, the drain to be carried to outside face of the building, and the price to be £220. Certain plans were to be worked to, and upon beginning the work it was found that instead of the ground upon which the buildings were to be erected being 16 feet from front to back, as shown upon the plan, there were 18 feet from front to back, which gave the defendant an opportunity of building his houses two feet deeper than otherwise he intended doing. Upon this discovery being made by Mr. Oliver he pointed it out to Mr. Calder, who told him to build upon the two feet, and that he should be paid for the extra work required to be done. The extra work was measured and valued by Mr. Joseph Foster, architect and surveyor, of Bristol, who testified the prices charged were fair and reasonable prices. The learned counsel then mentioned the various items which made up the sum claimed. Mr. Poole said his case for the defendant was this: that when it was discovered there were two more feet to build upon in width—not in depth—there was a conversation about it, and the plaintiff said, "There will be extra work there," and the defendant replied, "Go on; you will make plenty out of the contract." His Honour remarked that this extra space could not be brought into the plan. Mr. Poole said the difference between the contract and the cost was more than the extra work charged for. His Honour made certain deductions from items in the plaintiff's bill, and gave judgment in his favour for £14 8s.

LIABILITY OF OWNERS FOR ARCHITECTS' ORDERS.—SANTER v. HASLER AND CO.—Northern Circuit, Manchester, Feb. 4.—Civil Court—(Before Lord Coleridge and a Special Jury.) This case raised an important question as to the liability of building-owners for orders given by their architect with regard to the building on which he was employed. The defendants, who were printers at Bolton, employed an architect named Simpson to prepare plans for new works, and they were afterwards built by a contractor named Burrows, under Simpson's supervision. When the work was finished the lofty chimney was found to be out of plumb, and Simpson, without any communication with his employers, the defendants, gave instructions to a person named Hindley, a sub-contractor for the brickwork under Burrows, to straighten the chimney by tying a rope to the top of it, and hauling it by means of a powerful winch. The effect of this novel and extraordinary attempt to straighten the chimney was that it fell, injuring the plaintiff. For the defendants it was contended that they had not, in fact, authorised Simpson to give an order of this kind, and that he had no implied authority as their architect to give it so as to bind them; but, on the jury finding that the way of straightening the chimney was dangerous and negligent, Lord Coleridge ruled that Simpson, as architect, had implied authority to give the order in question, so as to bind the defendants, and that they were liable, but stayed execution to enable the defendants to move against this ruling. Subject to this a verdict was given for the plaintiff for £500.

THE ST. ALBAN'S CATHEDRAL FACULTY.—An interlocutory discussion was held last Saturday before Chancellor Robertson, D.C.L., on the objections made by Lord Cowper, Mr. Evans, of Nash Mills, Hemel Hempstead, and Archdeacon Grant, to Sir Edmund Beckett's answer to their acts on petition against the faculty, which we stated some time ago that the present faculty committee, the Bishop, the rector, and churchwardens, and all the parishioners, except the archdeacon, wish to be granted to him to continue the repair and restoration of the cathedral. The opponents obtained a fortnight to put in their rejoinder, to which the petitioner can again reply if he thinks fit.

The parish-church of Lamerton, near Tavistock, which, after being once restored, was burnt down about two years ago, was reopened for the second time, last week, after restoration. Mr. J. Piers St. Aubyn has been the architect, and the work has been carried out by Messrs. Blatchford and Sons, contractors, Tavistock, the cost being £6,000.

Our Office Table.

MR. SMITH, one of the inspectors of the Local Government Board, held an inquiry in Manchester, on Tuesday week, in connnection with an application made by the Corporation for powers to borrow the sum of £200,000 for the purpose of completing and furnishing the Town-hall, and a further sum of £250,000 for purposes connected with the Gas-works. It was stated that the cost of the site, inclusive of expenses, was £272,829, 5s. 3d.; excavations for foundations, £4,470 4s. 10d.; the basement story, £28,794 17s. 9d.; superstructure (the shell of the building), £235,220 1s.; erection of towers and finishing interior, £170,850; heating appatus, gas-fittings, water mains and pipes, metal-work, safe and strong rooms, £28,240 0s. 3d.; parqueterie flooring and mosaic paving, £6,045 5s. 8d.; bells and clock, £6,985, 6s. 3d.; furniture, plate, earthenware, and glass, £18,660 14s. 9d.; organ, £4,169 13s. 6d.; painting and decorating, £10,057 3s. 1d.; architect and clerk of the works, £28,313 10s.; sewering and paving, £813 15s. 6d.; and miscellaneous expenses, £17,058 8s. 11d., making a total of £832,508 6s. 9d., or £69,352 9s. 10d. below the full amount sought.

LAST week almost every Children's Hospital in the United Kingdom—(amounting in number to more than 100)—received a gift of about forty copies of the "Little Folks' Painting Book," painted throughout by readers of *Little Folks* Magazine. It will be remembered that the Painting Book—containing stories, verses, and pictures—was prepared by the publishers specially with a view to its being coloured by children for the benefit of the little patients in the Children's Hospitals throughout the country; and to this end numerous prizes were offered to the most successful artists. The widespread interest that has been taken in the project is clearly shown by the fact that upwards of *four thousand five hundred* Painting Books have been received for distribution, from all classes of the community, from the highest to the humblest; while many of the books have travelled hundreds and thousands of miles, having been sent by readers of *Little Folks* in Australia, India, the West Indies, America, Russia, Turkey, Germany, France, Italy, &c.

IT is stated that the negotiations which have taken place between the Government and the Directors of the London Water Companies are founded on a capitalisation of the dividends, estimated with a due regard to all contingencies. Where the due statutory dividend is not at present being paid, the probability of an increase is to be allowed for. The terms have now been settled with all the companies, the directors of the Lambeth Company being the last to come to an agreement. The machinery and works of the various companies are to undergo inspection, with a view to ascertain what amount of outlay, if any, is requisite to render them efficient. The inspection has already been completed in the case of the Chelsea company, and the works of the Lambeth company are now being examined. The financial scheme consists in the creation of water stock, and it is understood that the local rates of the metropolis will be made the guarantee for the payment of the dividends. The nature of the trust or Commission to which the undertakings will be transferred is not yet definitely settled.

FOLLOWING the efforts to produce minerals and precious stones artificially, comes the attempt to convert one mineral into another, a less costly into a more valued gem. Two Germans have patented a process for converting ordinary agate into onyx. Lorenz and Cullmann place the cut and polished agates for a week in a solution of iron in nitric acid only one millimetre deep, and then treat those portions of the stone which are to be white with a solution of equal parts of carbonate and hydrate of potash, dried, and burned in an earthen pot until the desired colour is obtained. An American journal asks: Cannot some readers devise a method for converting ordinary feldspar, orthoclase, into Amazon stone? The latter has a bright emerald-green colour, which is destroyed by heat, but brightened and intensified by certain hydrocarbons, like turpentine oil.

IN a recent paper (*Ding Pol. Jo.*) on the cooling of closed rooms occupied by human beings, Herr Fischer arrives at the following conclusions:—(1) The carrying off of the heat and water-vapour which arise from artificial illumination is impossible by means of the ventilation meant for the inmates. (2) The carrying off the heat and the water-vapour arising from tissue change of the inmates requires larger quantities of air and more extensive cooling arrangements than is generally supposed. (3) To obtain a lower temperature than that of the open-air, in an occupied room, is essentially more difficult than maintenance of the existing temperature, and in many cases is not to be effected by the arrangements hitherto in use.

WINDOW-GRATINGS are, of course, inconvenient by day, and on this account, Herr Born has recently patented in Germany a collapsible grating. It is described in *Ding. Pol. Jo.* (1st January). The vertical bars are supported on a plate, and connected together by jointed pieces, which, when the grating is closed, are fully stretched, forming the horizontal bars. In opening, the joints are bent, and the vertical bars are pushed together, forming a small bundle, which can be easily inclosed in a case at the sides of the window. The grating is in two divisions, which are pulled towards each other, then fixed with a screw fastening.

THE 24th annual conference of the General Alliance of Operative House Painters was opened at Manchester on Monday morning, Mr. P. M'Arther, of Birkenhead, presiding. About 30 delegates were present, representing 90 towns. The chairman reviewed the work of the alliance, and expressed regret that the disruption in Manchester had not been amicably settled. In the evening, a meeting was held in the Co-operative Hall, Downing-street. The chairman's address dealt mainly with certain misrepresentations to which, he said, trade unions were subjected. The primary object of such unions was not to relieve their members, but to defend their interests in relation to hours of labour and wages. He was not prepared to say that workmen should never strike, for he had seen cases where men were bound to strike. Referring to the Bishop of Manchester, he said he believed him to be perfectly fair, but that the advice he gave to workmen was quite as much needed by the masters. The workmen had no desire for war, but the employers must treat them differently. In conclusion, he expressed a hope that the painters would submit to the grievance which had been inflicted upon them in Manchester, and that they would in future have juster and fairer men to act as arbitrators. A resolution, pledging the meeting to support the union, was carried.

THE death is announced of the Rev. Henry Moule, vicar of Fordington, near Dorchester, which happened on Tuesday last, at an age not far short of 80 years. He was, in 1829, appointed to the living of Fordington, which he held for half a century. He was also Prebendary of Fordington in Salisbury cathedral. Mr. Moule was the inventor of the "earth-closets" now so generally adopted in country houses and public institutions, and in support of his invention he published several small works, "A Letter on the Dry Earth System," "The Science of Manure as the Food of Plants," "The Advantages of the Dry Earth System," "Land for the Million to Rent," "National Health and Wealth," &c.

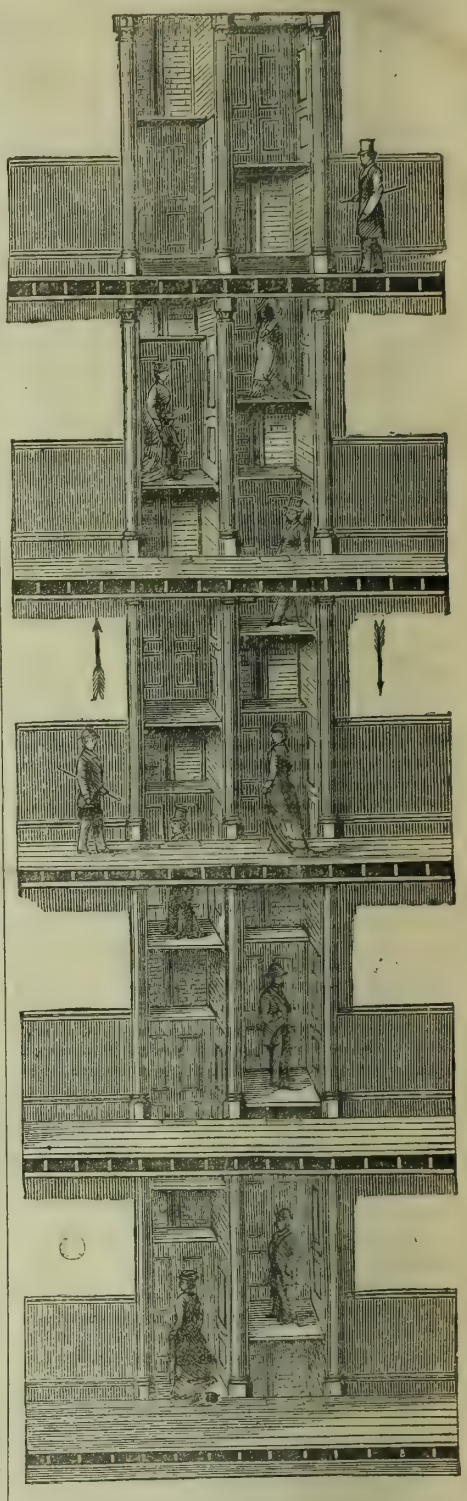
CHIPS.

The fifty-fourth Annual Exhibition of the Royal Scottish Academy opened last week. The exhibition comprises 1,820 works of art, an equal number having been rejected. On this occasion no works have been borrowed, those accepted having been in all cases sent in by the artists. There are, however, a number of pictures, chiefly those of Scottish artists resident in London, which have already been shown at Burlington House.

The prizes and certificates of honourable mention won by the members of the Institute of Art, were distributed on Saturday last, at the Rooms, 9, Conduit-street. The members now number about 400. The prizes were taken by Miss Sophia Beale in the oil-painting class; Miss Emily Jackson, water-colour painting; Miss Dunlop, painting on china; Miss Malinda Hoge, lace-making; Mrs. Elliott Scrivenor, crewel-work; and by Miss Percy Smith for silk embroidery.

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THE BUILDING NEWS.

LONDON, FRIDAY, FEBRUARY 13, 1880.

"ARBITRATIONS."

"IT does not affect us," the British public will, no doubt, say, when reading the decision given on the 4th inst., at Leeds, by Mr. Justice Lush, in the case of Wynn v. Fenwick, reported in another column. At the "first blush" this may appear so; but, on consideration, the matter will assume a very different aspect.

Let us first consider, then, how it will affect the general public; and to do so it is necessary to show what is the position of arbitrators.

A simple case of a fire will be sufficient to illustrate that position. A fire occurred next door to a photographer, at the east end of London. He sent in his claim for his loss. The Insurance office disputed the amount, and appointed an arbitrator on their behalf; the photographer also appointed an arbitrator. The arbitrators met; and the Insurance office, at the first meeting, attend by counsel, and propose to bring, (1) evidence of arson, and (2) evidence as to value of house; and also (3) as to value of the stock; and, lastly, (4) as to value of fixtures and fittings. Some twenty meetings take place; the arbitrators being bound to listen to any and all evidence. Very many witnesses are called, and examined and cross-examined. Photographs are produced to show the premises as they were and as they are. Quantities are taken out by skilled witnesses, to show what the cost of *reinstating* will be. A "view" takes place, accompanied by counsel. The evidence is at last closed, and counsel review the evidence. The arbitrators appoint a day to meet and consider the award. The only point they can agree upon is that the fire, having had its origin next door, arson is not proved against the claimant. Well, the next step is to call in the umpire, submit the notes taken of all the evidence (except that relating to arson, on which the arbitrators are agreed) to the umpire, and the calculations, and the umpire decides; the award is drawn up by the umpire's solicitors, and the arbitrators and umpire sign such award, and agree what shall be the costs of each, and the total amount is the only amount mentioned; the umpire writing to the solicitors of both parties that the award will be handed to either of them on the payment of such amount. When the umpire has received the money, he sends to each arbitrator the agreed amount.

One difference I may mention; it is—that sometimes, where no agreement is likely to be arrived at by the arbitrators, the umpire is asked to sit at once. This gives the umpire the advantage of hearing the witnesses. It must not be understood that the umpire would be precluded from requiring the attendance before him of witnesses, even although they had already attended the arbitrators. He has the power.

Again, it may happen that both arbitrators refuse to sign umpire's award. In this case he signs it.

Now what is the effect of the present decision? It is that directly the arbitrators "call in" the umpire, they lose their right to be paid at the taking up of the award. Does this not put them in a false position? for they may never be paid unless they agree; and is it fair that their efforts to benefit their client (and it must be remembered that it is possible the more earnest they are for their respective clients the less likely is an agreement between them) may result in much unpaid labour?

Already the difficulties of the arbitrator are great; but payment for his services has usually resulted, so that he could feel that good work would receive fair pay. Now he will feel that the work may be well done, and yet receive no pay.

Let it not be imagined that arbitrators or umpire are *now* always paid, because they are not, and many reasons account for this unpleasant result. I will explain how this is. During the progress of a reference, the *view* of the case taken by the arbitrators or umpire may — sometimes must — become known. The party to whom the decision of the arbitrator or umpire will be adverse is not likely, or, at all events, does not usually, take up an award, and the other side may not have the ready money; or both the parties to the reference may be so uncertain as to the award that neither will take it up. Again—unfairest conduct of all—the parties agree to a settlement to avoid the expense of taking up the award.

I remember a peculiar incident. An award was made; neither party took it up, and it remained sealed up year after year waiting that event. After a time, the sight continually of this unpaid labour so annoyed me, and, feeling there was no chance of ever securing payment, that I had it put away among old papers. Some long time after this a solicitor called to take it up. With delight we tried to find it. It could not be found. The solicitor then served formal notice that unless handed over on a certain day, he should hold me personally responsible for all and every loss his client might sustain, and setting out that the other party was bankrupt, and the proof must be made on the certain day he had named. Luckily, it was found, tied up with a bundle of papers having no relation to the matter. This only shows what care should be taken.

The decision in "Wynn *v.* Fenwick" is not so novel as may be imagined. It has for years always been considered a matter of courtesy rather than right, and in my book on "Arbitrations," p. 57, will be found the following: "When arbitrators have disagreed, and an award is made by umpire, he *should* charge the fees due to the arbitrators as part of the costs of the umpirage." If he were obliged, the wording would be *must*.

While it is difficult to estimate the services rendered by the umpire in this case, the observation of counsel that he had charged £149, and was only occupied three days, does not appear an unfair comment; and certainly one would imagine that he, the umpire, would not so strongly object to the arbitrators' charges for their 74 days' labour, as the remuneration would be at the rate of about £5 13s. a day, while his own charge was at the rate of about £50 a day.

Of course there may be some explanation not given in the report of this case; but if that report is correct, it would appear that the items were agreed, and all the umpire had to do was to check the prices, and yet, while charging about £50 a day for his services, his counsel said: "Mr. Fenwick, the umpire, felt he could not lend himself to such a *scandal* as the charges made by the arbitrators," their charges appearing to be *pro rata* less than *one-eighth* of his own.

This decision will not, probably, affect the usual method being continued of the umpire adding the costs of the arbitrators to his own; but it would appear that, should it have that effect, it will be necessary to have an understanding when appointed.

I think the conclusion the public will arrive at is, that they have little cause to be pleased with Mr. Justice Lush's novel decision. The conclusion that arbitrators will arrive at is, that they will have a decided preference for being umpires, and they may say in the words of Shakespeare—

"Let me be umpire (not arbitrator), in this doubtful strife."

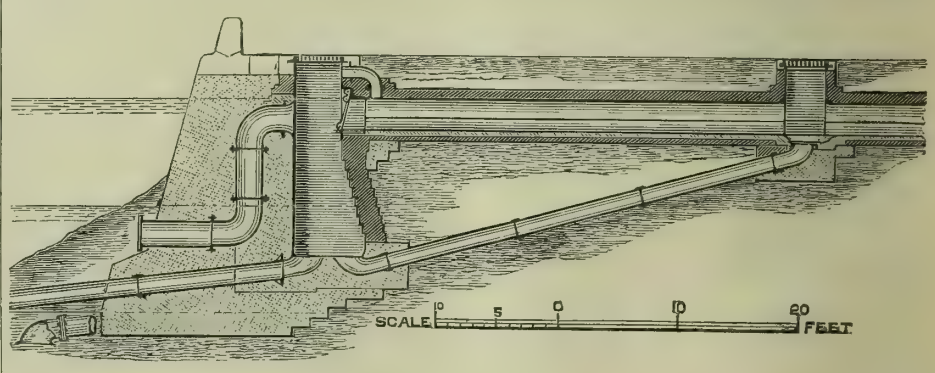
B. F.

DETAILED DRAWINGS FOR SEWERING AND WATER-SUPPLY.

THE idea of furnishing, at a low nominal cost, local engineers and surveyors, under the Public Health Act, with drawings to a large scale exhibiting the most approved methods for main-sewerage and water-supply, such as man-holes at junctions of sewers and pipe-sewers and for steep gradients, flushing chambers for flat gradients, outfalls for steep sea-cliffs and tidal estuaries, tidal flaps, and the various details for water-supply, is one that will commend itself to all those holding public appointments under the Act. It is well known, to the cost of many local surveyors, that the Local Government Board are rather exacting—as, indeed, they are compelled to be—in requiring a compliance with certain principles whenever plans are submitted for various purposes under the Act; indeed, we know that it is not an uncommon thing for surveyors to submit schemes and details for sewering a town or district that either very imperfectly fulfil the object, are too extravagant and visionary, or do not satisfactorily carry out the provisions of the Board. In such cases the labour is thrown away, the plans are returned for amendment, and valuable time is lost. To obviate these inconveniences in the carrying out of the Act, and to facilitate the labours of the local engineers, Robert Rawlinson, C.B., chief engineering inspector to the Local Government Board, has recently prepared, and the Board has issued, a series of official "Suggestions" upon the preparation of district maps and plans for main sewerage and water-supply, the gist of which we gave some months ago in a notice of the book. As a supplement, not the less desirable, and of even more practical utility, he now publishes a series of ten sheets of detailed drawings, in which the engineer or surveyor will find to his hand, probably, the detail he is in quest of, or information that must afford him great facility in the preparation of his plans. These drawings embrace a variety of methods to suit various local circumstances, such as levels, contour, and outfall, so that now an engineer never need to be at any loss, or in any difficulty—in fact his work is in a great measure cut and dried for him, as regards details at least. Engineering in many of its branches is beginning to become an exact science, and in matters of this kind speculation may be profitably reduced, if not superseded altogether, by actual data, based upon the most approved principles. No engineer can now question or theorise about the right forms and sizes for sewers, nor the sections of manholes or flushing-chambers. Gradients and outfalls are pretty much the only varying factors, but these admit of only one or two forms, so that the science of sewering can now be reduced to a few easily-understood rules, and so much easier does the engineers' work become. We cannot, without diagrams, do full justice to Mr. Rawlinson's detailed drawings, but we can profitably direct our readers' attention to some of the suggestions made in them. The introductory remarks of the author are first worth remembering. He there refers to the varying sites and surface-contour of towns, showing that they require different modes of treatment. Every engineer must, for instance, echo the remark: "Some towns, as Portsmouth and Hull, situated on the margins of tidal estuaries, are, for the most part, low and flat, whilst other towns, like Brighton, Liverpool, and Sunderland, though also situate on the sea, or the shores of estuaries, have steep gradients, from which the water, falling during heavy rains, is

accumulated and rapidly precipitated, to the destruction of the sewer inverts, by the extra scour and wear." Each area, therefore, he shows, requires attention, that right forms may be given to the sewers. In speaking of interception, Mr. Rawlinson insists upon the common-sense arrangement we have so often advocated in these pages. It is simply this: that many points of sewage-gas interception and main-sewer ventilation should be constructed on the sewers, so that the gases may be subdivided and liberated at these places during all hours. It is rather singular so many engineers still try to concentrate sewer-gas by confining or bottling it up in long airtight drains, and then attempting to get rid of it by lofty shafts, at a few points, the effect of which ventilation is practically futile, as the poisonous effects of the gas are being gradually given off at innumerable weak parts of house-drains and traps. The clause on "Intercepting Sewers" in the introduction we may quote as the only plan that will commend itself to the engineer who has to prepare plans for draining hilly districts: "Where the character of the ground and the formation of the lines of streets will admit of the arrangement, town areas having steep gradients should be divided into zones, main intercepting sewers being formed on contour lines to receive the flow of sewage from the upper area, and prevent accumulation of sewage in the low-level system of sewers." But let us refer to some of the drawings. In sheet I. we have several good forms for man-holes. Fig. 1 shows a plan and section of one at the junction of two sewers, or rather pipe-sewers, into which they enter, and which pipe-sewer has a right-angled turn. There is a sluice-valve and chain for flushing, and the cover of man-hole is open and intended to serve for ventilation. An iron pail under the cover intercepts all dirt that may fall in. It is so fixed on an iron bracket to the side of man-hole that it can be made to turn round to admit of entrance when the cover is taken off. The man-hole is square in plan, 3ft. 6in. wide in clear, 10ft. deep to invert, and has 9in. brick walls, with a bottom of brick and cement upon a concrete foundation. A moulded bottom of Portland lime concrete is also suggested. A similar arrangement to that just described is shown in Fig. 2, which is for a single-pipe junction with 18in. sluice. Another example shows a light iron plate working in a groove that can be lowered to stop the flow of sewage or raised to let it off suddenly. In this instance an overflow over the top of sluice is necessary to prevent the man-hole being filled above the level of the sluice when shut. Fig. 5 is a man-hole, with pipe-sewers of 9 and 21in., with an overflow near the top for storm-water. A few sections for lamp-holes and ventilating pipes for sewers are given in Fig. 6. These are for the upper ends of sewers and drains and intermediate points between man-holes. They show 18in. sewer-pipes, and 9in. stoneware, socketed or cast-iron ventilator-pipes, embedded in concrete, and opening into small gullies or cesspools of brick. Sheet No. 2 contains a few designs for manholes, on steep gradients. The principal features in these are the ramp, or "tumbling bay," by which the flow of sewage in steep gradients may be arrested, and the valves or flaps to the sewers and drains, to check the up-current of sewage-gas. One section shows a pipe-sewer with a light flap cover at the end of the highest outlet, so as, by preventing in-rush of gas, to let it escape through man-hole grating. The junctions are of cast iron, which is better than earthenware when there are many man-holes to construct. Another section shows the same arrangements for a brick sewer, 3ft. by 2ft. Fig. 3 has a screw action to the sluice, for flushing, and an overflow-pipe for a sewer 4ft. 6in. by 3ft. The inverts are of semi-vitreous blue bricks, the overflow-pipes are of cast iron. The latter are introduced from about the level of the crown of inlet-sewer and turned vertically downwards into the outlet or lower sewer. The ordinary flow of sewage may be provided for by an inverted siphon descending from inlet end of sewer just behind the flap, and ascending to the lower sewer or invert of ramp. The flap of main sewer can thus remain closed against any upward flow of gas from the sewers below. We may observe that these man-holes are shown circular in plan, and diminish as they rise by set-offs on one side above the junctions. The sections for flushing-chambers for the upper ends of sewers are useful. The outlet and overflow pipes form a cast-iron junction-piece opening into man-hole. The chamber itself is cylindrical, and, of course, its length and cross section must be determined by the capacity required. At the upper end of chamber a ventilating pipe, with open grating over, is fixed. These arrangements are intended to be supplemental to man and lamp-holes, which latter are for cleansing and examination purposes. The flushing arrangements for large brick sewers are pretty complete, and the manner of opening and closing the gates is clearly seen in the sections. A chain passing up the man-hole closes the gate, and when the flush is required the chain may be slackened and the gate turns over on its pivot. Sheets Nos. 5 and 6 are particularly valuable to engineers who have to deal with outfalls on sea coasts or tidal rivers. The first shows an outlet to the sea through a steep sea cliff or rock as in many seaport towns. The brick sewer ends at a vertical shaft bored in the rock, in which a cast-iron pipe descends and turns into a horizontal heading, discharging at low water. For the provision of storm waters the sewer is continued also horizontally to the face of cliff at a slightly lower level, the difference being joined by a ramp. Hinged flaps are shown at the outlets of sewer in each case, the outer flaps are to prevent the wind blowing up, and the inner ones to arrest wind or sewage gases flowing back into the main sewers. A man-hole at the junction of sewer with the vertical shaft and overflow is shown; it also acts as a ventilator. Provision we see is made for access to the iron pipes which descend through the vertical shaft and tunnel for repairs, and also in the lower part of pipe for air-vent when the tides are high. In the next sheet, No. 6, is shown a sewer-outlet on a tidal river, the detail for which we have engraved as a good mode of dealing with a difficult point. The sewer-proper ends as before at a man-hole, though it is carried on as an overflow for flood water to the shore. At the first man-hole, where the sewer-proper ends, an inclined cast iron pipe is introduced which carries the ordinary sewage to the second or deep chamber, and from thence it continues to the low-water level. The upper or overflow part of sewer also ends at the deep chamber where it is closed by a hinged flap, and on the opposite side a bent overflow cast iron pipe discharges on the shore at some point below high water. By the arrangement of a second man-hole-chamber the tide can rise and fall without interfering with the overflow of sewage, while its ventilating cover allows the gas a free escape upwards. This chamber is shown constructed of brick, and the whole of the outlets are embedded in concrete. If this plan be properly carried out, we cannot see how the sewage-gases can be driven back into the sewers when the tide rises, while the second or upper man-hole ventilator is another safeguard. We may add that details of balanced tidal flaps for outfall are given. The inner rims of the flaps have bands of vulcanised indiarubber upon hemp-rope packing, to make them fit tightly against the cast-iron sewer.

Sheets 8, 9, and 10 show plans and sections for details of water-supply. One is a covered service reservoir to a ¼in. scale, constructed of brickwork with concrete backing. It is a parallelogram on plan, divided into three parallel avenues by piers, and the surrounding walls have buttresses corresponding to the piers. Two sections are given, which show the brick arching and concrete backing, ventilating openings, and every detail necessary. A few useful suggestions are given in the descriptive notes in which Mr. Rawlinson says, that if the bottom of the reservoir should be of gravel or sand, the "entire area should be incorporated with silt, by washing clay in and incorporating it with the subsoil." A single lining of clay puddle on such a bottom is liable to crack. Portland lime concrete is recommended in preference to clay puddle, and great care is necessary in carrying up the side walls and pillars. In the drawings furnished, the inlet and outlet valve-chamber, an overflow and wash-out chamber are shown outside the reservoir, by which arrangement the reservoir can be emptied for cleansing or repairs without disturbing the supply. On sheet No. 10 a plan and section for a covered service tank in concrete is given. It is planned similarly to the last, but is divided into four bays, by three longitudinal walls of concrete, which are pierced by arched openings instead of the piers, as in the brick tank. At one end on the outside are arranged the service and rising-main, and at the other end the overflow. Full details are given of the connection of the inlet and supply-mains, screens, &c., and the descriptive letterpress contains a few practical directions as to the brickwork and covering arches. In the cross-section of the brick reservoir the vaults are shown cambered slightly in the centre, so as to produce a rise; this is effected by carrying up the centre barrel-vault higher. The appendix, we find, contains some useful memoranda as to materials, and with the "Suggestions" formerly published, the drawings will form a most valuable and practical illustration of the two branches of sanitary engineering. We may add the sheets can be obtained at 2s. each, from Messrs. Knight and Co., of Fleet-street; Harrison and Sons, Pall Mall; E. Stanford, Charing-cross; or of W. H. Allen and Co., of Waterloo-place.



THE ROYAL ACADEMY OF SCOTLAND.

THE R. S. Academy Exhibition was opened recently, and promises to be liberally patronised, the receipts for sales on the opening day exceeding in amount those of previous years. A cursory inspection of the rooms is enough to indicate that the general attainments of this Scottish school of art are of a high order of excellence in all branches of portraiture, figure, and landscape painting. There is no work this year commanding any very great interest. The positions of honour are held by works of secondary importance, and the wonder is, that with such a wide distribution of artistic power, there should not be more pictures with loftier aim and more enduring interest. A few, however, there are: Sir Noel Paton illustrates mythology and mediæval legend in his "Dream of Latmos" and "Sir Galahad." In the former, the fair lady, in the form of Cynthia, hovers over the sleeping Endymion, and is just about to steal her nightly kiss. Sir Galahad is on horseback, and the sudden appearance of the Holy Grail seems to have partially unseated him, as he bends in adoration at the vision. Both works are of small size. There is a curious picture by Archer, entitled, the "Sacrifice to Dionysus," intended to illustrate the fact that the worship of the true Bacchus was a very sober and innocent cultus. Certainly his presentment of the subject bears about as much resemblance to the ordinary Classic delineations as Mr. Gladstone's claret has to that fiery stimulant, Scotch whisky; and the picture is perhaps intended as a homily on temperance. "Interviewing the Member," by E. Nicol, is another popular work—of a serio-comic kind—but it does not tell its own story very clearly. The faces are Scotch and the dress is Irish, the Member, in hunting costume, looks as if he were roaring at the hustings, instead of answering questions in a parlour, and his tormentors are huddled together like a pack of hounds waiting for the prey, and yelping at the huntsman. The most impressive work probably is "Cardinal Beatoun's Capture," by Lockhart. "Judith's Prayer, before entering the Tent of Holofernes," by Portaels, is a large subject. The expression of the countenance, and the attitude of the arm and hand indicate forcibly the desire for aid to undertake a work for which her heart might fail. Architecture in its picturesque form is very scarce. There are two works professing to be pictures of that interesting relic of the Later Norman, "Leuchay Church," of which a faithful etching was given in the BUILDING NEWS, some years ago. Both are pretty pictures, but they are not pictures of the church, of which little or nothing is visible. 832, Gateway, "Cærtmel Priory," by E. Little, and 822, "The Painter's Window" in St. Machar's, Aberdeen, and 1023, "Roslin Chapel," by J. Leime, are the principal, if not the only, works of this character. The Architectural section is less in bulk than it has been for years, about 30 works in all, the half of which are church subjects. In the delineation, etching or pen-and-ink sketching has almost entirely superseded water-colours, and this, when artistically executed, is always satisfactory. But there are sketches on the walls, of fair design, of which any junior student in the Academy would be ashamed. There are only two Mansion Houses of the larger sort; 977, "Ballinard, Forfarshire," is prettily situated in extensive park ground with landscape gardening, and moor and forest scenery around it. It is an effective water-colour; the house itself is roofed with overhanging eaves and projections and gables are very nicely managed, without anything of needless decoration. 985, "Drum Castle, Aberdeenshire," is also a large water-colour sketch of additions and alterations recently made. The Castle proper is an ancient one (the square keep), and the wooden habitations seem to have grown up around it by a process of addition and alteration which has made no attempt to emulate the fortalice in design, consisting of a picturesque straggling group of buildings of no great height. 988 is a beautiful pen-and-ink drawing of the "Head Office of the City of Glasgow Bank." This was illustrated in last year's BUILDING NEWS. The characteristic feature is the intercolumniation over the ground story, with the architrave and figures overhead. All the detail is clearly rendered, and worthy of a careful inspection. 984, "Design for Institute of Fine Arts, Glasgow," is another beautifully-executed Geometric Elevation, but placed rather high for minute inspection. The only defects apparent are the enormous scale of the honeysuckle incised decoration, and the amount of plate-glass beneath the ashlar masonry above. 991, "Design for a Town Hall," by J. Armstrong, is an elevation of the front, with octagonal domes in the centre and extremities. The larger one in the centre, as well as the others, is of good proportions, but the effect of the design is impaired by carrying the octagonal form in all the three to the ground-line. The etching, however, is so indefinite in the outlines, and the shadows and the projections forming them so blurred by over-scratching, that it is not easy to make out the real form of the details. 989 is a very elaborate etching of the "Duomo and Campanile of Florence," by A. Taylor—to a small scale, however—which is hardly consistent with the amount of the detail exhibited. The Campanile is well rendered, simply from the fact of its distance making the detail less complex. But the perspective lines are carefully rendered, and a little of light and shade would much improve it. 986, "East End of Elgin Cathedral restored," by S. Stronach, is a beautifully distinct, and, no doubt, accurate, development of what was by far the most splendid of the Scotch cathedrals. 998 is a "design for a street-front," by J. Small, in the picturesque style of the old timber houses, projecting balconies and carved supports, &c. This drawing is too far away for critical inspection of details. The only School Buildings are two by Mr. Anderson, one of which has been for some time erected. 993, "West Fountainbridge," and 995, "School House at Kirkcaldy." Both are perfect specimens of geometric elevations. There is no plan or projection of shadows, and consequently 993 does not give the spectator any adequate notion of the ingenious method by which the architect has managed to get a maximum of light for the school, which is placed in one of the darkest and dingiest of the narrow thoroughfares of the City. In the Kirkcaldy school there is no upper floor, and the aspect is not improved by the chimney-stacks and flues thrusting their not very pleasant form upon the eye, when they might perhaps have been more seemly and useful if built in the ordinary way. These schools are both of purely Gothic design. 968 is a villa by the same architect, "Allermuir House, Colinton," the only representative of its class. It is an artistic etching of a country-house, with the stepped gables and steeper pitch of the old Scotch Gothic, with some quaintness in the arrangement of its lights and irregularity in the projections, which make up a very pleasing composition, without any of the usual or more expensive accessories of villa decoration. Church architecture is largely represented. In the designs exhibited there are not a few which are evidently constructed with nave and aisles, though all, or all but one, are for Presbyterian service. The use and wont system, however, apparently still holds its own. The Presbyterian is not yet educated sufficiently in the matter of æsthetics to abandon the traditional meeting-house, with its galleries and facilities for neighbourly inspection and proximity to the pulpit. 976 has a general interest as being a well-intentioned but very imperfect attempt to represent the interior of St. Giles' Cathedral as it would appear from the western extremity when restored as proposed by Dr. Chambers. The drawing is a very large delineation in pen-and-ink, but neither the forms of the pillars, nor the lights of the pictures are properly rendered, so that the impression is not favourable, and the complexity of the pillars will confuse any one not acquainted with the edifice. Enough, however, is detailed to indicate that the choir will be shut off from the nave by a wooden screen—placed were the Royal pew now stands. Possibly this screen may be itself the Royal pew. No arrangement can well be satisfactory which so obstructs the view of the choir—a plate-glass screen might be erected—but it is plain the present arrangement of the choir is quite unsuitable for a general restoration of the interior. Of the larger church designs with nave and aisles, 967, "Free Anderston Church, Glasgow," is a well-erected pen-and-ink drawing of a design very similar to that which appeared in the BUILDING NEWS last year, and was commented on as having a strong resemblance to a street church of Mr. N. Shaw. In this design there is the addition of a spire. The architectural decorative detail exhibits little of the æsthetic skill which marks the Classical designs of Messrs. Douglas and Sellars—and the tower-like proportions of the front, the gable being swallowed up by the buttressing, which is not relieved in any way by surface decoration— is a mistake, which it would need considerable surface ornament to correct. The pinnacles of the spire are too much recessed, and appear to be clinging to it for support, instead of acting as counterpoise to possible thrust. The little surface arcading next the tops of the belfry opening has a very purposeless look. 974 "Mayfield Church, Edinburgh," is another church of the same description, and one of the most effective etchings in the delineation of details. The front has a peculiar feature in its two separate entrances on either side of a central buttress. The spire is not improved in the belfry stage by the amount of its louvre boarding.—992, "Free Mayfield Church," is not so large a church as the preceding, but the drawing is three times larger. The perspective is drawn from the worst point of view, at an angle of 45°, and whilst the length is exaggerated the altitude is lessened. The church is well proportioned in every way, and is one of the most richly decorated of the Presbyterian churches in the city. Its defects arise from this source. The architect seems to have been enamoured of certain details, and determined to have them executed. Clustered pillars in window jambs are very beautiful, but our ordinary walls are much too thin to admit of the subordination and variety essential to their beauty. In the same way, the two pretty windows in the front would have been much prettier if the blank windows at the sides had been omitted, the arcuation, or its outline, forming a very unpleasing feature in the masonry, encroaching too far upon the breadth.—978, Granton and Wardie Free Church is too far away and too faint in colour of the pigment to admit of any critical inspection. It is another church with nave and aisles, and has a tower without the spire.—987, U. P. Church, Morningside, is also a church with nave and aisles, having great breadth apparently in proportion to the length. This is one of the inaccurate and inartistic etchings, and the design exhibits in many of its details a very slender acquaintance with the style selected, which is the Norman. Of all the varieties of mediæval architecture this is probably the one most unmanageable for a large modern

church. The result of designing in this style, from a superficial study of its decorative characteristics, can be seen by inspecting the lifeless decoration of the Episcopal Church, in Rutland Place, or in recollection of the late Dr. Candlish's Church before it migrated to Stockbridge, where its character is partially redeemed by the erection of a tower in better keeping, at least, with the massive character of construction in this style. The design for this modern church has nothing Norman about it, but its charon mouldings and its angle pillars and circular arching. The cornice moulding is transitional, like Lauercost or Jedbugh, and is constructively misplaced. The tower is not of Norman proportions, and buttressed with early English buttresses. The range of what may be called chancel triplet lights in the clerestory, without the usual pilaster buttressing or corbelled recesses, gives an aspect of weakness to the walls, which is not removed by the curious addition of pyramidal bits of masonry appearing over the cornice, where the trusses fall. The proportions of the edifice are well adapted apparently for a classical interior or some of the modern developments of the ancient Romanesque, towards which, indeed, all Norman architecture would probably have come had the pointed arch not superseded it by the superior advantages of its economies of construction. It is quite possible, however, that these superficial defects may be much exaggerated by the evident inaccuracy of the drawing. The remaining designs appear to be of the ordinary type, *i.e.*, galleried churches, without any subdivision in the construction of the interior, except what is necessary for support of galleries or roof. 969, "Argyle-place, U. P. Church," is an etching in pale sepia, in which not a single line with any curvature is correctly rendered. The architect has evidently taken his ideas of detail from modern Gothic not of the best description. In the panelling of his pinnacles and weatherings of buttresses the prentice hand is apparent. But the design, which is the principal thing, is good, so far as any design in Gothic can be good, in which the proportions of the edifice itself are a perpetual protest against every organic line and curve of the detail. The width of the interior, which appears to be constructed for galleries, is well marked by acute gables, and traceried lights, rising into view around the spire, and the drawing gives a very unfair representation of the edifice as it appears. The house at the end of the church ought to have been treated with more of ecclesiastical design. 983, "South U. P. Church, Galashiels," is another large church of the same doubtful consistency as to its Gothic, but treated in the usual Nonconformist style. The tower has far too much surface decoration on it. 990, Trinity Church, Dundee, is a piece of street architecture, the upper room, with range of shops below. The design shows a handsome wheel window, and two effective turreted pinnacles at the extremities, but there is no attempt at other decoration. The remaining designs are for smaller churches. 965, "Colinton and Currie Free Church," is the ordinary plan apparently with gable front, ornamented with Belfry and other ordinary accessories, but it is placed out of reach of any notice of the detail. 997, Catholic Chapel, Ratho, gives plans and prospectives of interior and exterior. The drawings are rather far off for observing the detail. The interior shows hammer-beam roof and arched principals, with rood-screen. 972 exhibits the new Chancel to St. John's Episcopal Church, with a new design for the east window, which, however, does not appear to be so good as the present one, which is the only good one in the building. 975, "Design for proposed Completion of Free St. George's," is a handsome and lofty campanile, with perhaps rather too much of the Mediæval about it to harmonise well with the heavy cornice mouldings, projections, and horizontal decoration detail in the Classical design it is to complete.

REPRODUCTION OF SCULPTURE.

THE enlargement and reduction of sculptures and ceramic works, in which we are considerably behind our neighbours the French, promises to become a new and profitable field of artistic enterprise. MM. F. de Marnyhac and G. Hubmann have just opened a new atelier, at their establishment, 163 and 165 Regent-street, for the reproduction, enlargement, and reduction of the principal works of statuary in the British Museum. The association they have formed called, "The Fine Art Reproduction Association," is chiefly with this object in view, also for furnishing English sculptors and others with facilities so extensively enjoyed by artists on the continent for the reproduction of their works, and for bringing them before the public. The idea of popularising the priceless treasures of Greek art now buried in the dark cellars of the British Museum is a good one. Mr. C. F. Newton, in a lecture on Greek sculpture the other day, observed that a part of the Townley Collection, which cost the nation £20,000 at the beginning of the present century, has remained uselessly idle in the dark basement of that building for upwards of twenty-five years, and is now visited only by foreigners. Messrs. F. de Marnyhac et G. Hubmann have taken the initiative, and the Company have, we understand, made arrangements with the Society of Artistic Marble and Bronzes of Paris, and other collections, for the reproduction of works of marble and bronze, which now only grace French and Italian museums. The process which we have seen in operation at 163, and 165, Regent-street is remarkably simple and ingenious. The instrument used in copying or reducing is known as Sauvage's, but is simply a large pantagraph loosely suspended by cords to the ceiling at two points so as to be readily moved or adjusted by the operator to any plane or position required to trace the original. The instrument is pivoted at one end of arm to a sort of slotted bench, so that it may be moved nearer to, or farther from, the model, and by which also it can be shifted from a vertical to any oblique plane. The limbs having the guiding and tracing points are suspended by cords passing over pulleys, by which means the dead weight of the instrument is carried, and the operator can adjust his guiding point to any part of the model. In the process of copying, enlarging, or reducing, the operating artist takes the movable and suspended arms of his pantagraph in his hands, and passes the guiding point over the part of the model he requires to copy, at the same time as he does this, the tracing point or tool is precisely in the position required to work at the copy. Every point, curve, or plane traversed by the guiding point is simultaneously and proportionately transferred to the copy, and the superfluous plaster can be removed by a succession of strokes or curves made on the original. We saw the torso of a Venus being enlarged to a colossal size by this means, and we may observe that every stroke or trace of the operation is repeated in the plaster copy with great exactness, and without the necessity of retouching. In fact, by the principle of construction of the pantagraph, which most of our readers know, if they have ever copied or enlarged maps by it, the original and copy are geometrical counterparts. The most minute curve, point, or mould line in the statue is reproduced with mathematical precision to the enlarged or reduced scale, and a copy, either enlarged or diminished, can be produced in a very short time. By the aid of a horizontal chain or band round the bottom of the model and the copy, the artist can gradually turn both on their axes simultaneously, so that any part of the statue or rotund object can be brought under the operation of the instrument. We may mention that the four steel bars of the instrument are perforated with holes so that it can be set to any desired scale in the same manner as the pantagraph. A valuable use for which the process may be employed, is the reduction of great works of the antique for schools and other purposes. The large size of some of the colossal statues makes it difficult to obtain copies of them. We hear that MM. de Marnyhac et Hubmann have reproduced the Ostian Venus to an enlarged scale, or to the heroic size of the bronze Venus of Milo in the Louvre; and are engaged upon other statues from the Græco-Roman and Lycian Rooms of the Museum. The process also can be applied to the copy of bas reliefs and architectural ornaments. The Society further intend to establish a school for bronze work. Our rapid survey of the collection of bronzes in the Maison Marnyhac is sufficient to show us that the Society have opportunities for promoting the art here; while the facilities they are about to afford for reproducing and copying in various proportions our masterpieces of art in bronze, plaster, and marble, deserve all success as an educational work.

CHURCH RESTORATION.*

SIR EDMUND BECKETT has just published a second edition of his "Book on Building," a work we noticed at the time, to which he has added a long chapter on "Church Restoration." In fairness, he says, to the possessors of the first edition, he has published the additional matter separately, so that they may obtain it, enabling at the same time others to do so, for whom the subject has a special interest. Probably the recent conflict in which the author has been engaged with the Anti-restorationists, and with one or two leading architects, has induced him, more than the former liberal reason, for departing from the usual course in publishing the additions in a separate form. Be that as it may, Sir Edmund Beckett, in the work before us, enters more into the arena of controversy, by repeating the arguments he has used in the St. Alban's roof dispute, than in laying down any distinct principles to guide the public; and the little pamphlet, from beginning to end, breathes rather the spirit of the *odium architectonicum* than that of a dispassionate treatise. The 36 additional pages are divided into several sub-headings, and the "Anti-restorationists" and the "St. Alban's Abbey and Southwell Minster Restorations" are subjects that occupy the larger portion of the pamphlet. We are not surprised to find that Sir Edmund Beckett, with his usual common-sense remarks, is constantly at variance with architects, and that even his great and intimate colleague, the late Sir Gilbert Scott, does not pass unchallenged as a restorer. The author says, "Restoration, in the proper sense of repairing old work by copying it, or building in the style of the old work if it is past copying, began towards the end of the Georgian era, in the quiet way of clever resident masons being kept at some of the cathedrals doing work of that sort as ordinary repairs, without any interference of architects, and they often did it much better than a great deal that has been done since." It is necessary to observe the "churchwarden masons who used to make a good thing of their office" are not to be confounded with them. Speaking of the unlikeness of restorations to the old work, the

* Church Restoration: from the second edition of "A Book on Building." By Sir Edmund Beckett, Bart., LL.D., Q.C. London: Crosby Lockwood and Co.

author mentions Scott's work as superior to all others in the quality of resemblance to the genuine Gothic work of the originals; and yet it is said even Scott "went on for a good while fancying that he was imitating old proportions, depths and thicknesses, and modes of working stone and wood, until he was made to see that he was not, and then he had the candour and good sense to change. His eye for proportion was never very good, as is proved by all his great original works." All Saints, Halifax, has certainly the fault of a too tall spire; but we have certainly considered that Sir Gilbert Scott had a good eye for proportion, whatever his other faults may have been, and we think this view will be generally endorsed. Sir Edmund thinks he was never successful in any complete composition of his own, and the shrine of Bishop Lonsdale, at Lichfield, is declared to be a lamentable failure. He further speaks approvingly of Scott's later woodwork, but not so of his metal work "for which," the author says, "he had acquired an unwholesome affection, and wasted thousands of pounds of his employers' money on it." Again he speaks of that architect's carelessness, and that he had several times to convince him of the inadequacy of his abutments for vaulting. The author, nevertheless, pronounces Scott the greatest architect of this age, though a long way short of a truly great one, and adds, "I wish I could think that he has not carried his mantle to heaven with him." The Anti-restorationists, of course, are attacked, and a few sensible remarks are made at their expense. Speaking of them he says, "It is no doubt easier to invent plausible maxims and call them principles, and to subscribe a few shillings a year to some society with a fine name and a secretary or president to write letters in their name to the newspapers, than to take the trouble to understand your own business, and control the ignorance or wilfulness of men who tell you that your only business is to pay their bills for doing as they choose." On the protests of the Society against the removal of the modern pews and galleries at Southwell, Sir Edmund waxes warm. He says he is happy to say their protests in this and about the choir of Canterbury were treated as they deserve, and adds, "They are only fit to rank with anti-vaccinators and objectors to interference with other filth." The cant of "conservative restoration" is exposed in terms that we cannot disapprove, and the absurdity of architects "rebuilding defects and accidental bits of ugliness" is equally ridiculed. St. Alban's Abbey restoration is adduced to illustrate the writer's views, but the facts are already well known to our readers. The opinions of Sir Gilbert and Mr. J. O. Scott on the roof are given; but our author is amusing when he ridicules the conclusions arrived at by the anti-restorers, especially Messrs. Christian, Street, and Co., whom he designates as the "impartial party from the R.I.B.A. and Antiquaries," and who admitted in detail the necessity of every bit of new work which had been contemplated. As we may suppose, the Southwell Minster case is rather exultingly brought up to justify the author's views in the St. Alban's roof alteration. In this part he observes: "The Anti-restoration Society have begun to find out the difference between architects preaching conservative restoration when they criticise the work of other people whom they do not like, and against whom they happen to have a private grievance, and doing restoration jobs themselves." Reference is made to the recent misunderstanding between the Society and Mr. Street, touching his proposals to remove the great stone rood-screen of the 14th century, and Mr. Street's denial, which the author makes to appear very contradictory. Sir Edmund Beckett does not leave that architect alone, but makes much fun both out of him and the Anti-restoration Society, in the matter of the undulating surface of the mosaic pavement at St. Mark's, Venice. He says: "They and Mr. Street especially have been distinguishing themselves again, by proclaiming and demonstrating that the undulations of the mosaic pavement is a most interesting and artistic original feature, which it is desecration to restore into flatness." But we have no space to say more. Sir Edmund has the good sense and judgment to expose many of the crazes of antiquarianism and architectural restoration, his remarks on the phrase "sham Gothic," used by the Society, and his denunciation of the doctrine that nothing should be introduced that is required for a good reason now which formerly did not exist, will commend themselves to all sensible minds, and his work at least represents the rational side of the great question of restoration.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

At the fifth ordinary meeting, held on Monday evening last, the chair was occupied by the president, John Whichcord, Esq., F.S.A.

At the request of the President, the Secretary read the by-law in reference to the award of the Gold Medal of the Institute, on which

The President announced that the Council that afternoon had resolved to nominate Mr. John Loughborough Pearson, A.R.A., to be submitted to Her Majesty the Queen, as the Royal Gold Medallist for 1880. (Applause.)

The Secretary announced the names of several candidates for the Pugin Travelling Studentship for the current year.

The Secretary also announced that the Council had awarded the Pugin Travelling Studentship for 1880, to Mr. Leonard W. Stokes, and had awarded special prizes of silver medals of merit to Mr. Frederick Hemings and Mr. J. Landsdell, who had taken part in the competition.

The Secretary said he had formally to announce the lamented death of Mr. E. M. Barry, R.A., a vice-president of the Institute, and to add that the Council had received letters of sympathy, from Mr. Eastlake, Sir Thomas Beckett, and Mr. Edward Nash, and other well-known members.

The President thereupon read an address, and a resolution was then proposed and carried, offering the condolences of the Institute to the relatives of the late Mr. Edward Barry.

The following gentlemen were then balloted for, and elected:—As Fellows: Sydney Stent, Department of Public Works, Cape of Good Hope; Joseph Fogerty, 1, Westminster-chambers, Victoria-street, S.W.; William Warlow Gwyther, 43, Lincoln's Inn-fields, W.C.; Charles Bell, Associate, 4, Union-court, Old Broad-street, E.C. As Associates: Vincent Wing, 4, Westbury-terrace, W.; Hamnett George Furner, 31, Windsor-road, Ealing, W.; Cyril Blacket, 131, Pitt-street, Sydney, New South Wales; John Edward Sears, 26, Addington-square, S.E.; William Charles Street, 4, Westminster-chambers, Victoria-street, S.W.; Arthur Job Barlow, 22, Great George-street, Westminster, S.W.; Ernest Flint, 5, Laburnum-cottages, Middle-lane, Crouch End, N.

DISCUSSION ON ARCHITECTURAL COMPETITIONS.

The President expressed the pleasure he felt at the presence of a distinguished Honorary Associate, Sir Edmund Beckett, and asked him to continue the debate on Mr. Porter's paper, read at the last meeting.

Sir Edmund Beckett, Bart, Q.C., said that Mr. Porter's paper dealt entirely with the professional side of the question, or the "commercial side," as one of the building newspapers had termed it. He should not have interfered in the discussion if he had not been invited to do so. As an outsider he had practically nothing to do with the professional view of the question, but he had a right, as one of the public, to express an opinion, though, as an Honorary Associate, he should not have offered any advice unless specially asked to do so. Having referred to the unique character of the Institute among learned societies as being composed, during the greater part of its existence, of professional men only, though recently Honorary Associates had been elected, he said there was no reason why he should interfere in the matter, except that six years ago he expressed a strong opinion against competitions, and had subsequently published a book giving certain reasons against them. Mr. Porter had, however, adduced other reasons in his paper, among which was the great waste of money among those who engaged in competition. That, however, was a professional view of the subject; but as an outsider he could not see much in it, because such an expenditure of money was only one way of advertising, and all professional men who wanted to make themselves known must do it in some way or another. If advertising was a waste of money, it might be said that all tradesmen wasted their money in the same way. He agreed, however, with Mr. Porter that the drawings required in competitions were absurdly numerous, and that people who engaged in competition were put to an unnecessary expense. What, for instance, could be more ridiculous that requiring detailed specifications, when there were no professional judges? No ordinary man could understand a specification. Mr. Porter had been able to give a large number of instances both of successful and unsuccessful competitions. He (Sir Edmund) had mentioned publicly three great competitions which had very odd results, for, as everybody in London knew, a most eminent Italian architect had built a large Gothic building, whilst a most eminent Gothic architect had been employed to build an Italian building; and in the third case they had got the Law Courts. (Laughter.) Mr. Porter had no doubt pointed out that some most distinguished architects were indebted to competitions for their success. Some architects admitted as much, whilst others thought that our most eminent architects would have obtained the same position without engaging in competition. Therefore, as far as the public were concerned, the matter seemed to be an open one, and if the public would take pains to learn their own ignorance, and would employ assessors to advise them, then competitions might do some good; but whether competitions under any condition or without conditions were or were not proper, he was certain that Mr. Charles Barry was right when he stated, at the last meeting, that it was hopeless to think of stopping them; and therefore the best way, no doubt, was to consider how competitions could be directed. If the well-known fallacies of competitions were made known, he who did it would be doing a benefit to mankind. The fact had been alluded to that perspective drawings were very misleading. An architect might be a very good architect without the power of drawing a good perspective. At the same time it was not to be inferred, as some writers in the building papers had inferred, that all the bad effects seen in modern days in architecture were attributable to competitions. There were equally bad effects in buildings which had not been the subject of competitions. It had been urged that in competition buildings, utility was sacrificed to excessive ornament; but that was obviously nonsense, because everyone knew that ornament was employed as much upon buildings where no competitions had taken place, and to him the fact appeared quite shocking, when public money was so wasted. Sir Edmund then, as an instance, quoted the council-room of the Royal Astronomical Society, as being badly provided with light and ventilation, while the ceiling was splendid and gorgeous—splendid in everything except having holes in it (laughter). The windows, he said, were darkened to prevent a sight of an ugly wall; but he hoped some day to have ordinary glass windows, and the ugly wall whitewashed (laughter). That building (a part of Burlington House) was not the result of competition. But bad architecture in competitions was not always the fault of the architect, because he remembered in 1874 or 1875 hearing Sir Gilbert Scott saying, "You know perfectly well in competition drawings we do not make them as we should make drawings of our own, because we are obliged to work up to the bad taste of the public (hear, hear). Now, whatever could be done to correct that, he thought should be done. In regard to the discussion on Mr. Porter's paper, he had been astonished to find that in the previous debate no one had discovered the great blot of the paper. It was one thing to contend against competitions, and to advise the public against them, and to say that they produced

bad architecture; but it was quite another thing to invite a body of architects, like the Institute, to make rules to restrain its own members from doing what they liked: for that was really the issue they had now to try; and because this point had not been adverted to, he had accepted the invitation to come here for the purpose of calling attention to the serious position which the Institute had been invited to take. In order to look at the matter correctly, let them suppose him to be a young architect desirous of getting on by competition, or as a middle-aged architect who, as Professor Kerr had said, had already learnt "the trick of it" (laughter). Supposing also that any one of his fellow-members proposed to enact a rule that there should be no more competitions, or that competitions should be carried on under certain restrictions? He, as a young architect, would have to say to the Institute something of this kind: "You ask me not to engage in competitions. Why should I not engage in competitions? It is notorious that the greatest architects of this age, Sir Gilbert Scott and Sir Charles Barry, got their greatest works by competition, and that they succeeded by competition; also that a considerable number of architects of the present day are more or less in favour of competition. If they found it necessary to go into competitions, why should I be prohibited, in order that people who have already got a position should be able to keep it?" He found the writers in newspapers talking about dignity and sentiment; but according to his experience of the would, he generally found that sentiment was a diguise for selfishness—(laughter)—and that when people talked of sentiment to their own advantage it almost always meant "selfishness and breeches-pocket." (Renewed laughter.) Therefore, as a young architect, he would answer, "I shall do nothing of the kind"; and he would say further, "If you call upon me to do it, I shall do one or two things—I shall either try at law your right to do it, or I shall say 'You go—somewhere.'" (Laughter.) But at the worst, if such rules were made, the Institute could only deprive such a member of using the letters "F.R.I.B.A.," and he had yet to learn that an architect could not make a position quite as well without those letters attached to his name, and if a man asked him whether the absence of these initials would prevent him getting employment, he should certainly treat the question as a joke and nonsense. Mr. Porter might advise young architects not to waste their money in competitions, but a young architect might reply—"What do I care if I waste some money? I have nothing to do, and I like the job, and I have a clever clerk, and I should like to put him through the work." These were the difficulties the Institute would have to face if they began making regulations. Architects might talk of their dignity, and call themselves artists; but, in his opinion, an architect was of a much higher rank already than an artist, because an artist was one who did his own work with his own hands. In fact, he had heard of cooks being called artists, as well as singers and dancers (laughter); but supposing they were artists, and ranked themselves with painters, they would find that the fees of the painters varied very much indeed, for whereas one painter would charge 500 guineas for a full-length portrait, another would do a similar one for 150 guineas. Sculptors' prices varied very much for the same kind of work; and even lawyer's prices, for if anyone were to offer him now a fee which he would have been glad to accept forty years ago, he should certainly laugh at it. (Laughter). Physicians and surgeons, again, had different scales of fees; in fact, all professional men contended from beginning to end with competition, and any attempt to stop competition must end in failure. Rivalry—and friendly rivalry—existed in all professions. It began at college, and continued throughout life, and there were no greater friends than those who had been continually rivalling each other in the same pursuits in life. But what would the public say if the profession of architects were to resolve that there should be no further competitions? Architects knew little of town councils (not to mention public bodies), if they thought they could control their actions in this matter. It might be said he was going beyond the object of the paper. The subject of the paper was "architectural competitions," but its object was to stop competitions violently. He was further of opinion that any attempt of the kind was wrong, for it was contrary to the doctrines of every political economist. Dugald Stewart, professor of Moral Philosophy at Edinburgh, held, with Adam Smith, that everyone had the right of pursuing his own interest in his own way so long as he observed the general rules of justice. That was a new doctrine 100 years ago, but it had grown, and it was approved in the present day by Mr. Gladstone. If they would think of it, they would see that that profession prospered most in which every member of it was free to do the best he could for himself; or, in other words, the way to advance his art was to advance his own interest, though at first sight it might appear to be advancing himself only. The same principle had been expressed by Parliament in the matter of the College of Physicians, which existed not only by Charter, but by Act of Parliament; and it was curious that when the College was regulated by Act of Parliament, not only the College, but the Crown itself, was prohibited from making any regulations which should interfere with the freedom of action of its members except with one curious exception which prohibited members from sueing for fees. The Institute existed by Charter, and not by Act of Parliament, and though he had not seen their charter, he should be surprised to hear that it contained any authorisation to make prohibitive regulations against any of its members. The question under discussion, however, was rather one of policy than law; and on this point they must remember that in a case brought before the Court of Exchequer the judges declared that the very idea of making rules for regulating trade was suicidal. He contended that an architect had a right, if he chose, to make a plan for 3s. 6d., and that the Institute would have no right to interfere with him. The proper remedy in that case would be for the majority of the members to abstain from doing anything of that kind; but every individual must have the right of carrying on his own business in his own way, and to prohibit competition or cheap work would be entirely obsolete and too late now by a hundred years. The question of taking less than the customary fee arose in the law, and on the barristers being called together they unanimously said, "We have nothing whatever to do with the matter, for if these people like to do it they have a right to do it." In considering this question he had put himself in the position of a counsel to whom this question had been put; "Is it expedient, or lawful, or right to make these rules?" He had given them his opinion, and he hoped they would all think about it.

Professor KERR said: The only conclusion I can arrive at, with any regard for common-sense, is that the system of architectural competition is radically unsound in principle, and in practice most prejudicial to the profession of architects, both financially and morally. Whether it benefits the public in any way may be for a moment a question; but, even on this point, I believe the answer must eventually be in the negative. The nearest approximation to competition which I am able from experience to approve is, that the client who desires to have the benefit of a selection of designs shall obtain designs from as many architects as he pleases, pay for them all, and choose for himself. This is the only form of competition (if you prefer to call it by that name) which is commercially defensible, or, in honour, satisfactory to those concerned on either side. It corresponds, moreover, precisely with the custom of other professions. The client who consults several lawyers pays them all, and follows the advice which seems the best. He who consults several doctors does the same. Several other analogies might be quoted. It is only with tradespeople that the custom is different. The buyer who asks for samples of goods to be supplied to him, or occupies the time of the seller in explanation and negotiation, may in the end decline to buy without offering to pay for the trouble he has given. But even here the samples that are supplied will be of no substantial value, and the time that is wasted is equally of no account. But I know of no other instance in professional business in which anything really akin to architectural competition has ever been recognised—except of course in those cases in which other artistic practitioners have been induced (very seldom) to follow the example of architects, when they have always regretted it. I speak as having been myself a successful competitor. Excuse me for going into a little detail. Commencing at the age of two-and-twenty, in no less remote a place than New York, where I gained my first premium, I find that I have engaged in about twelve competitions, never competing at random and frequently trying what I could do, as if for the honour of the cause, in the most important contests. I have gained four first prizes, one second, and two otherwise highly satisfactory positions; once I was paid in full with all the others, and four times I have been wholly unsuccessful. I mention this with a certain hesitation, for the sake of saying emphatically that in spite of all I have never got any real good by competition. I may also remark that in one of my most satisfactory works—a public building—I obtained the preference in spite of competition, and by the very means of refusing to compete; that is to say, I first submitted a sketch design which was set aside for a competition; I refused to compete; the competition (a limited one) took place, the premiums were paid, and my design was then sent for and adopted; I never saw any of the competition designs; but I mention this instance because I have always held it to be evidence of the futility of competition when fairly contrasted in effect with the selection of an architect in the usual way, and the communication to him in their full completeness of those private explanations of the requirements which competitors can never by any possibility so thoroughly obtain. I have never known any man succeed in establishing by competition any reputation which he would not have better acquired without it—except occasionally a bad reputation, which, but for competition, he might fortunately have been able to escape. I know of no other kind of temptation in business so subtle as that which assails, as I think, a high-minded man when involved in architectural competition, and especially if he is to be successful. I know of men who have succeeded by competition in attaining to the promise of a position which they were not qualified to hold; but they have never been able to retain it, and have in several cases been ruined in their legitimate prospects by the consequences of such hasty and fallacious good fortune. I do not hesitate to say that competition success leads generally to personal and public disrespect; and this not through jealousy alone, or personal offence, but by reason of the ordinary estimate of the qualities by which alone such success can be obtained. I will add that the effect of competition is never to encourage the generous sympathies of competitors, but always to provoke envy and false hope and self-conceit insufferable. There seems to be more heartburning caused by competition than by all the other forms of antagonism that prevail amongst us. We are at this moment the only profession which to all intents and purposes exists without an etiquette; in this most vital respect we are no better than the commonest of trades; and I do not see how any principles of professional discipline can ever be recognised so long as we adhere to the practice of a kind of rivalry which is so essentially unprofessional and so entirely tradesmanlike in its character. The only inducement that I can see for the maintenance of the competition system lies in the supposition that modest merit can thus obtain its reward. This I hold to be an utter fallacy. Modesty will wait; it is immodesty that will not. Merit can wait; it is demerit that cannot. The man who in professional life is the most fortunate is he who starts without false aids, without fallacious incentives, without self-conceit, and without hurry. Waiting patiently, working diligently, and walking uprightly, until he has reached the age of matured usefulness, he then attains that position which matured usefulness alone can permanently hold, because it alone is worthy to hold it. In plain language, at the age of forty (which is recognised as the earliest period at which a man may expect to acquire a position in a profession as distinguished from a trade) he finds himself beginning to know the world well; youth has passed into full manhood, and he has five-and-twenty years before him during which to employ his energies at their best, and to win respect for a meritorious old age. What does such a man want with competitions? What can he gain by them? But I am sorry to say, as the result of a long and intimate acquaintance with the profession of architects in all departments, that there prevails amongst the young men, even the youngest men, an undisciplined restlessness and a fatal feeling of rivalry with their seniors—in one word, an absurd impatience or mere self-conceit,

which exists nowhere else within my observation —at least in what may be called business as a different thing from those more transcendental pursuits of poetic fancy where the wildest assurance is perforce excusable, ludicrous however as it is generally discovered, sooner or later, to be. I attribute this circumstance, speaking advisedly, chiefly to the public recognition of the idea, with respect to architecture as distinguished from everything else, that meritorious adolescence may attain instant ascendency by the happy institution of competition. What is the natural consequence of such perverted doctrine? I dare to say there is not one amongst the very foremost architects in England who has not at this moment in his office a lad or two who would be perfectly prepared at any moment, with the most brilliant confidence, to try conclusions with the master and all his peers in the field of open competition! Surely this is a most outrageous misconception of intellectual principle; and what can we reasonably expect to come of it? Can there be any doubt what the opinion of the outside public is about our competition? Is it anything else than a feeling of astonishment that we should be so foolish? Depend upon it, the more closely we look at the practice, the more foolish it must seem. It has no more substance in it than the Will-o'-the-wisp, the delusive phosphorescence of mere pestilent vapours; and I hope we are not now to be induced by specious sophisms to confirm and renew our reliance upon it. I have been hoping of late years that it was being permanently distrusted. I am prepared to say, lastly, that this Institute ought to discourage, and even to denounce, every form of competition except those in which each competitor shall be fairly paid for his work. This alone is respectable and honest, professionally dignified, commercially rational, and consequently satisfying all round. Disappointments there must be, but reason for dismay there need not be, The history of our architectural competitions is a history not of disappointment, but of despair. The only agency in which I have any faith for the correction of the evil is this Institute. No special association of competitors can work with any effect; but this guild has a practical authority over the profession at large, and a practical influence with the public, which are all powerful for any good end if exercised with decision, and of course with wisdom. When we hear, as we have recently done, of a member of our body who was commonly held to be the one most especial favourite of Fortune having been so disturbed by continual dissatisfaction—chiefly arising out of success in competitions—as to threaten in the very hey-day of his success to throw up the profession altogether as a hopeless failure, it is time that we began to reflect seriously upon the position which we occupy. It is a position, I believe, possessing many advantages to ourselves individually, both intellectual and social; the peculiar delights of an architect in his work, and the peculiar respect he meets with from his clients, despite the usual trials and troubles of business, are considerations refined and gratifying in a most unusual degree; but I cannot help saying we are falling in general estimation rather than rising; and I am of opinion, with all submission, that the best way out of such a condition of things is the boldest; to establish in the profession, under the authority of this important and in itself as yet honourable Guild, some system of generous etiquette, at the very root of which there must inevitably lie a determination to avoid this demoralising form of rivalry which separates us from all gentlemanly professions, and associates us with the most vulgar ideas of the shopkeeper class.

Mr. Dawson remarked upon a singularity connected with the profession different from that of others, namely, the difficulty the public had in appreciating their work except through the process of drawings which would show the work to be accomplished, and therefore he did not see how they could escape the preparation of plans and drawings. There must, therefore, he thought, be competition of some kind or other; and the question was whether such competition was desirable and profitable either to the profession or the public. He did not believe that competition was profitable where the work to be executed was small; but if the works were of large extent, competition was a healthy medium for securing the best work, not so much, perhaps, to the public as to the profession. It might be well that the younger members should abstain from large competitions; but he should be sorry to attempt to prohibit them by any rules to that effect. Many of the younger members would stand a greater chance of success if they waited and knew more of their art before entering into large competitions. If Fellows were understood to abstain from the smaller competitions, he saw no reason why such associates as were equally qualified to become Fellows should not abstain also. He could not agree, however, with Sir Edmund Beckett that the members of a profession belonging to an institute, and having subscribed to its rules, should be allowed to do work in any way they might choose; and if the rules of the Institute were good, he thought it would be an abominable piece of behaviour for any member, as long as he remained a member, to transgress these rules. (Hear, hear.) If any amendment was desirable in the regulations of 1872, he thought it should be more strictly insisted upon that, in all competitions, one or more professional assessors should be appointed; but the great evil which had sprung up was, that even some of the Fellows of the Institute seemed utterly to disregard the regulations of 1872, and would go into any competition of sufficient size, where they thought there was a chance of winning it; and so long as that was the case, it was certainly useless to make any regulations at all. ("Hear, hear," from Sir Edmund Beckett.) If regulations were made, they ought to be strictly and faithfully adhered to.

Mr. Chatfeild Clarke, whilst thanking Sir Edmund Beckett for his visit, remarked that his speech left on his mind a very unpleasant savour, for he could not imagine Sir Edmund Beckett's advice to young men to be wise. Sir Edmund seemed to forget that in most of the professions there was a minimum regular free. The fees of the architectural profession were moderate, and to work for lower fees must tempt members of the profession to do that which was not right; and he earnestly counselled them not to follow Sir Edmund's advice.

Sir Edmund Beckett said he had given no such advice, nor was his advice in that direction.

Mr. Chatfeild Clarke said he had had something to do with competitions, and he knew the trial and disappointments connected with them. He knew it was no use discussing how to do away with them, for they would certainly go on; but they ought to be regulated fairly, and that was the practical question with which the Institute had to deal. The unfairness of committees to whom plans were submitted was notorious. In one competition he succeeded, but was "done" out of the execution of the work by the unfairness of the committee. He claimed his commission on the advertised cost of the building, and ultimately he settled the matter for one-half of the commission, instead of the whole. He advised architects to look closely into the conditions of competitions, and bring committees to book when any unfair treatment was experienced. He was asked once to compete for some co-operative store buildings. He found the conditions were not in accordance with the rules of the Institute, and called the attention of the secretary of the co-operative stores to to the fact, after which he heard no further of the matter. He regarded the practice of using mottoes as a sham, and thought that it would be better to have drawings openly signed; and on the question of honorarium he thought a moderate one should be awarded to each competitor.

Mr. Hayward agreed that competitions could not be done away with. He held further that many benefits arose from them, and that they had done benefit to himself to a small extent. Mr. Porter, he believed, had framed a series of regulations, and he hoped that gentleman would move a resolution that they be considered by the Council. He thought, however, that competitions should not be engaged in unless certain conditions, approved by the profession were complied with.

Mr. Porter, after a brief reply, said he would move the following resolution at the next general meeting:—"That the Council of the Royal Institute of British Architects be requested to appoint a committee, to take into consideration the subject of architectural competitions—that shall, in concert with other London and provincial societies, frame certain regulations for the conduct of architectural competitions, and report to the Council the result of their action."

The business closed with votes of thanks to Mr. Porter, for his paper, and to Sir Edmund Beckett for his speech.

NOTES IN THE WEST.

THE tenor bell of the parish-church of St. Peter, at Tavy St. Peter, near Tavistock, fell down on to the floor of the upper belfry chamber not long ago, whilst the ringers were practising.

The bell had cracked round the crown, and a portion, with the clapper, still adhered to the beam. Its fall was broken by some timber, otherwise it must have gone down to the basement, inflicting serious injury on those below. About forty years ago a similar accident, though to a much less extent, happened to the same bell, which was then repaired by the help of hoop-iron, &c., and without injury to its tone, by a man named Burley, still living in the village.

This second accident within half a century points a moral that clergymen and others entrusted with the care of bells cannot be too careful to whom they entrust work of this description. The church, which consists of nave, chancel, north aisle, and western tower, surmounted by pinnacles, was, in part, restored in 1870. The belfry contains four other bells.

The proposed new railway from Totness to Paignton will be seven or eight miles long, and will be the means of bringing Torquay an hour nearer to Plymouth.

A memorial window, with stained glass design, by Messrs. Fouracre and Watson, of Stonehouse, has been inserted in the south wall of Christ Church, Plymouth. The subject is the Good Samaritan, beneath which are the words, "Show mercy and compassion every man to his brother," and the inscription, "In loving remembrance of Wm. Ross Hall, R.N., three years churchwarden of this church, who died March 14th, 1879, aged 62 years, this window is placed by his sister, Ann Hall." Both in design and colour this window is quite up to the standard the artists generally turn out. They were, it may be remembered, awarded a medal at Paris last year for their stained glass.

Work on the Eddystone reef in connection with the new lighthouse was suspended some weeks ago, as far as actual progress with the tower was concerned. The *Hercules*, the engineers' floating workshop, of which so much has been heard during the work, was in the mean time to be taken round to London to be overhauled, and, as far as necessary, repaired. The interval was opportune, as just covering the dark days, and was well warranted by the position of the works. The marvellous progress made since the undertaking commenced, some eighteen months ago, shows how thoroughly efficient the engineers' arrangements have been. In the light of the experience which has been gained, hope is entertained that within two years from the present time the light of the new tower will be visible from the Hoe. The most difficult stages have been completed, or are thoroughly well in hand. The "stepping" of the rock wants only a few turns of manual labour to be finished. The stonework in two of the dams has been united, the segmental dams formed inside the great circular breastwork to divide the well for pumping are now knocked away, baring the few feet of rock which have yet to be covered; and as soon as three or four stones which are now on the site have been placed, the stonework of the lower course of the tower will completely cover the rock. In the eastern dam the work is brought up within a few inches of the high water-level, in the south-west one course less is laid, and in the north-west the point reached is two courses lower. Six months' work will bring the base of the tower above high-water level. This encouraging progress has been attained notwithstanding the bad weather of the year, the exposed situation of the reef, and the constant difficulty of working on a rock fourteen miles from port. The results now seen have been gained by catching every opportunity of landing. Just before suspending operations for the season, the men worked two consecutive tides without returning to Plymouth, and two or three night tides have been utilised by aid of lantern light. Care has gone hand-in-hand with speed, however, and it must be a great satisfaction to Mr. Edmond, the superintendent

of the works, that here, as in all the other undertakings under the Trinity Board with which he has been connected, not one accident to life or limb has occurred. He, his assistant, Mr. W. T. Douglass, and the engineer of the structure, Mr. James N. Douglass, are to be congratulated on this immunity, and also on the progress reported.

Up to the present, the works were deserted, merely the iron derrick-mast used to lift the immense blocks showing above high water. Even the moorings, by aid of which the *Hercules* took up her berth between the spars of the reef at worktime, had been removed, and taken to Oreston. The show made by all that has been done seems slight, but it may appear more in its true proportions when we mention that it has been computed the weight of material placed on the reef is equal to all that was used in the erection of Smeaton's tower.

On St. Stephen's day the Bishop of the Diocese consecrated the chancel and transepts of the new Church of St. Mark, at Ford, a suburb of Devonport. The style of architecture is Early English, and Mr. James Norman, of Plymouth and Devonport, is the architect. The building is to be put up in three sections. Mr. Jenkins, of Marlborough-street, Devonport, is the contractor.

A new organ has been erected in Christ Church, Teignmouth. It is by Messrs. Dicker and Son, of Exeter. At the Methodist Church at Chacewater, a similar instrument has been put up by Messrs. Brewer and Co., of Truro.

It is proposed to build a new market at Teignmouth. The old market was built 60 years ago. At a public meeting it was decided to proceed with the matter.

WROUGHT-IRON BRIDGEWORK.*

(*Continued from page* 455, *Vol. XXXVII.*)

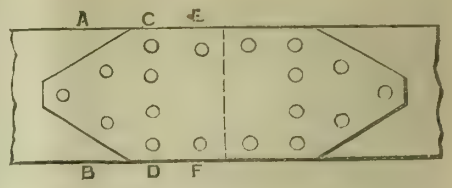
In the first article on this subject, our remarks were chiefly confined to the consideration of the effects of rolling loads upon wrought iron structures, and before we leave that part of the subject, there is the action of another external force which should not be neglected. We refer to the wind, a most important element to be taken into consideration when designing a roof or building, and which should not be neglected in the calculations for a bridge, especially in the long span roadway bridge, when, if the bridge is not braced, or constructed so as to obtain lateral stiffness, oscillations would be set up in a strong wind, which might seriously affect the stability of the structure, and it is therefore very necessary that means be adopted to counteract these effects. This is generally done by means of diagonal bracing fixed under the roadway and between the main girders; but we remember seeing a very novel plan in a bridge designed by Mr. Baker to cross the river Broom at Braemore, when, instead of having the booms in a vertical plane, they were curved inwards, thus giving them increased lateral stiffness at the expense of a small amount of metal.

The question now arises, What is the amount of pressure of the wind on a given area, and what must be allowed in our calculations? If we seek for information amongst the papers of most of our great authorities on the subject of winds and storms, where we should naturally expect to find most accurate observations recorded, we find ourselves in hopeless confusion, and we come to the conclusion that there is yet a great deal to be learnt in anemometry. Not only do the various authorities differ as to the relation of the speed of the wind and the consequent pressure, but they cannot agree as to the description of the wind; for instance, Smeaton, Beaufoy, and others give 31lb. to 49lb. on the square foot as the force of a hurricane, while Scott Russell, in a table, which is to be found in the *Annales de Bureaux des Longitudes*, for 1828, gives 8lb. as the force of a hurricane. Again, we have totally different accounts of the velocity and pressure of the same storm; so it is very evident that there is something erroneous in the statical methods of obtaining the pressure of wind, and that there are other influences at work which should be taken into consideration. One possible source of error may be in the use of thin metal discs, when the partial vacuum formed at the back, by the air rushing past the periphery, will no doubt affect the recorded pressure, which will vary, of course, with the angle of the direction of the wind and the face of the disc. Some years ago Mr. Hutton conducted a series of most elaborate experiments at the Royal Military Academy, Woolwich, on the pressure and velocity of the wind, and the following is a verbatim copy of the conclusions he came to at the end of his investigations:—"On the review of the whole of the previous, we find that the results of the air, as determined from the foregoing experiments, differ very widely both in respect to its quantity on all figures, and in regard to the proportions of its action on oblique surfaces from the same actions and resistances as assigned by the most plausible and imposing theories which have hitherto been determined and confided in by philosophers. Hence, it may be concluded that all the speculative theories on the resistance of the air hitherto laid down are very erroneous, and that it is from experiments only, carefully and skilfully executed, that a rational hope can be founded of deducing and establishing a true and useful theory of the action of forces, so intimately connected with the numerous and important concerns of human life."

The following are records of some of the highest winds that have been known, which may, perhaps, assist us in forming an idea of the maximum pressure to adopt in our calculation, but the accuracy or truth of the very high recorded pressures we consider exceedingly doubtful:—In the "Proceedings of the Asiatic Society of Bengal" for 1873, it is stated that at Calcutta the highest pressure, recorded by an Osler's anemometer, was 50lb. to the square foot. During the gale at Glasgow, in January, 1868, the recorded pressure was 42lb. to the square foot. In October, 1859, when the *Royal Charter* was wrecked, a pressure of 30lb. was recorded. During the storm which swept the country about fourteen years ago, when the roof in course of construction at London-road Station, Manchester, fell in, a pressure of 32½lb. was recorded. Tredgold gives as a maximum observed pressure 57½lb. per square foot; but during the gale of Sunday, September 26th, 1875, a pressure of 70lb. was registered; and on the 9th of March, 1871, a pressure of 92lb. was registered by Mr. Hartnup at the observatory on Bidston Hill.

From the above figures, it would be rather difficult to say what was the safe amount to allow; but we have no evidence to prove that these extraordinary pressures act simultaneously over a large area, and Mr. Scott has shown that they do not, and that the pressure of a storm is in distinct, separate parts, each extending over a limited area; so we think that by adopting 35lb. per square foot as the maximum uniform pressure of the wind, we have an ample margin for safety. Of course, a great deal depends on the locality of the proposed structure, and for very exposed situations we should probably allow a little more. Some authors, in giving the probable loads on roofs, give a very high figure for the pressure of the wind, and then add, say, 5lb. for snow; but we may be quite sure that when the wind blows with a pressure of, say, 35lb., there will be very little snow left on any roof, and possibly no tiles or slates.

There is a point in the designing of a bridge which often does not receive the careful attention it should do, and that is the joints and covers of the plates. We may have the plates the right thickness and width, but it is very necessary that the arrangement of the joints and cover plates be carefully designed, so that we may not possibly have any weak places at these joints. Joint plates of members in tension have, of course, a distinct office to perform from those in compression, for the joint covers of the former really represent the plates which they cover, and must have the same net sectional area, while those of the latter have simply to keep the plates in their position, and theoretically do not in any way take the thrust of the member in compression. Joints in tension require careful designing, and joints in compression careful manufacture; the former require greatest care in the office, and the latter greatest care in the bridge-yard. In addition to having the required net sectional area in the cover plates of a joint in tension, we must, of course, have the same sectional area in rivets on each side of the joints; and but for the fact of the rivets being generally made of superior iron to that of the plates, it would be necessary to have the area of the rivets 6-5th that of the plates, as the proportions given by Rankine for the resistance of iron to a shearing strain to that of a tensile strain is nearly as 5 to 6.



We find that by having the necessary number of rivets in a joint, the sectional area of the plate is much reduced in consequence; but if we design it, so that the number of rivets gradually decreases, as shown in the cut, a little consideration will show us that the weakest part of the plate is at the section A B when the area is reduced by the diameter of one rivet only, instead of four times as when this plan is not adopted. For supposing the plate were to break at C D, it would have to shear the three rivets behind before it could get clear away; and theoretically we could reduce the loss of section to nothing by simply gradually reducing the number and diameter of the rivets to zero, but of course this is not practicable, and in the majority of cases it is not possible to reduce the number to less than two rivets on account of constructional arrangement. We must not, however, forget that as the covers represent the plates at the joints, they must be treated in a similar manner by reducing the number of rivets in the centre of the cover-plate, when, for the reasons given above, E F is the weakest section of the cover. It will be often found that it is not advantageous or possible to reduce the rivets in the cover to the same amount as for the plate, in which case a small addition in thickness to the cover will make up for the reduced section. When we have only one thickness of plate, as in the verticals of most booms, it is advisable to have cover-plates inside and outside the joints, by which means the rivets are placed in double shear, and consequently we require a less number of rivets and shorter cover-plates.

In joints of compression the plates are supposed to butt fairly against one another, and theoretically the cover takes no part of the compressive strain; but, of course, it would not do to assume that the plates fitted so accurately together, and it is the custom to make the cover-plates the same thickness as the plates they cover; the rivets, however, can be pitched much closer, and the cover-plates need not be so long. Great care should be taken that the plates are accurately planed at the ends, so as to be perfectly square with the length of the plate; the two plates should butt fairly against each other the whole length of the joint, or the strain will be borne by the rivets instead of the plates. For this reason many engineers will not trust to the possibility of the plates fairly butting, and design their joints exactly the same for tension and compression; but we think that with the present splendid machinery which is now to be seen in many bridge-builders' yards we need not fear any such faulty workmanship if proper precautions are taken to ensure the work being executed according to instructions.

As cover-plates for joints materially affect the weight of the girders it is very desirable to have as few joints as possible, and this can be effected by using as long plates as can be rolled without materially affecting the cost, and when the booms are very broad it is advisable to have the width of two or more plates, by which means we can introduce much longer ones without extra cost; and as the longitudinal joint does not affect the tensile or compressive strength of the plates, no covers are required for it, and the number of joint covers is thus reduced to a minimum.

Before leaving the question of joints, we will casually mention, in support of our repeated protest against the use of pins, an objection to this form of connection which we consider is sufficiently strong to condemn the use of them. Suppose we take, for example, one of the favourite American trusses; it is necessary in our calculations to consider the long members in compression as so many columns; and we know, that by placing a pin through the ends at the connections, we place them under the same conditions as a column with rounded ends. Now

* From the *Engineer*.

such a column, we learn from the well-known experiments of the late Professor Hodgkinson, is only about one-third the strength of one with its ends fixed, which latter condition can be obtained by riveting the ends of the member in question.

About the question of drilling or punching in bridgework there is much to be said on both sides; but it is very amusing to look over our notes and find what conclusive results from apparently most elaborate experiments have been published by the advocates of each plan to prove that their view of the question is the correct one. These results are probably familiar to most of our readers, and in the midst of this diversity of opinion, we are compelled to form one of our own; and as "*In medio tutissimus ibis*," we recommend the adoption of both plans; the application of either one being, of course, entirely governed by circumstances. One of the disadvantages of punching is the fact of not being able to get the holes so true as with drilling, and for that reason all holes should be drilled at joints, and where the rivet has to pass through many thicknesses of plate; the hole being afterwards slightly countersunk to remove the sharp edge and possible "burr" left by the tool. All other holes may be safely punched, care, of course, being taken that the markings are properly covered.

It sometimes happens, through careless punching, drilling, or marking out, that some holes do not come quite fair with one another, and are, indeed, at times so bad, that the holes are "blind"; in such cases the hole should be carefully rimed out, and on no account should that dreadful tool the drift be used, as in most cases it would be far better to leave out the rivet altogether than subject the iron to the fearful tearing and dragging, which might possibly affect the safety of the structure; and we think that a person cannot be too severely punished who will persist in using such a dangerous tool.

(*To be concluded.*)

"BUILDING NEWS" DESIGNING CLUB.

A VILLAGE CHURCH.

ONLY one or two members of our club have grasped the idea of a village church; the others have sent in sketches that would be more suitable for small suburban or large parish churches. As regards plan, a simple roofed nave, with a prolongation of the walls for a chancel, the roof being carried through, a small porch at the west end, and a simple bell-gable or turret over the chancel-arch, or in an angle between the vestry and nave, seem to have been the kind of building required. By making the ridge continuous, cheapness of construction is insured, while simplicity of grouping and rural character are gained. Then the turret or tower might be made to break the roof-line. If the former, it should be placed in a convenient part for ringing, not in centre of nave, as some have got it; if the latter, it might conveniently be carried up over the porch, chancel, vestry, or organ-chamber. We place "Sub Rosa" first, because he appears to have based his design upon these principles, and his elevations are unpretending in brick and flint, with half-timbering introduced in the gable of vestry and corner turret; but the plan is not quite up to the mark. The chancel is made narrower than the nave, the only advantage of which arrangement is that openings are obtained towards the nave from vestry and organ-chamber, the former leading into the pulpit, but the seats are crowded into the central passage. The porches at west end are certainly cramped, and the baptistry between them looks crowded at the end. A better and cheaper arrangement would have been to have placed a porch at one corner, allowing a space for font. The details are in a Late Perpendicular style, the windows of aisles have square heads, cusped lights, and hood-mouldings. We believe the design can be executed for the sum named. "Edwin's" design has a good plan, though he also makes his chancel a separate and narrower building. The vestry and organ-chamber on the north side is conveniently large, the chancel seats are well placed, and the font occupies a square area at the south-west angle. There is a spacious porch at this end. In the elevations, proposed to be in flint with stone dressings, there is little originality; the large buttress between the single lights at west end is a good feature; above it, in the centre of gable, is a bell niche. We do not accord the same praise to the east-end treatment, where we have a poorly-proportioned three-light window and angle buttresses. The section shows a plain collar and brace roof, with a chancel-screen of suitable design. Internally the author proposes to use red brick and stone dressings. "Fleur-de-lis" sends a church with triapsal termination much too Continental and expensive, and ill-adapted for a village. The plan is ill-proportioned, too long in the nave, which measures about 60ft. to the chancel-arch, for the width, about 20ft. No seats are shown. We cannot see the use of two aisles and clerestory in a church of this kind, nor the advantage of a circular-ended apse. Notwithstanding these defects, we admire the boldness and simple treatment of the elevation, with the central octagon tower over the crossing, and the arcade and clerestory. "Sub Silentio" smacks rather of Mr. Norman Shaw's church at Turnham Green; the author places a low tower over the chancel, which groups picturesquely in the general view; but we do not see the advantage nor necessity of a side-aisle. The Gothic, Late in character, is not of the kind we can approve. In the design of "Nineteenth Century," in a plain Lancet style, there is not much to sustain the motto. The plan would have been better without the side-aisle, and the design indicates provision for another. The roofing is carried over the aisle in one slope, and the nave is lighted on this side by a row of dormers. The detail of roof is weak. Red brick, terra-cotta, and flint are proposed for the walls, and red tiles for the roof. A bell-turret over chancel is not convenient for ringers. Cubing is taken at 6d. "Castello" shows a huge buttress, saddle-roofed tower over the easternmost bay of nave, which divides the building nearly equally in length. This tower is wider across, and the increased width is made to assume the effect of slight transepts. As it rises above the roof the width is reduced by the sets-off of buttresses. The choir-seats crowd the chancel entrance, but the plan is generally good, and the plain treatment of brick lancets suitable. In "No. 90" we come to a rather laboured-looking design, reminding one of a small Nonconformist church. It has a nave and side-aisle, a chancel with octagonal end, and a porch in one corner. The organ-chamber forms the end of aisle, and is roofed as a tower in two stages, the effect of which is pretentious. The clerestory windows are too small, and the detail not up to mark. Many other designs show a chancel of this sort, thrown out as a separately-roofed structure, with much assumption, the value of which is not apparent in a village church. "Alfred's" design is unpretending, and shows a wide-roofed nave and single aisle, chancel, and vestry, with a porch at west end; it is too broken. The manner of carrying the rafters between nave and aisle by plain upright posts with angle-struts to a purlin is suitable, but the detail of flat Pointed windows is debased, and is not equal to the open-timber porch. Bench-ends are of good form. "Toledo" is appropriate in its general outline; the tower forms a porch at the west, and there is one transept. The chancel and organ-chamber are conveniently planned, but we do not see the use of a second porch near vestry. The timber belfry of tower and its low roof are characteristic, but the detail is not well drawn. The author cubes his church at 6d. "F. W." (in lozenge) has a gabled tower over chancel with lean-to transepts on each side, the effect of which is to dwarf the apse by the overpowering size of the walling behind it. The plan and details are simple. "Con Amore" (in pencil and unfinished) sends a well-conceived plan, with circular apsidal end to chancel, the latter being a continuation of nave, which is 52ft. by 22ft. The author is the only one who has taken this type. His elevation shows a bold tower over the nave at its junction. A semi-circular baptistry projects by the side of porch at west-end. The design is suitable in style and inexpensive in detail.

The distinguishing features of a large class of the designs are expensive and irregular plans, pretentious detail, and want of adaptation. "Burswell," "Perseverantia," "Glyndwr," "Osian," "Ormono," and "Mot" have all taken extravagant types; the chancels of "Osian" and "Burswell" are wastefully large, and the arrangement of seats equally so. The design of "Orsmond" shows an expensive termination, with apse for altar, and the width of church is too wide; such a roof as shown could not possibly stand. The exterior elevation shows a tower in centre of west end over a baptistry, but the style adopted can scarcely be described to be any of those usually employed. We should not be wrong in saying it is a modification of the pseudo-Gothic which preceded the revival of Gothic. The elevation is carefully executed, and flint walls with brick dressings are shown. We do not like the arrangement of tower and west end in "Mot," though there is something suitable in the wooden belfry of the tower. "Fidessa" is too long in nave and chancel; the one redeeming feature in elevation is the tower, which forms a porch on the south side; perspective is poorly drawn. A more carefully-drawn set is "Our Praises are our Wages." The apsidal end projects from a short massive tower which rises over chancel, but withal a certain picturesqueness in grouping, the author shows an internal porch which is poor in design, and would form an awkward feature internally. In another class we must place a few of lower architectural merit. "Padishah" has a fair plan, but the exterior treatment is in feeble Gothic. "Clausman" goes in for a preposterously wide nave, the roof of which could never stand if executed as in the section; detail poor. "Stone" has a good idea for a bell-gablet, but the elevations and plan lack experience. "Gemshorn" shows side passages with seats occupying the centre of nave, the chancel and vestry arrangement is cramped, and the centre-turret for ventilation would not be suitable for a bell. We cannot speak favourably of the details of windows. "T-square" is a prodigiously long church, and has done everything to make it appear more so, with a choir projecting each side like transepts. We never saw such an arrangement as that for vestry which forms the eastern part of sacrarium, and is roofed low. A touch of Queen Anne appears in the tower at one end. "Pendennis" has a simple plan, but the elevations are below par. In a similar category we may place "A. U. C.," who roofs his chancel-end in as remarkable a way as he has planned it; "North," "Figaro," and "Excelsior." We should advise the authors of the last four to study detail of good Gothic work.

PULPIT AND FONT.

As in the designs for church, expensive detail has been lavished on these subjects. "Binny" certainly oversteps the bounds in his pulpit, which is suitable for a large parish-church. The style is Renaissance, and the detail good. The font is a scalloped bowl resting on a pedestal, enriched by sculptured festoons and moulded base. "Fleur-de-Lis" sends in a suitable sketch for a circular stone pulpit, while the shape of font does not suggest its office; it is oblong and plain, and is attached to a wall, but is certainly better fitted for a pulpit or desk. The detail is good, however. "Sub-Silentio" shows a pulpit in wood, octagon in shape, and framed in cusped panels. If the detail had been better, drawn we might have spoken favourably of it. The stone font is appropriate. The font by "Æquanimiter" is a massive cylindrical bowl, with plain moulded base, suitable; but the octagon plinth is not drawn correctly where it joins the circular base stem. We do not like the pulpit handrail, and the design is rather commonplace. "Chip" (in Circle) contributes two designs in the correct Gothic taste of twenty years ago, but far too elaborate. Designs by "Sanctus Cuthbertus" are even more open to this charge; both pulpit and font are enriched with panels, the former having traceried heads of elaborate Late Perpendicular. "N. B." shows a plain framed pulpit, commonplace in style, and the font is equally so. The detail of pulpit-capping is not quite correct in its mouldings. "B." (in three circles) is carefully drawn, but too elaborate in the detail. We may place "Burswell," "Glyndwr," "Ogmore," and "Fidessa" in the order of their merit.

At the last ordinary meeting of the Bacup Local Board plans and estimates were approved for the construction of a bridge over the river Irwell. The plans and estimates have been prepared by Mr. John Wilson, C.E., engineer and surveyor to the board, and application has been made to the Local Government Board for a loan to carry out the necessary works, which will be executed immediately.

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ILLUSTRATIONS.

HIGH SCHOOL FOR BOYS, OXFORD.—DESIGNS FOR ORGAN AND AN OPEN PORCH.—THE WEST ENTRANCE, TINTERN ABBEY.—DETAILS OF DESIGN FOR A BAPTISTRY.

OUR LITHOGRAPHIC ILLUSTRATIONS.

CITY OF OXFORD HIGH SCHOOL FOR BOYS.

THE new City of Oxford High School for Boys, which is being built from the designs of Mr. T. G. Jackson, and of which a foundation-stone will be laid by H.R.H. Prince Leopold on the 13th April, will occupy the vacant plot of ground behind the houses on the south side of George-street, and between that street, Bulwark's-alley, the remains of the old city wall, and New-inn Hall-street. There will be a frontage in George-street of about 120ft., which will be recessed so as to form a forecourt, behind which will be the principal block of the building occupying the whole width of the frontage. This building will contain four classrooms on the ground floor, a large hall 84ft. by 28ft. on the upper floor, and the principal staircase, which occupies a projecting wing in front, finished with a decorated gable and a lantern. There will be a second staircase at the west end of the hall, with an entrance from the south. For the present the building will not be carried beyond this point; but, according to the ultimate plan, a long wing containing classrooms and corridors will extend westward behind and parallel to the houses in George-street. By this arrangement of the building a large extent of ground is left vacant for a playground between the school buildings and the old city wall with an entrance from New-Inn-Hall-street, and another from Bulwark's-alley. The plan, when completed, will include a house for the head-master and new Science and Art Schools for the use both of the High School and the townspeople generally. The builder is Mr. Claridge, of Banbury. The clerk of works is Mr. Mockford.

"BUILDING NEWS" DESIGNING CLUB.

"SUB SILENTIO" and "Alfred" are the authors of the selected designs which we publish this week in connection with our Designing Club, and the subjects are an organ-case for a village church and an open porch for a town-house in a Classical style. Of these designs we have little here to say in addition to the critical review already published. "Edwin's" organ-case was in many points equal to that by "Alfred," but with the exception (from an organ-builders' point of view) of "Alfred's" arrangement of pipes, we decidedly give the preference to his plan. The open porch was probably a rather difficult subject to treat with any degree of freshness, and if "Sub Silentio" cannot lay claim to much originality in his design, he was very much in advance of any other plan submitted.

THE WEST ENTRANCE, TINTERN ABBEY.

TINTERN ABBEY has special attractions for an architect, apart from its picturesqueness as a ruin, and its beauty of situation in the Valley of the Wye. He cannot fail to admire it as a piece of unusually fine architecture, of which every portion, down to the smallest detail, is designed with particular elegance. Except the north arcade and clerestory of the nave, the walls of the church remain almost entire with their windows, while the moulded stones of the fallen portions lie in heaps on the ground, and can, therefore, be studied with ease. In fact, the place is a rich storehouse of exquisite mouldings of the latter part of the thirteenth century. The west doorway, which we illustrate, still retains traces of ancient colouring, especially on the diaper. Our illustration is from a drawing, made in 1877 by Mr. Walter J. N. Millard, Pugin Travelling Student for 1879.

ROYAL ACADEMY PRIZE DESIGN FOR A BAPTISTRY.

OF the Royal Academy prize-drawings for the past session we have now illustrated all those to which awards were made in the Architectural School, including the gold medal and extra special medal designs; also the design which won the Travelling Studentship for Architectural Students and the silver medal drawing of Old Examples. To-day we complete our series by publishing Mr. F. T. Baggallay's baptistry design, in detail, from the author's half-inch scale drawings. This is the design for which the gold medal was awarded, and a perspective view thereof, with plans, appeared in the BUILDING NEWS of January 2nd this year. The drawing given to-day will show how thoroughly Mr. Baggallay earned his reward, and if we cannot speak of his plan as an example of vigorous design, the painstaking completeness of his drawings deserves our best praise.

THE MERCERS' HALL, CHEAPSIDE.

IN a recent article on Architectural Improvements in the City, we noticed the progress of the new façade of the Mercers' Hall, which has now nearly reached its full height. The Architectural Association paid a visit to the building last Saturday, and we may glance at the more important features of the old and new work. It is interesting to note that the Mercers' Company is one of the most ancient of the City guilds, and can be traced back, as a Metropolitan guild, to A.D. 1172. We find that it was incorporated by letters patent in the reign of Richard II., in 1394. That king was a free brother, and Queen Elizabeth a free sister, of the Mercers' Company. The Company, in fact, ranks first amongst the twelve great livery companies of London, though there is scarcely a single mercer in the company. In Hare's "Walks in London," we find it stated that the "pillared court was used as a burial-place as late as 1825. The court contains a recumbent effigy of Richard Fishborne, mercer, a worthy benefactor, 1625, and other monuments." The Mercers' chapel and its portico are said to occupy the site of Gilbert à Becket's house. The hall was rebuilt after the Great Fire, by whom, it is not distinctly known, though Jarman is said to have been its builder. The walls are surrounded to a certain height by some fine oak panelling, decorated with pilasters and broken along the top, at intervals, by circular pediments. The frieze and panelling are enriched by some bold carving also, which reminds us of Sir C. Wren's work. A very profusely-carved sideboard in dark oak is at one end of the room. In the court-room adjoining, a few good portraits are to be seen of Sir R. Whittington and his cat, Sir Thomas Gresham, &c. It is lighted by an oval lantern, and the ceiling is decorated in the Adams style. In the kitchen, we notice an interesting example of a cast-lead cistern, with the date 1781 worked in the ornamental panels. We may mention that in digging the foundations for the new building the workmen found a fragment of a terra-cotta bust, which is preserved. The new building, which is shallow in depth, chiefly fronts Cheapside, and consists mainly of a grand entrance and vestibule, which will be adorned with marble pilasters, a staircase on one side, of easy flights, and on a scale worthy of the building; a row of shops and stores, and a large showroom cut off from the last named, near Ironmonger-lane, and on the first floor a long drawing-room, 54ft. 4in. by 21ft. 4in., a vestibule and grand staircase at the west end. The drawing-room is carried up two floors in height, and, we understand, will be decorated by Messrs. Crace; the ceiling is relieved by panels, and the room is lighted partly by a flat bay window, which forms a feature in the elevation. The architect appears, from the plans we have seen, to have incorporated the new building with the old skilfully, and to have made the most of the narrow strip of area towards Cheapside. Externally, Portland stone is used in the façade. Its main features are an entrance centre, a little on one side, in which the architect has reproduced the old entrance supposed to be by Wren; a red granite arcade of flat arches, including a mezzanine, forming a series of shops to the street; on the first-floor a series of three-light windows with polished red granite shafts, and above these another row of arched-headed windows with granite shafts and carved ornament. These are varied by flat bay windows of similar design. Horizonal mouldings and bands of carved ornament intervene. The elevation has an upper plain story, and the roof line is broken by the entrance tower crowned by a high pavilion roof, and by dormers. In the entrance or tower part of the composition the figure of Charity and two figures of boys will occupy the positions they formerly had. These are being carved by Mr. Samson from the original sculptures. Those interested in the original work will be glad to know that the ancient entrance is preserved, and its stones roughly placed in position on the floor of the lower hall. One of the prominent features of this work is the arched gateway, with its bold sculptured figures of boys in the spandrels and the bust of the Virgin (in allusion to the seniority of the company), and the broken pediment and side ramps of the upper part. The architectural detail, the architrave, carved consoles and cornice of the archway, are particularly fine examples of the period, and contain some good leaf-and-tongue and egg-and-tongue enrichments in the ovolos. The architrave profile is a bold cyma-reversa, which is continued round the arch, and is enriched with the leaf-and-tongue ornament. On the whole, the composition bears a resemblance to Wren's Temple Bar, and the details appear to warrant the belief that the same great architect designed this. The lower hall is adorned with stone columns of the Roman Doric, and the chapel—a lofty square apartment—has a fine dark oak reredos and wall lining and a panelled ceiling. We may add, the new building is being carried out by the contractors, Messrs. Ashby and Horner, Mr. J. Hayes being the chief foreman, and Mr. Wilkinson the clerk of works, under the architect, Mr. J. B. Williams. The ironwork was supplied by Messrs. Rownson, Drew, and Co.

COMPETITIONS.

SHREWSBURY.—The Corporation of Shrewsbury lately invited competitive plans for the laying-out of the borough property of Kingsland as building sites for villa and other residences. At a meeting of the Council held on Monday, it was intimated that the premium of twenty-five guineas had been awarded to the plan designed by Messrs. Carfrae and Belfrage, C.E., Edinburgh.

WEST BROMWICH.—The West Bromwich Improvement Commissioners, in October last, invited the following architects, viz., Messrs. Ettwell, Pincher, and Wood and Kendrick, of West Bromwich, and Mr. Henman, Birmingham, to send in designs for a refreshment lodge and shelter, to be erected in Dartmouth Park, at a cost of £1,100. Mr. Yeoville Thomason, F.R.I.B.A., Birmingham, was called in to adjudicate upon the designs, and in his report he recommended Messrs. Wood and Kendrick's for adoption. The Commissioners decided to accept their design, and have instructed them to carry out the works.

The Metropolitan Board of Works obtained an injunction on Wednesday, to restrain the London and North-Western Railway Company from carrying the drainage of some cottages at Acton into the Stamford Brook. Vice-Chancellor Hall suspended the order for six months, to give the defendants time to provide a new drainage system for the cottages.

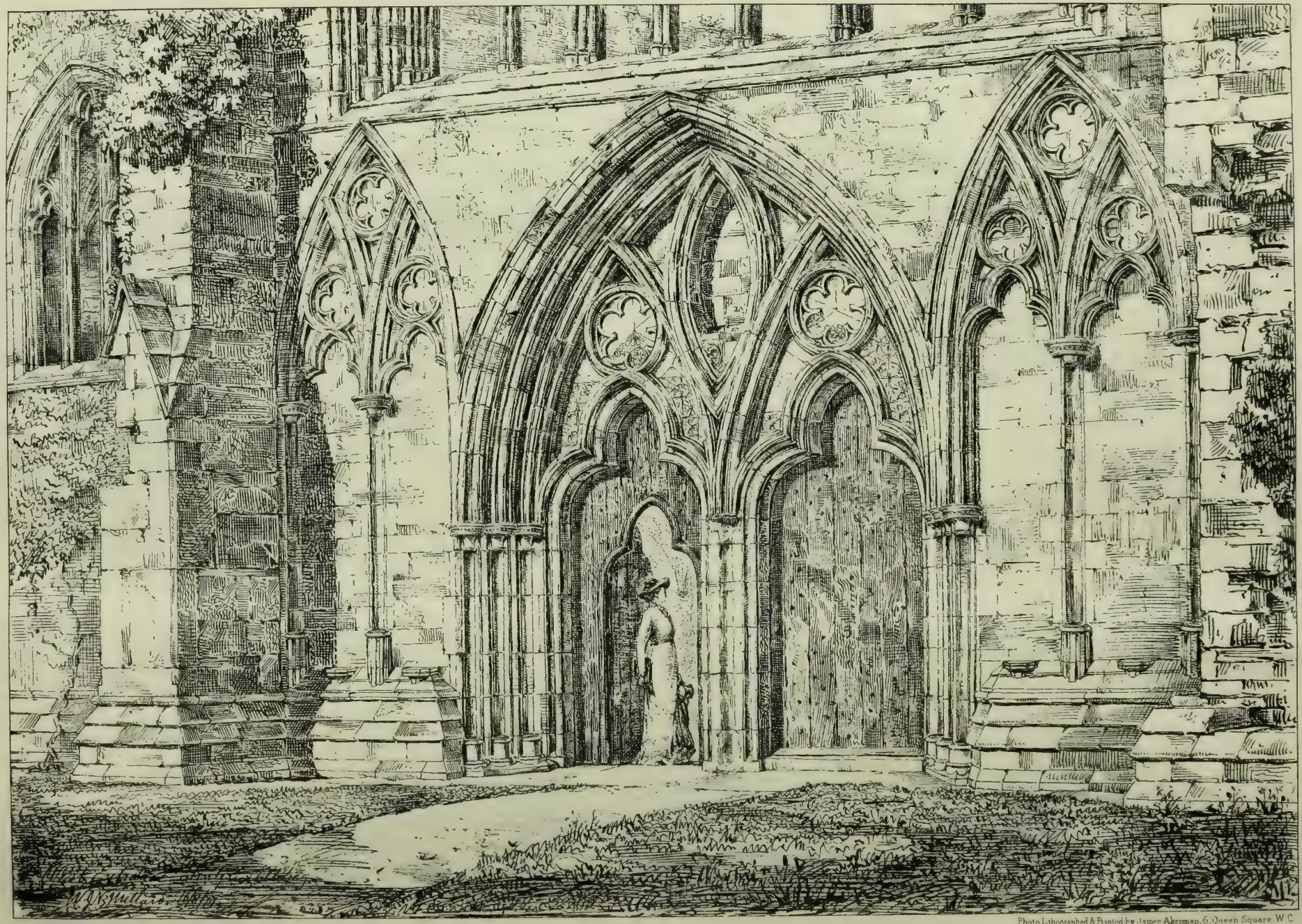


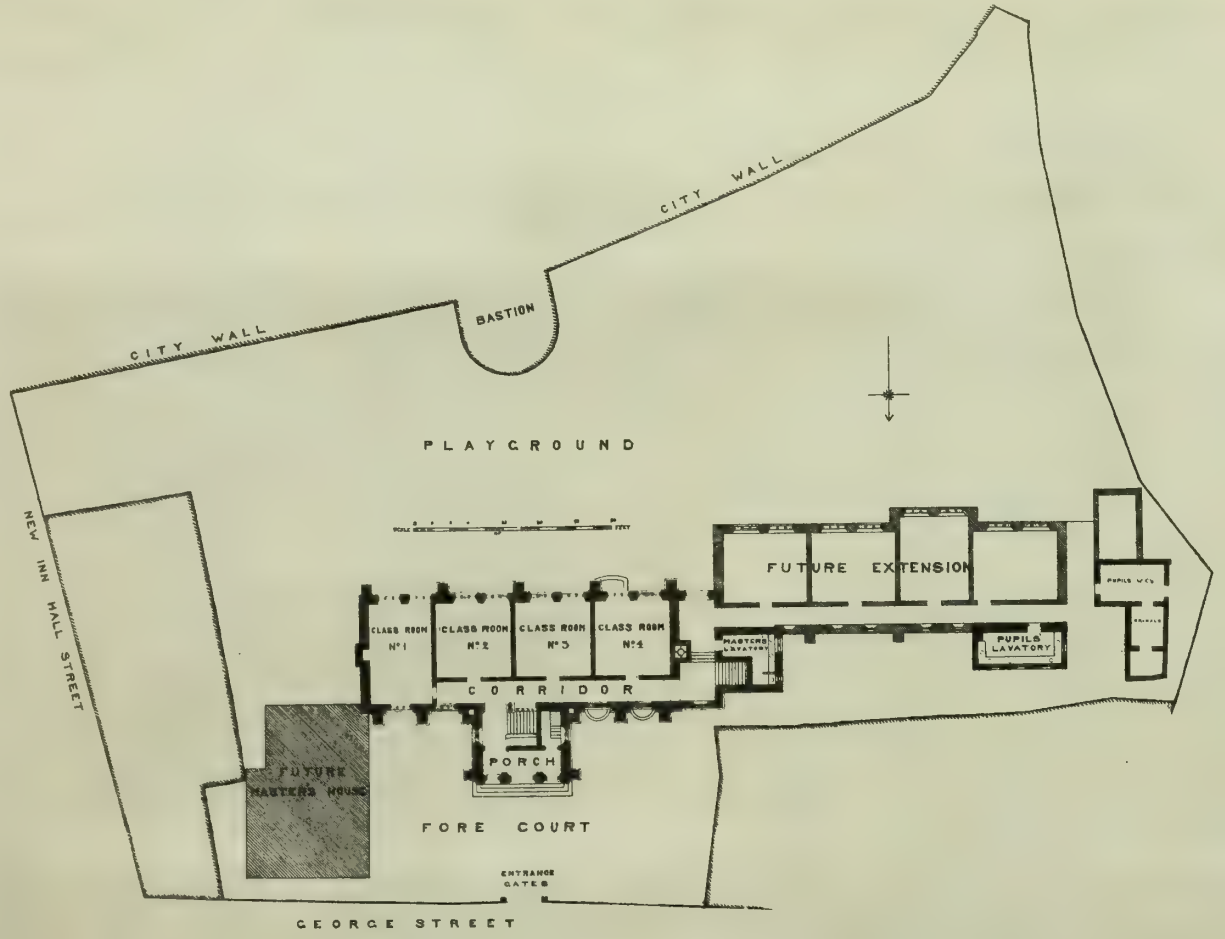
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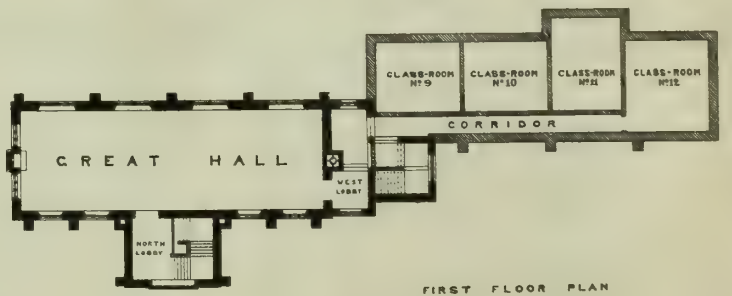
The West Entrance: Tintern Abbey:

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HIGH SCHOOL FOR BOYS
OXFORD

T.G. JACKSON, M.A. ARCHITECT.





FIRST FLOOR PLAN





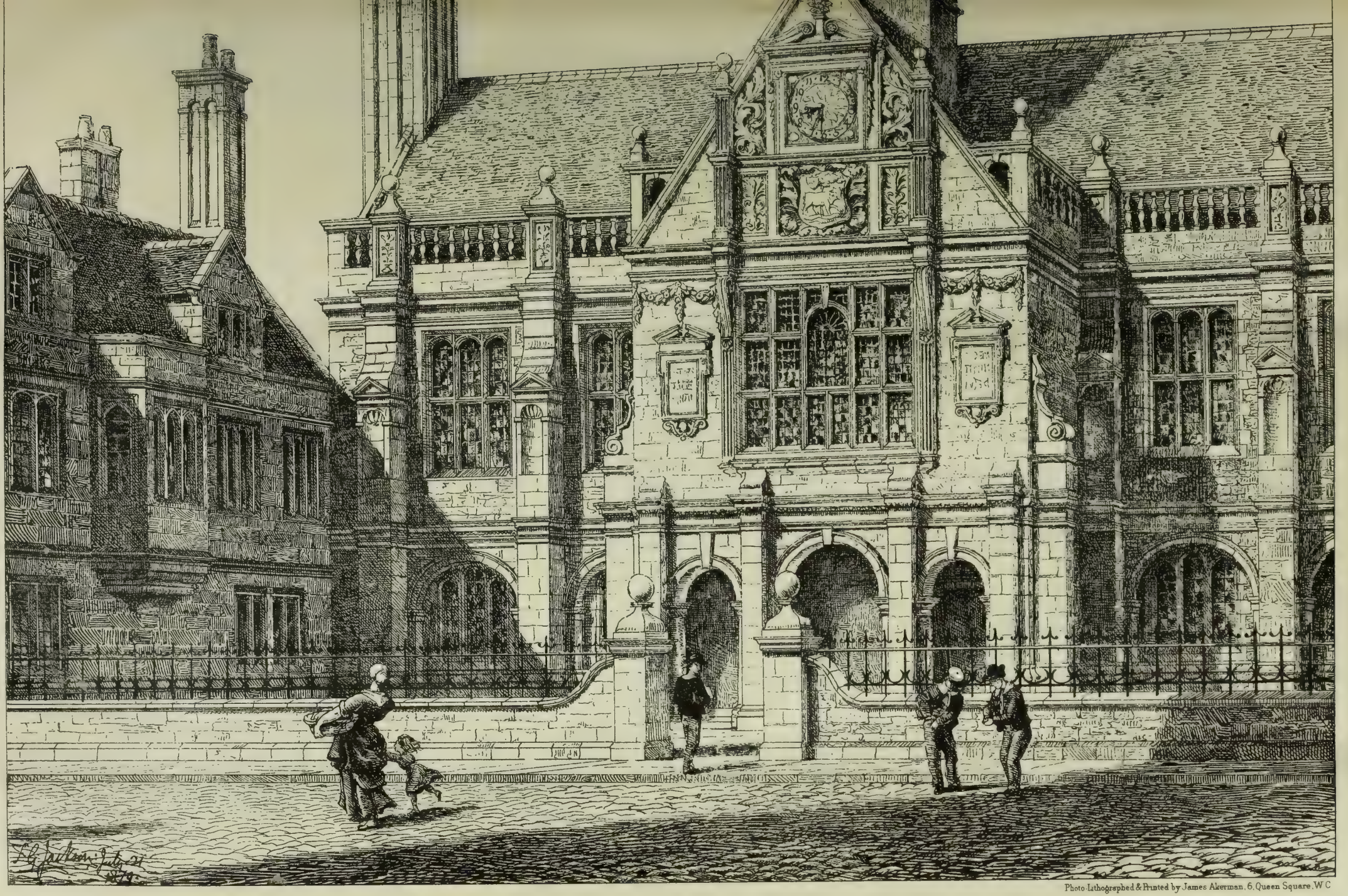
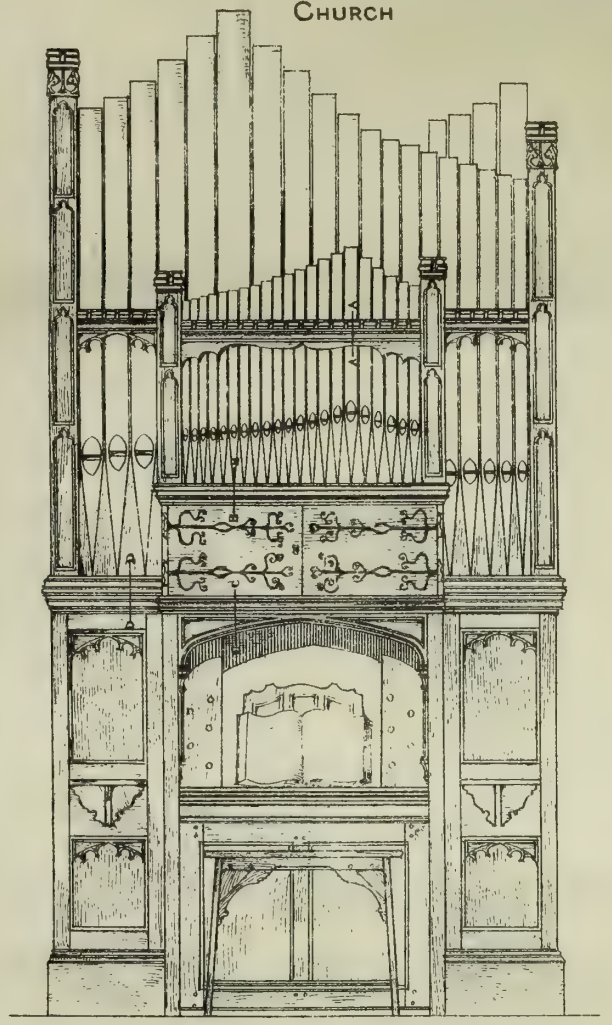


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"BUILDING NEWS" DESIGNING CLUB

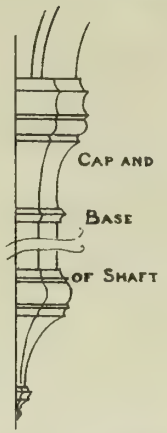
DESIGN FOR AN ORGAN FOR A VILLAGE CHURCH



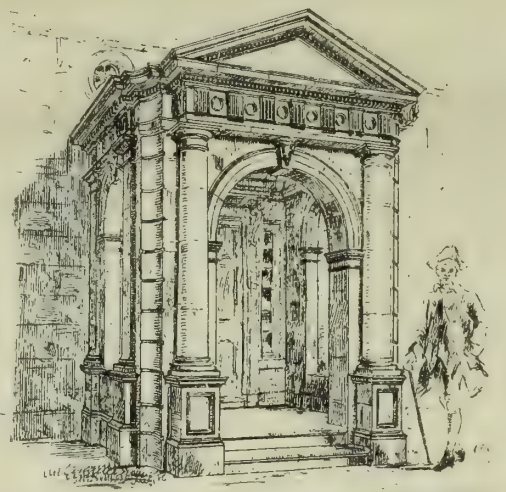
SCALE TO ELEVATION — FEET

"ALFRED"



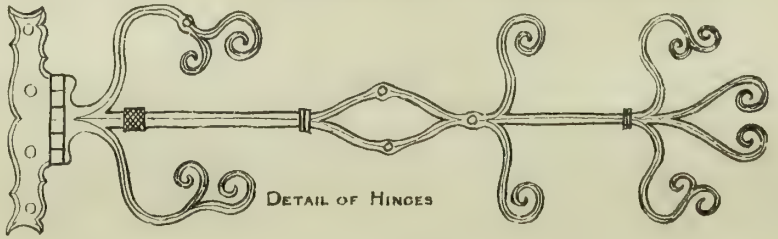


AN OPEN PORCH

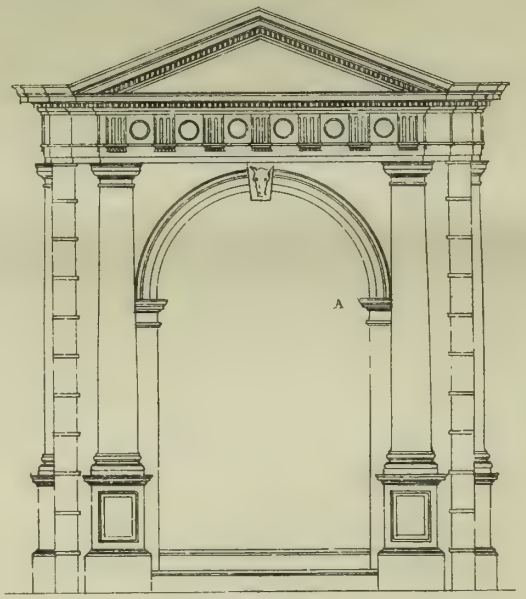


"Sub Silentio."

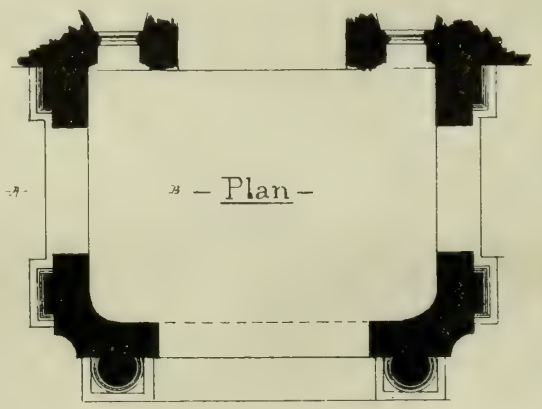
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SCALE TO DETAILS — INCHES



— Elevation —



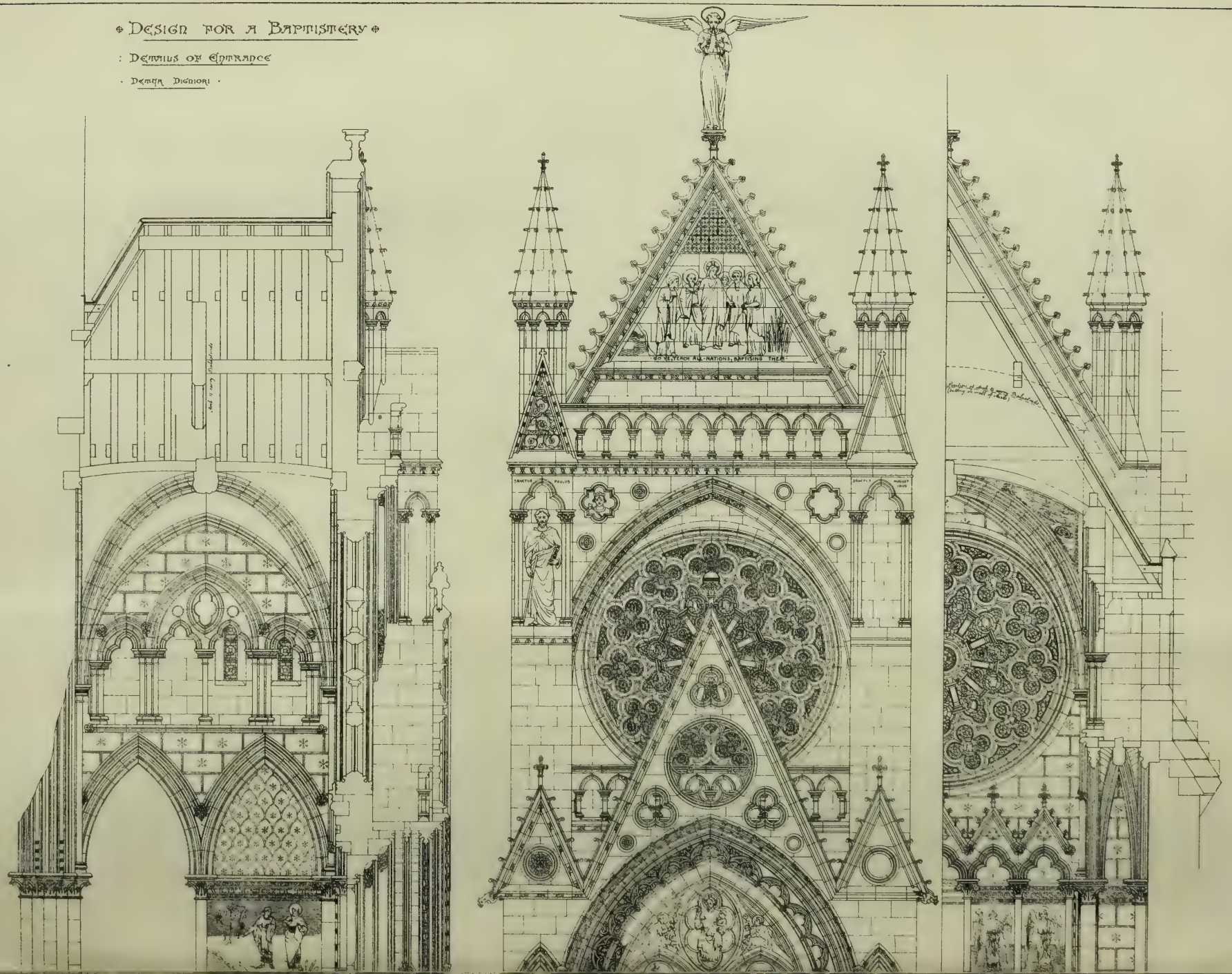
— Plan —

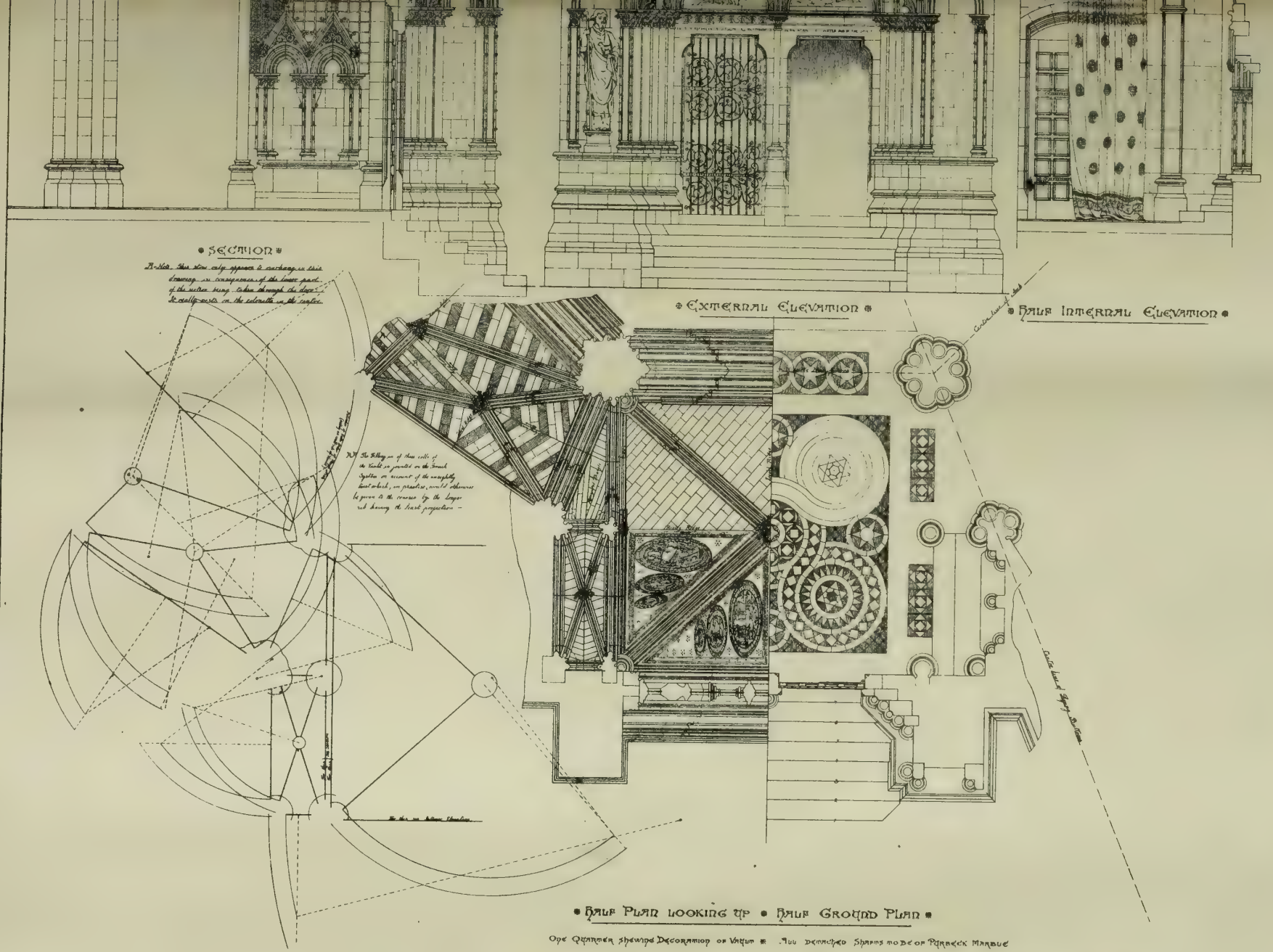
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DESIGN FOR A BAPTISTERY

: DETAILS OF ENTRANCE

· DEMUR DIGNIORI ·





ROYAL ACADEMY GOLD MEDAL FOR ARCHITECTURE 1879

THE PRIZE DESIGN BY F.T. BAGGALLAY.

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THE RESTORATION OF ST. MARK'S, VENICE.*

ASHAMED of my delay, I have the honour of replying to yours of the 23rd December, 1879. I must beg your indulgence for my involuntary delay, as, among other things, it was principally owing to my awaiting the translation into Italian of those articles relating to the Church of St. Mark. I am very much obliged to you for the courtesy shown me in inviting me to give my opinion as to the restorations completed, and about to be undertaken, in the said church, as well as about the present condition, and what should be done to insure its preservation. I cannot, however, at this moment dedicate the time necessary, as the subject is one which does not admit of easy solution. The theme is an arduous one, both in extent and in the peculiar nature of the work necessary to demonstrate the state previous to the restorations, and the necessity for those which have been executed, as well as for those that are about to be undertaken.

It is, however, my intention to occupy myself with this subject; in fact, I have at hand a résumé of all the particulars necessary for giving an historical sketch of all the proceedings, together with the circumstances and conditions which led to the works which have been executed during the last forty years. To do this properly, would take up a long time, and would necessitate writing out a treatise of several hundred pages, and I could not do it at so short a notice.

Should I follow out my idea of publishing such a work, I will not fail to send you a copy of it. I must not omit, however, for the moment to make some observations upon what appears on pp. 577, 673, 674, 689, and 777 of your last volume, as I find therein some considerations and opinions which are not exact.

At page 577 we are told "that the *total destruction* and rebuilding of the west front has been proposed," and this is qualified as an "*act of barbarism*." Nothing can be more inexact! Neither by me (as the architect for the works of the church) nor by others was it ever proposed to commit so *bizarre* an act. The proposal that was made limits itself to the removal of portions of the first arch to the right, which, as they threaten to fall, we have been obliged to support with struts; and to others that are in like unsafe condition. On the south side, on the contrary, we were obliged to proceed to the "total demolition," because its fall was imminent, and it would have carried with it the greater part of the church. Supposing (after due consultation with clever judges) this demolition had not been effected; supposing, I say, that the ruin had taken place, which would have been the greater barbarism, that of abandoning the church to its fate, or that of a demolition for reconstruction, to be effected with scrupulous conformity and identity with the original, and even bettering the conditions of stability? To me the reply seems obvious.

P. 611. At the meetings of the Universities of Oxford and Cambridge, another, and no less erroneous, opinion was expressed. It was asserted by Mr. Street that the western façade was in a good state of construction, that its aspect was beautiful and worthy of veneration, and *that the alterations proposed would be detrimental to art*. Now the western façade (or, more exactly, the one looking to the west, of which they speak) is now, as it was, with the above-mentioned ravages of time.

Either there is a contradiction in the ideas expressed, or else the conception is not sufficiently clear. If it was *in a good and beautiful state* (and it is now as it was, since no work has been done to it) it is so now, the façade has absolutely undergone no change. But decay exists, and this condition is in direct opposition to a *good and beautiful state*. The necessity of reparation exists, and the propositions that have been made tend in this direction, and nothing more. To the observations made by Mr. Street, I might oppose contrary consideration, but I abstain, as I do not wish to exceed the limits of a brief notice, and because I wish to avoid a polemic on such a delicate subject.

For the same reason I abstain from refuting the other statements contained in the forementioned pages, as I do not wish to enter into long digressions. With reference to the memorial or petition addressed to the Minister of Public Works of Italy, in which accusations and ideas not in conformity with the truth have been expressed, and of such a nature as to call for observation, I shall reserve myself the right of answering them when called upon by my Government.

In some of the reports quoted from your pages, censure and lamentations are freely poured forth with reference to the mosaics and the pavements of the Church of St. Mark. Both the former and the latter can be met with an explicit and clear refutation, which cannot, however, be condensed into a few words, and which I cannot undertake to write out at present. Nevertheless, not all the writers on this subject are of like convictions. I may recall to your memory the acconnt inserted in the *Times* of December 13, by Mr. W. J. Stillman, which is widely different from the conclusions arrived at by the authors of the reports in the BUILDING NEWS. It appears to me that one writer (quoted by you on p. 689) has judged of the condition of the Church of St. Mark with equal impartiality, since he says that in the façade there are damages or injuries that must be repaired. Whoever knows intimately, and is minutely informed of the condition and circumstances or surroundings of the Cathedral of St. Mark, must admit that what has been done is exactly what ought to have been done, and I think it should be exempt from harsh censure.

A building cannot last for ever, and by the action of atmospheric vicissitudes, as well as charges in the subsoil, acting for several hundreds of years, all monuments would disappear, leaving only ruined heaps of sad remembrances of what they once were, if the hand of man did not interpose with previsions suggested by art.

From the above general notes I think we may conclude that, before launching into the anathemas and censures which have been hurled against what has been done in this Church of St. Mark, it would have been more logical to have studied carefully the causes that have led to—nay, that have necessitated—the adoption of certain proceedings by means of which the danger of certain ruin has been dispelled—ruin which decidedly would have given rise to tardy and unavailing repentance.

I, who would omit nothing to succeed in the best manner, and who do not admit that any one can love art more than I do, I certainly would not have subjected myself to so grave a responsibility as to let the church go to ruin. GIO. BATTISTA MEDUNA.

Venice, Feb. 2, 1880.

* On the 23rd of Dec. last we wrote to Signor Meduna, the architect of the restoration of St. Mark's, expressing our opinion that as, up to that time, the evidence placed before the English public with regard to the works contemplated at St. Mark's had been brought forward by those opposed to the restoration, it was but fair that the architect himself should have an opportunity of stating his case. We offered him the opportunity of doing this through our columns, and now publish a translation of his reply.—ED. B. N.

ART LEGENDS AND SYMBOLS.

(*Continued from p.* 176.)

IT may perhaps assist us in our study of this subject if we spend a little time in noting how the Christian fathers gathered up many defiled gems from the crown of a dead paganism, and fastened them in the purer diadem of a living Christianity. Let us, for instance, compare the Greek myth of Perseus with the Christian legend of St. George. The Greek myth tells us that Cassiopea, queen of Æthiopia, extolled her own beauty above that of the Nereids. At their request, Poseidon, to avenge the affront, sent a terrible sea-monster, which devoured man and beast. The oracle of Ammon was consulted, and declared that the nation could be saved only by the sacrifice of a king's daughter. Cepheus, the king, and husband of Cassiopea, at length yielded his daughter, Andromeda, and after many tender farewells, she was chained to a rock on the seashore. At this time, Perseus was returning from his adventure with the Gorgons, and, in the situation described, found the beautiful lady. He gleaned from her the whole sad story, and resolved to stand by her side and await the coming of the beast. Andromeda earnestly entreated him to leave her to her fate. But Perseus was firmly resolved, and when the monster came up from the waves, the hero slew him; casting the bonds from the maiden, he afterwards married her—a ceremony too frequently neglected by the Greek heroes. We learn from the Christian legend that, "St. George was of noble family, and a tribune in the army of Diocletian. As the saint was travelling to join his legion, he came to a city called Selene, the inhabitants of which were suffering from the ravages of a monstrous dragon, who came up from a neighbouring marsh and devoured their flocks. At length, the supply of sheep failing, it became necessary to feed the beast with two children every day, the selection being by lot. The king of this city had one daughter, Cleodolinda by name, of exceeding beauty; and, after a time, the lot fell to her. Her father, wild with despair, offered half his kingdom and all his treasures if she could be spared. But the people rose in riot, crying, 'Is this just? Thine own edict hath made us desolate, and now thou would'st withhold thine own child!' And they threatened to burn him and his palace unless the princess was given up. Then he submitted and the beautiful maiden was put outside the city, and the gates shut against her. As she walked on over the bones of former victims, St. George rode up, mounted upon a beautiful steed. He asked the cause of her sorrow, and on learning the truth cried—nearly in the same words as Perseus, 'Fear not, for I will deliver thee,' and, nearly in the same words as Andromeda, Cleodolinda replied, 'O noble youth, tarry not here, lest thou perish with me; but fly, I beseech thee!' 'No,' cried the warrior-saint, 'I will lift my lance against this loathly thing, and I will deliver thee in the name of Jesus Christ.' At that moment the monster emerged from its lair, and half-crawling, half-flying, advanced towards them. St. George made the sign of the cross, and after a desperate combat, pinned the brute to the earth with his spear." [This is the moment chosen to represent the saint upon our gold coins; only the artist has dressed the Roman tribune like a Greek athlete, and armed him with a short sword. All circumstances considered, a dress and a weapon about as absurd as could well be.] "Having subdued the beast, St. George called to Cleodolinda to bring her girdle, which he fastened about the neck of the dragon, and the maiden led it up to the city as one would lead a little dog. When the people saw this they were much afraid; but St. George cried, 'Fear not, only believe in the God who gave me strength to fight, and I will slay this thing before thy eyes.' Then they believed and were baptised, twenty thousand in one day. The king bestowed great riches upon the saint, who distributed all among the poor, and went upon his way. At the next city he saw the cruel edict of Diocletian against the Christians, but he bravely tore down the scroll, and trampled it under his horse's feet. This was the cause of his martyrdom." So much for the legend. Now let us look at the man; for, unlike his pagan counterpart Perseus, St. George really had some kind of existence. I do not know that we shall be any better for learning that our patron-saint was really a contractor supplying the pagan army with pork, and that is not the worst of it. But we will let Gibbon tell the tale. I am quoting now from the twelfth chapter of the "Decline and Fall of the Roman Empire." "George, from his parents or his education surnamed the Cappadocian, was of mean origin, and having obtained a lucrative contract to supply the army

with bacon, he accumulated wealth by the basest arts of fraud and corruption; but his malversations were so notorious that George was compelled to escape from the pursuit of justice. After this disgrace he embraced with zeal, or affected zeal, the profession of Arianism. He was elected successor of Athanasius in 356. Each moment of his rule was polluted by cruelty and avarice; and he oppressed with an impartial hand the various inhabitants of his extensive diocese. Under the reign of Constantius, he was expelled by the fury, or rather by the justice, of the people; and it was not without a struggle that the civil and military powers of the state could restore his authority and gratify his revenge. The messenger who proclaimed at Alexandria the accession of Julian announced the downfall of the Archbishop. George was ignominiously dragged in chains to the public prison, and at the end of twenty-four days was torn in pieces by the fury of the multitude, who, impatient of the tedious forms of judicial proceedings, forced open the prison Dec. 24th, 361. The rival of Athanasius was dear and sacred to the Arians, and the seeming conversion of those sectaries introduced his worship into the Catholic Church." In the last line Gibbon is wrong; in his eagerness to have a fling at the church he has gone a little too far. It was not by that means St. George was introduced into its worship. For a long time the Western Church did not accept the legend at all, and it was authoritively repudiated when the calendar was reformed in 494. It was then decided that St. George should be placed in the category of those saints "whose names are justly reverenced among men, but whose actions are known only to God." It was at the time of the Crusades, at a time when might was right, when the symbol of a pure and dauntless soldier was much needed, that the Church took up the legend again, reburnished its details, and held it up to the eye of men who, like the romantic Greeks, could best be guided by such means. He was the symbol of knightly valour dedicated to God, the scourge of the oppressor, and the guardian of chastity. Richard the First, on his arrival in the Holy Land, placed himself and his whole army with great solemnity under the especial protection of St. George. His name was their battle-cry; and at the institution of the Order of the Garter in 1330, he became the patron-saint of our country. Parker, in his "Calendar of the Anglican Church" tells us that there are 162 churches in England dedicated to St. George. Besides this he is sponsor for numerous civic halls, piers, and favourite public resorts; and recently Mr. Ruskin's Society has been placed under his protection. In short the Greek Perseus was little more honoured in his country than the British Perseus in our own; and, having looked into the legend, we shall now be better able to judge how much of the honour belongs to the symbol and how much to the man. We will now see what the early Christians teachers did with the legend of another of the Heroes. You will remember that the Greeks represented their symbol of physical strength, Hercules, as devoting his power in gigantic labours imposed upon him for the most part by exacting task-masters. This Hero effected little by wit or wisdom, and nearly everything by main strength. He did not entrap the Nemean Lion, as Jason would have done, but followed it into its lair and strangled it with his hands. He had no greatness of mind by nature, and acquired none by art. He was a well-meaning, blunt, strong man, and nothing more. And those of the Greeks who were strong men and nothing more—and all nations abound in such—placed themselves under his protection. We are all familiar with his giant form, clad in the skin of the Nemean lion and bearing a formidable club; and it will be well to keep the image in view while we survey for a moment his Christian counterpart St. Christopher. The legend is one of the oldest of the Christian series, and one of the most romantic. We are told that St. Christopher was a rude man, of gigantic stature and of terrible aspect. Proud of his bulk and strength, he declared he would serve none but the greatest prince on earth. So he set forth and came at length to the court of a monarch who said he was the most powerful of living kings. The giant soon found favour with the king, and was liberally entertained. But one day a minstrel was singing at court, and Christopher observed that whenever the singer made use of the word "devil" the king made the sign of the cross. The giant desired to know the meaning of the gesture, and the king replied "I make that sign to preserve me from the power of Satan, for fear lest he overcome and slay me." "Then," cried Christopher, "thou art not the most powerful prince in the world if thou fearest him. I will go and seek this Satan, and him will I serve." So he departed, and when he had crossed the desert he saw a great crowd of armed men led by a terrible being who rode in their midst like a conqueror. He called to Christopher, "Where goest thou?" and the giant replied, "I go to seek Satan, for he is the greatest Prince in the world, and him would I serve." Then Satan, replying, said: "Go no further, I am he." And Christopher, bowing low, entered his service. But, after a time, they came where four roads met, and there was a cross in the centre. When the Evil One beheld this he trembled, and turned back to avoid it. When Christopher saw this he was amazed, and cried, "Why hast thou done so?" and the fiend replied: "Upon that cross Jesus died; and, when I behold it, I must tremble and fly, for I fear him." "Then," replied Christopher, "this Jesus whom thou fearest must be more potent than thou art! I will go and seek Him, and Him will I serve." So he travelled far and wide in search of Christ, and, having come to the cell of a holy hermit, asked that he would show him Christ. Then the hermit said: "This King whom thou seekest is indeed King of heaven and earth; but he will impose many hard duties upon thee; thou must fast often." Christopher replied that he should not fast, or his strength would fail him. "And thou must pray." The giant protested that he knew nothing about praying, and would not be bound by such service. Then said the hermit, "Knowest thou a certain river, stony, and wide, and deep, and often swelled by the floods, and wherein many people perish who attempt to pass over?" And he answered, "I know it." "Then," said the hermit, "go to that river, and use thy strength to succour those who are about to perish. It may be that this good work shall prove acceptable to Christ, whom thou desirest to serve." And Christopher cried, "This can I do; it is a service that pleaseth me well." So he went and dwelt by the river-side; and having torn up a palm-tree for a staff—he was so strong and tall—he used it to guide his steps in the deep and dangerous waters, and never tired, day or night, in his task of carrying over the weak, and guiding the way of those who would otherwise have perished. And, the legend says, "The Lord looked down out of heaven, and said within Himself, 'Behold this strong man, who knoweth not the way to worship Me, hath found a way to serve Me.'" There is another charming episode in the legend which must not be passed unnoticed, as we shall find it turning up again, in a very unexpected place, presently. "One dark and stormy night the strong man heard the voice of a little child calling from the bank of the river, 'Christopher, come forth and carry me over! Christopher, carry me over this night!' The giant arose, and having sought about with a lantern, found the child, and lifted it upon his great shoulders. As he entered the flood the waves rose higher and higher, the wind blew with terrible fury, and the weight of the child grew heavy and heavier, until it seemed that the strong limbs must fail under the enormous weight. But Christopher struggled to the other side, and, lifting the infant to the ground, cried, 'Who art thou, child, that hast placed me in such peril? Had I carried the whole world upon my shoulders the burden could not have been greater.' And the child replied, 'Wonder not, Christopher, for thou hast borne Him who made the world. Me would'st thou serve; and, as a proof that I accept thy service, plant thy staff in the ground.' Christopher did so, and from the dry staff clusters of fruit and spreading leaves came out like a palm-tree in the season—but when he turned to speak the miraculous child had vanished."

(*To be continued.*)

THE LATE MATTHEW ALLEN.

I DO not think the body of Matthew Allen, who died Feb. 3, and was buried at Ilford Feb. 7, 1880, aged 69, should be consigned to the grave without some slight tribute to his worth. He was one of those rare men whose only wish and thought was to do good to others, utterly regardless of self, and whose greatest happiness was to see others happy. Beneath a rugged exterior he had the gentle heart of a child, and the darling project of his life was to improve the homes of the poor. With this object in view he laboured early and late, in and out of season, in health and sickness: he laid the paths that led others to honours, and, after having made the fortunes of many, died a poor man. How many who watch the growth of industrial dwellings know that but for Matthew Allen they might never have existed? The first block erected in London was built by him, and most that have been since erected are on the lines he laid down; the material he invented so greatly reduced their cost as to make them a paying speculation; for this he took out a patent which proved a great success, but in his large-hearted generosity he gave up his patent when its merits were recognised in order to further the interests of the scheme he had at heart. He cared not for fame: others might wear the titles won by his industry, others might pocket the wealth earned by his genius and foresight; it brought joy to his heart to see his predictions fulfilled, and to find the cause he had taken up single-handed, amidst scoffs and sneers, become a triumphant success. He was a singularly outspoken man, and, therefore, repelled many; but those that knew him best loved him most, and his memory will live ever-green in the hearts of all his friends. An intimate acquaintance of a quarter of a century enables me to bear this testimony to his memory, and I can truly say the grave never closed over a better man.*

W. H. LASCELLES.

SKETCHES OF A FEW EXECUTED EXAMPLES OF STAINED GLASS.

BOOKS illustrating designs prepared by trading firms are, generally speaking, little better than worthless to architects, notwithstanding the large outlay often incurred by the enterprising promoters, who incessantly shower their productions upon the profession, in the hope of an extension of business, of course, and thinking their books will be carefully preserved for future reference. A little consideration, however, would have told them that most architects view these things, not only for their practical value and suitability, but also from an artistic point of view, and architects naturally conclude that any manufacturer or producer of architectural iron-work, terra-cotta, furniture, stained glass, &c., who publishes an inartistically-executed book of designs, is not likely to be the most suitable man to go to for really good work. Of course, at best, mere drawings or photographs can never equal the advantage of judging from the actual executed examples themselves, but this is not frequently convenient or possible, and so books of a more or less catalogue character, when properly drawn and arranged, will always be of great use to those for whom they are intended. Few firms can now affect to despise illustrated lists of this nature, however prosperous their business may have been in days gone by when competition was less strong, and enterprise, perhaps, less conspicuous. Now everybody finds it necessary to advertise more or less in some form or another, if they would not be left behindhand in the race of business advancement. Notable improvements have in a few cases been made lately in catalogue literature, chiefly in the matter of art furniture and stained glass, not forgetting Mr. Lascelles' book of concrete slabs. Of furniture books we have noted that published by W. Watt, of Grafton-street, and now we have before us two works illustrating specimens of stained glass. The first is by Gibbs and Howard, of Charlotte-street, W., and the second by Shrigley and Hunt, of Lancaster, and of John-street, Bedford-row. The former book is certainly very nicely produced, and contains

* [Mr. Lascelles' tribute to the memory of Mr. Allen might well stand without any endorsement by us. Our acquaintance with him dates back nearly as long as that of Mr. Lascelles, and if one point of his character was more apparent than another throughout the whole time it was the constant and enthusiastic energy with which, in spite of disappointments and the falling away of some with whom he had worked most manfully to secure the success of his ideas, he still entered upon fresh enterprises for doing good. Mr. Allen united in a rare degree the qualities of a philanthropist and a man of practical ideas, and he has certainly done as much—probably more—than any other man during the past twenty years to improve the dwellings of the people.—ED. B.N.]

many very well-drawn examples of stained glass of good design, the plates being photo-lithographic prints in brown; but we miss, however, the artistic feeling, for some reason or other, which we find in the lithographic drawing of the plates in the last-named volume published by Shrigley and Hunt. The drawing here may frequently be less carefully executed, but there is a sympathetic touch which is thoroughly in character with the spirit of the work illustrated, and this is an advantage of no little value, especially in a book which is intentionally of a suggestive character. The book under notice also has the merit of giving drawings of only executed examples in different parts of the country. Of the designs themselves we may say that they are in nearly every instance both suitable and good, combining the quaint effect peculiar to the treatment of old glass with the improved modern drawing of the figure. The single-light windows from Menai Bridge church and St. Anne's church, Ings, may be named as two different examples of style, but both equally pleasing, while the east window from Morecambe church seems a clever treatment of a rather difficult subject for an Early English triplet window, and the later window from St. Paul's Church, Swanley, Kent, we like very much. The painted tile decorations appear good, and we like the Domestic glass windows from Mr. King's house, Liverpool; The Oaks, Millom; and from Mr. Lockwood's house at Harrogate. Such books as these which we have mentioned are worthy of their publishers, and can but add to the credit of their authors. This remark cannot, however, be applied to the majority of similar publications, which usually find a fitting resting-place in the architect's waste-paper basket.

OUR COMMONPLACE COLUMN.

LIBRARY: DETAILS OF ARRANGEMENT.

In addition to the remarks already made under this head, we may refer to the position of the library in the monasteries of the middle ages. It was sometimes placed over the scriptorium and adjoined the presbytery, as in S. Gall, generally situated towards the north; in Finchale priory it is placed next the slype; at Wimborne, south of the choir; at Lichfield and Dunfermline it is placed over the chapter-house. At Gloucester and Hereford it is near the north transept (see Walcott's "Church Arrangement.") As regards the aspect, opinions differ. Many recommend the north as the best position for the windows; others say the east, so as to avoid glare, and to insure a steady light. The effects of gas lighting are injurious to the bindings and paper, and it has been advised that cases should not be placed too near the ceiling, where the air is hot and charged with gas. In planning libraries the lower shelves should be made deep enough to take folios, and 20in. projection is not too much, as it affords a ledge on the top at about the height of a sideboard; the shelves above should be able to hold quartos and books of common reference. The gallery shelves may be reserved for octavos and smaller books. For library tables the dimensions are generally about 9ft. to 18ft. long by 4ft. wide; they are best covered with leather. Loudon describes a circular reading-room with eight galleries abutting and radiating from it. At Birmingham this form is adopted, the room being lighted from a dome supported on columns. The circular library and reading-room at the British Museum is 140ft. in diameter, and 120ft. high. The Bodleian library at Oxford has three large rooms in the shape of the letter H., but the majority of the libraries at Oxford and Cambridge are oblong. Trinity College, Cambridge, by Sir C. Wren, has the library 190ft. by 40ft. by 37ft. high; at Corpus Christi the library is 87ft. by 22ft. by 25ft.; at All Souls, Oxford, the dimensions are 198ft. by 32ft. by 40ft. The University College, London, is 91ft. by 21ft. 6in. by 32ft.; the Middle Temple Library is 85ft. by 42ft. by 62ft. Libraries should be well ventilated, so as to avoid mustiness, and it is necessary that the walls be battened. The cases should be of well-seasoned deal, pine, or mahogany, with a small space left behind the backs for circulation of the air.

LICHGATE OR LYCHGATE,

Derived from the Saxon *lic* a dead body, is an open shed covering the gate to the churchyard, so as to form a shelter under which the bier is rested on the way to the grave. It is sometimes called "corpse-gate," and in Herefordshire, "scallage or scallenge-gate." It is generally of timber, and it is thought that not one of those in England is as much as three centuries old. At Bray Church, Berkshire, the lichgate has two chambers over it connected with a charitable bequest. In Parker's "Glossary," to which the reader is referred for examples, it will be seen that they are usually constructed with upright timbers resting upon oak sills, with bracket pieces and struts at the top, carrying a projecting roof; sometimes these brackets are wrought in curved forms. In the "Architectural Dictionary" under this heading several examples are mentioned. It is stated: "In Devonshire the lichgate was formed by a gabled wall, built up on either side of the church-path, and a roof built from one gable to the other on stout beams. Of such a fashion was the old 'bier-house' at Tormoham and Paignton in Devonshire, both destroyed, and such still exists at Marldon, Abbotskerswell, Manaton, Priors Dean, &c." A list of several appears in this dictionary. We may mention a few: Arundel, Sussex (re-erected as a north porch); Ashwell, Hertfordshire; Beckenham, Kent; Beckingham, Lincolnshire; Birstal, Yorkshire; Boughton Monchelsea, Kent; with a recess on one side, Compton, Berkshire; Hartfield, Sussex; Hayes, and Heston, Middlesex; St. Peter's, South Weald, Essex; Worth, Sussex; West Wickham, Kent.

LIFT.

The employment of lifts is now become common, and in large buildings like hotels, club-houses, warehouses, and factories, the lift has, to a large extent, superseded the staircase. Dr. Cap, in 1857, was one of the first who proposed to employ lifts for private dwellings, and the use of this mode of conveyance is common in Paris in the loftier kinds of houses. Lifts are of various sorts and sizes; many are intended to carry small articles, others heavy weights and luggage, and some persons. The ordinary construction for the former kind of conveyance is a small tray or box, suspended by balance weights, hung over pulleys in square vertical shafts between the various floors. The hydraulic lift is worked by a ram, which moves by the pressure brought to bear upon the column of water acting in a water-tight cylinder; the reservoir should be above the point to be commanded. Various means, for preventing the tray, box, or cage, from falling in case of any accident have been devised, such as Baine's safety; but more recent methods have been noticed in the Building News in describing the lift fitted up at the Criterion and other recent hotels, to which the reader is referred. Mr. Whichord, the President of the R.I.B.A., read a paper on "Hydraulic Lifts" in 1864, and various descriptions will be found in this journal.

LIGHTNING-CONDUCTOR.

It has been observed that the zone protected by a conductor may be limited by a circle whose radius is equal to twice the clear height of the point above its last bearing. The lower end should be carried 3ft. below the surface of the water of a well, or 10ft. below surface of damp ground. One important point is that all metallic parts of buildings should be brought into conducting connection. For further information, we refer the reader to articles in the "Architectural Dictionary," Chambers's "Encyclopædia," and especially to an article in the last volume of the Building News.

LIME.

We refer the student in quest of information on the nature and properties of lime to Burnell's treatise on "Limes and Cements," in Lockwood's series; "Notes on Building Materials," published by the Science and Art Department, South Kensington; to various articles in the Building News; and to Mr. Reid's volume on "Portland Cement and Concrete." We may as well remind the reader that lime is classified under the heads of hydraulic and non-hydraulic, there being two subdivisions of each class called the *rich* and *poor* limes, and the hydraulic and eminently hydraulic. Rich limes increase largely in bulk while slaking, and are obtained from calcareous substances, yielding not more than about 5 per cent. of silex or other foreign matter. Poor limes swell very little, and contain about 20 per cent. of foreign matters. A grey colour is preferred in this country; but no reliance can be placed on this test.

LIMESTONE.

Reference may be made to various articles on building-stone in this journal, to Ansted's "Lectures on Geology," to Reid's "Treatise on Cement," to the article in the "Architectural Dictionary," and "Notes on Building Materials."

MACHICOLATION,

The projecting parapet of a wall or tower, usually pierced and supported on corbels, between which were open spaces, through which melted lead, stones, and other missiles were dropped on the heads of the assailants when close up to the walls. Machicolations are to be found on most of our castles, and in many of the old gateways and remains of fortifications, and were a common mode of defence in the Middle Ages. In France the feature is frequently seen upon chateaux and cathedrals, as at Puy en Vélay. The subject is fully illustrated by Viollet-le-Duc, in his Dictionary, "Machicoulis." See examples at Warwick Castle, and Bargate, Southampton, two representative instances. In late buildings the feature became to be used as an ornamental termination, and in this sense it is often reproduced by Gothic architects.

MALT-HOUSE.

It is observed in the "Architectural Dict." that "the most convenient and usual arrangement is to have the steep at one end of the building, with the barley-store above it, so that the barley is filled into the steep by means of shoots. The working-floors form the centre portion of the building, and at the other end is the drying-kiln, with malt-store adjoining." Diagrams are given in the article referred to, and much useful information. It is stated that the working-floors should be wide, and should together contain an area of 200ft. superficial for every quarter of barley steeped at one time.

NIMBUS.

M. Didron, in his "Christian Iconography" (Bohn), devotes the first part of his history to a scholarly and erudite treatise on the Nimbus. Every art-student should possess the book. We in the following notes have availed ourselves of the author's researches. The Latin word *nimbus* has the same meaning as the Greek *νιφας* (with which it is very closely connected), snow, dew, rain, a cloud. "Nimbus may also be understood to signify the aërial car, the cloud which, according to Virgil, serves as a chariot for the gods." "The etymology of the word," says M. Didron, "has been little regarded by artists, for the nimbus, which ought always to have the character of a cloud, a vapour, or flakes of snow, frequently assumes the form of a circular disc, sometimes opaque, sometimes luminous, and sometimes transparent." It assumes the shape of a triangle, of a square, of several jets of flames, of a star, with six, eight, twelve, and sometimes even a countless number of rays. There is scarcely perhaps a single instance in which the shape of the nimbus agrees entirely with the idea which that seemed intended to convey. It also is sometimes triangular, sometimes a star of five points, square, with either straight or concave sides, occasionally rectangular, and also lozenge-shaped. M. Didron observes the following distinctions in the use of terms which are frequently used in much confusion. He speaks of the *nimbus* as that which encircles the head; the *aureole* as that which envelops the body; and the *glory* as the union of the two. It is impossible to speak with certainty of the epoch at which the use of the glory was first introduced; but it appears to be at least as ancient as the most ancient system of religion. It is represented on the most ancient primitive Hindoo monuments. The Egyptians represented it (usually coloured white or red) surmounting the heads of their divinities. It was in frequent use amongst the Greeks and Romans. A fine specimen of it is extant in the fragment of a marble frieze, discovered by Dr. Schliemann, on which Phœbus is being drawn in his car by spiritedly-executed horses. On page 41 of the English edition of Didron's work, there is an illustration of Maya, the Hindoo goddess, with a cruciform nimbus. The nimbus is generally held as an attribute of sanctity in the West. In the East it is emblematic alike of physical power and moral courage, civil as well as ecclesiastical

authority. We fancy we detect the idea of the nimbus (of light) in the following lines of Virgil's Æneid I. Speaking of Venus, "Dixit, et avertens rosea cervice refulsit" (v. 402), and again, in describing Æneas, after he had burst from the cloud which rendered him invisible, "Restitit Æneas, claraque in luce refulsit, Os humerosque deo similis" (v. 588.) Many other examples might be cited, but the above must suffice for the present. The Aureole we have already described as the nimbus of the body. It seems like a drapery, a mantle of light enveloping the body. The colour of the Nimbus is thus regulated: Christ's, and the four first orders of saints, Virgins, Apostles, Martyrs, Confessors, have the nimbus of gold; Prophets and Patriarchs, the Saints of the Old Testament, silver. The nimbus of the chaste is red, of the married, green, and that of penitents, yellowish, but slightly tinted. We must again urge our readers to consult M. Didron's work for themselves, in which they will find an immense amount of symbolical knowledge and copious notes. C. F. W.

SCHOOLS OF ART.

HANLEY.—The annual meeting of this institution was held on Monday week. Mr. A. A. Bradbury, head-master of the school, read his report, which stated that in the National Competition two bronze medals have been obtained for painting ornament and one bronze medal for figure modelling; also one national book prize for painting in monochrome from the cast, one for modelled ornament, and one for modelled design. The prizes next in order of merit are the third-grade, of which nine were obtained. Six free studentships have been granted. In the Advance Art Examination one student was successful in design. In the second grade (a time test examination in freehand, model, geometry, and perspective) 53 candidates were successful in 64 exercises, of which 20, being marked "excellent," gained prizes. Ten of these students, having passed in all the subjects of this grade, receive the "full certificate." In April last 1,759 drawings in the elementary section by 146 students, and 613 works in the advanced section by 59 students, were sent to London for examination.

METROPOLITAN DRAWING CLASSES.—The Duke of Edinburgh visited the City on Friday last, and at the Guildhall distributed the Queen's prizes awarded by the Science and Art Department to students of the Metropolitan Drawing Classes in connection with the South Kensington Museum. Mr. Busbridge, the master, in his report stated that there had been a satisfactory increase in the number of those attending the classes, and an advance in the quality of the students' work. These classes had been in operation for 15 years, over 5,000 students had passed through them during that time, and at present there were 15 centres with about 1,000 students under instruction. This year, although the standard had been raised, 280 Queen's prizes, and as many as 746 certificates had been gained in the examinations. The schools represented on this occasion were those of Paddington, Marylebone, Battersea, Chelsea, Westminster, Somers-town, Lambeth, Deptford, Hoxton, Bermondsey, Hampstead, Kilburn, and Stockwell.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

ARCHÆOLOGICAL INSTITUTE.—At the usual monthly meeting of the Royal Archæological Institute, held last week at the Society's rooms in New Burlington-street, the following papers were read:—"On an Inscribed Votive Tablet, found at Binchester (the ancient Vinovium)," by the Rev. H. M. Scarth; and "On the Recently Discovered Mural Paintings in Patcham Church, near Brighton," by Mr. C. E. Keyser, who exhibited drawings of the frescoes. Among the other articles exhibited were a rubbing of the tympanum over the south doorway of Everton Church, Nottinghamshire, by Mr. H. S. Harland; an embroidered pulpit cloth, formed of the orphreys and other portions of two copes, from Wool Church, Dorset, by Mr. E. A. Griffiths; photograph of a sculptured effigy of a lady carrying a rosary, found last year at Bangor Cathedral, and a leaden die, bearing the initials "I. F.," found in pulling down an old wall at Oundle, Northamptonshire, by the Rev. G. T. Harvey. The reading of Mr. Keyser's paper was followed by a discussion, in which Mr. J. G. Waller, Mr. Micklethwaite, and other gentlemen took part.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A meeting of this Association was held last week. Mr. T. Bonnar, president, in the chair. A paper was read by Mr. J. W. Small, on Craigmillar Castle, in which the connection of this stronghold with Scottish history was reviewed, and an architectural description of it was given. The paper was illustrated by the exhibition of a number of finished and unfinished measured drawings of Craigmillar in plan and elevation.

THE BRITISH ARCHÆOLOGICAL ASSOCIATION.—The fifth meeting of the session was held last Wednesday week, Mr. Thos. Morgan, F.S.A., in the chair. Mr. R. Blair announced the discovery of 6,000 Roman coins near the station, Hummum, on the line of the great Roman wall between Newcastle and Carlisle. They are all of the later Emperors, and are in capital preservation. Mr. Grover, F.S.A., exhibited some remarkable prehistoric weapons found in England and Switzerland, and Mr. Cecil Brent, F.S.A., some examples of the so-called Rhodian glass, of 15th-century date, found in excavations in London. Mr. Roach Smith, F.S.A., described a gold ring found at Branchester, and now in the collection of Mr. Fitch, of Norwich. It has two faces confronting one another, with the inscription "Vivas in Deo." Christian inscriptions of Roman date being so rare in England, much attention was given to this object, but it is most probably the work of the Gnostics rather than Christians, as was pointed out by Mr. Grover. Mr. Teniswood exhibited some remarkable designs from the little-known corona of the cathedral, Aix-la-Chapelle, of 12th-century date, and of much interest from their elaborate workmanship and details of costume. Major Bates, in referring to Mr. Cope's recent paper on "Ancient Jade," stated that the natives of New Zealand held this material in high estimation, not because of any religious belief, but because articles made of it were heirlooms among the principal chiefs. The first paper was by Mr. George R. Wright, F.S.A., and was a description of the ancient frescoes recently discovered above the Norman chancel-arch at Patcham Church. The colours are of remarkable freshness, and the entire composition is much above the average: several other frescoes were found above this, which was hidden by about thirty coats of whitewash. Mr. Loftus Brock, F.S.A., considered the work to be late 12th-century work. The subject was The Day of Judgment, so usual in the position where found—above the chancel-arch of our ancient churches. Mr. Patrick believed that this and similar works were tempora paintings rather than frescoes. An effort is being made for the preservation of the paintings. The second paper was on "Dozmore Pool," Cornwall, and in the absence of the author, Mr. John Brent, F.S.A., it was read by Mr. Brock. The Arthurian legends were passed under critical notice and commented on. The meagre size of the lake and its flat surroundings hardly justify Tennyson's description.

ARCHÆOLOGICAL.

ARUNDEL.—The other day some workmen in the employ of Mr. McManus, the contractor for the works at Arundel Castle, while excavating about 10ft. or 12ft. below the original surface of the ground, came upon a stratum of burnt wood, about 7in. or 8in. in thickness, in what appeared to be a cave used for sacrificial purposes at some remote period. A number of bones were found in a calcined state, while others were found partly calcined. One piece of ancient pottery was found almost entire, and its rude make, and the marks of the thumb being plainly perceptible in its formation, seem to prove its great antiquity. It appears to have been used as a cruse for burning oil. Other pieces of pottery were also found, but none of sufficient size to enable one to form an idea of what they had been. Some of them were very nearly black, which is no doubt attributable to the long period they have been buried. There are no indications of the ground in the vicinity ever having been disturbed; its floor of the natural chalk sloped downwards towards the east, from which side, opposite Mill-lane, was no doubt the entrance, till time and the elements, with their various changes, had completely buried all traces.

RECENT ASSYRIAN AND BABYLONIAN RESEARCH.—On Monday evening, Mr. Hormuzd Rassam read a paper on his last explorations in Nineveh and Babylon before the Victoria Institute. Prominence was given in the paper to the author's discovery, at Balawat, of the famous bronze gates and temple dedicated to the god of war by the Assyrian king Assurbanipal, father of Shalmaneser the Great, who bears that title in virtue of the campaigns and triumphs which the bas-reliefs, now in the British Museum, record. At Nimroud, which the Assyriologists identify with the Biblical Calah, Mr. Rassam found, below the north-east palace, the remains of a more ancient palace containing sculptures which had been brought from the centre palace, belonging to the time of Tiglath-pileser, or Shalmaneser; also two detached statues dedicated to the god Nebo, all of which are now in the national collection. Last year at the same site he discovered, not far from the north-west palace, a temple built by the same founder, but so thoroughly wrecked that no trace was left of the actual walls. Even the enamelled tiles, which must have adorned the ceiling, were so broken and scattered about that, although more than a dozen large baskets were filled with fragments, he was not able to piece together a single perfect example for the British Museum. The only objects he found whole and standing in their original positions were a marble altar and what seemed to be a vessel let into the floor of the temple to receive the sacrificial blood. There had been marble seats also for the ministering priests, and besides these were pieces of a very handsome tripod, round and square pillars of marble and stone, with some hundreds of inscribed bricks, and about twelve marble platforms. These platforms, from the hardly decipherable inscriptions, are thought to have been dedicated to so many different gods. At Kouyunjik he discovered the decagon cylinder, now amongst the choicest treasures of the British Museum, running to nearly 1,300 lines of cuneiform writing, and recording a score of the years of King Assurbanipal's annals, an elaborate monograph on which annals, as known before this discovery, was one of the late George Smith's greatest Assyriological works. In speaking of his discoveries at Nebbi Younis, which were not very considerable, he mentioned that this shrine of the "Prophet Jonah," half a mile from Kouyunjik, is to this day called Nineveh in official documents. As to Babylon, it was not until a year ago that Mr. Rassam was able to begin digging there. Having left some workmen to push on his trenches at Kala Shergat, either the Resen or Assur of Scripture, he reached the site of Babylon. To one section of its ruins, he stated, the name Babel still cleaves; at Imjaileeba was the palace of Nebuchadnezzar; and Omran with Jimjima looked as if they had been occupied by the royal household. Save the Birs Nimroud, of whose vast masses of vitrified relics a most graphic account was given, there was on the Syrian side of the Euphrates nothing beyond a faint tracing of some walls to show the extent of the city's western limit. At the mound of Babel he uncovered four exquisite wells of red stone placed parallel to and within a few feet of each other. These wells, 140ft. high, he believes, must have supplied the famous hanging gardens. Imjaileeba he did not find virgin soil. He accordingly soon abandoned it, but Omran and Jimjima, judging from the contract-tables and other inscribed terra-cottas found there, must have been covered with the royal mint and the banking establishments of Babylon. Probably his most important discovery hitherto among these ruins was the cylinder already deciphered by Sir Henry Rawlinson and found to be the official record of the taking of Babylon by Cyrus.

PARLIAMENTARY NOTES.

ANCIENT MONUMENTS BILL.—Sir J. Lubbock on Monday moved the second reading of this Bill. Mr. Storer moved the adjournment of the debate. After some discussion, the House divided, and the numbers were—for the adjournment, 35; against it, 55; majority against, 20. The Bill was then read a second time.

THE NEW COURTS OF JUSTICE.—In answer to Mr. O. Morgan, Mr. G. Noel said on Tuesday that the contract for the erection of the Royal Courts of Justice between Carey-street and the Strand should be completed by the end of the present year, but

owing to the unfortunate strike and the prevalence of frost during the last two years the work was delayed. Every progress was being made, and he hoped that before the end of the year 1881 the Courts would be sufficiently advanced to enable judicial business to be conducted in them.

Building Intelligence.

NOTTINGHAM. — Sneinton Church Institute, Nottingham, was opened last week. The style is Venetian-Gothic freely treated. The jambs and arches of the windows, doors, and cornices are of moulded brickwork, supplied by the Hathern Brick Company, from designs of the architects. The Young Men's Institute rooms consist of a reading-room 24ft in length by 16ft. in width, and a room for games, &c., 41ft. in length by 17ft. wide. The large hall is 66ft. in length, 41ft. in width, and 30ft. from floor to ceiling, and is capable of seating five hundred people. Messrs. Wheatley and Maul are the contractors for the whole work. The architects are Messrs. Truman and Pratt.

THE YORKSHIRE COLLEGE.—The first pile of buildings in connection with the Yorkshire College has risen on a portion of the site in Beech-grove, Leeds. The structure, which is from the designs of Mr. A. Waterhouse, forms the nucleus of the greater pile that may be expected to rise on the estate at some future time. The building is in the Gothic style of the fourteenth century, freely treated. It covers an area of ground 144 feet by 112 feet. The carving is being executed by Messrs. Farmer and Brindley, of London. The main building is an oblong square, treated on the east and west sides in a similar manner. The materials used for the exterior are red pressed bricks, with stone dressings from the Spinkwell Quarries, near Bradford. On the first floor is the museum, 39ft. 6in. by 30ft. Mr. J. Adams is clerk of the works. The contractors for the pile are Messrs. B. Woolley and Sons, Leeds. The glazed bricks came from the Farnley Iron Company. The whole cost of the land, the erection of the buildings, and the fittings will be defrayed by the Clothworkers' Company, at a probable cost of about £14,000.

To the long list of theatres destroyed by fire the Theatre Royal, at Dublin, has to be added. The accounts as to the manner in which the fire originated slightly differ: but if it broke out in the Viceregal box, and was due to the ignition of the lace curtains, we must, as usual, lament the results of gross carelessness. Within twenty minutes of the outbreak, the main roof of the building fell in. There is, of course, a special risk attaching to public buildings of this characterr Drury-lane, Covent-garden, and Her Majesty's Theatres have each been several times destroyed by fire. The Olympic and the Lyceum have suffered a similar fate. Astley's Amphitheatre has been burnt down three times, on two occasions leading to the destruction of a large number of the adjacent houses. The Surrey Theatre has been twice burnt; and the Standard, the Pavilion, and several other of the minor houses have at different periods fallen a prey to the flames.

THE "fiddler" at York Minster has for some time past been the subject of much discussion, especially when it became known that his removal was decided upon in the restoration of the exterior of the south transept. For nearly 200 years, the fiddler, placed upon a crocketed pinnacle, has surmounted the gable of the south front of the minster. On Wednesday week the figure was taken down, and in doing so great care was exercised, no injury being done in its removal. The removed pinnacle will be substituted by a floriated cross. The ultimate destination of the fiddler is not decided, but probably it will be presented to the Yorkshire Philosophical Society, and placed amongst the antiquities in the museum. The figure is exactly 3ft. in length, and is in a good state of preservation, considering that it was exposed to all kinds of severe weather. For the present it is lodged in the office of the clerk of the works. Has any reader an idea of its origin or meaning?

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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TO AMERICAN SUBSCRIBERS.—Mr. W. L. Macauley, of 23, Dey-st., New York City, is authorised to receive subscriptions for the BUILDING NEWS. Annual rates, 6 dols. 40c., gold.

Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—G. E. H.—D. D. and Son.—E. and R.—G. V.—S. T. and Co.—G. and Co.—W. P.

X. Y. (The competitions are open to all, but you must have previously passed the district surveyor's examination of the R.I.B.A. See advertisement on back page of Jan. 2.)—AIR-PUMP. (You must search our back volumes. A recapitulation in "Intercommunication" would take too much space, not to mention the endless correspondence from rival patentees we should soon be involved in.)—J. B. H. (Nothing better has ever appeared than the series of articles you refer to, so we do not see the necessity for repeating them or giving another series. We discontinued the "latest prices" on account of want of space.)—A. HALL. (Place the engraving between two sheets of stout blotting-paper, and then go carefully over the places where the spots of grease are with a heated flat iron, taking care it is not hot enough to scorch. This will melt the grease, and the blotting-paper will absorb it. Repeat the procedure till all is extracted, and then remove the traces of the spots with a little benzine on a piece of clean sponge or flannel.)—J. K., Derry. (A good polish for oak furniture is made with ½ gallon of methylated spirit, ½lb. of shellac, bleached, 1oz. of gum benzoin, and ¼oz. of gum mastic. This is to be bruised well and allowed to stand till it is dissolved. This will give a dead polish such as you require, but if you wish a dark colour at once a stain may be used. Any such treatment, however, always results more or less in an unpleasant appearance.)

"BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED.—O. L. L., G. and P., H. W. M., Oxford; J. T. W., R. P. P., J. L. C.

Correspondence.

PROFESSOR KERR AND THE LATE CAPTAIN FOWKE.

To the Editor of the BUILDING NEWS.

SIR,—My attention has been called to your impression of the 30th ultimo, in which Professor Kerr is reported to have made certain very defamatory statements with regard to my father, the late Captain Fowke, and the competition for the Natural History Museum at South Kensington.

To these statements I trust you will allow me to give an entire and emphatic denial in your columns. Professor Kerr has made them before, and their falsehood was exposed at the time by Sir Henry Cole. I cannot ask you to reprint the correspondence between him and Professor Kerr, but I trust that, before accepting Professor Kerr's ascertion, all who are interested in the matter will, in justice to my father's memory, refer to the *Times* newspaper of the 15th, 18th, 20th, 21st, and 22nd December, 1865.—I am, &c.,

FRANK REDE FOWKE.

11th February.

EXPERIMENTS ON VENTILATING PIPES AND COWLS.

SIR,—As I notice that there have been several allusions lately in your paper to the experiments on ventilating pipes and cowls, carriedout at Kew, in 1878, I think your readers may, perhaps, be interested to learn that these experiments are going to be continued on a greatly extended scale. The results obtained in those experiments were considered of such value that a considerable sum has been raised by private subscription for investigating the whole subject of ventilation by automatic means, with a view to the publication of the detailed results by the Committee appointed to undertake the investigations, viz., Capt. Douglas Galton, C.B., F.R.S., Mr. W. Eassie, C.E., and myself.

The subscriptions already collected amount to a considerable sum, and, amongst the larger donations, may be mentioned £150 from their Graces the Dukes of Northumberland and Bedford. Many of the leading architects and engineers have also subscribed. I may add that subscribers of a guinea and upwards will be entitled to receive a copy of the details of the experiments when published.—I am, &c.,

ROGERS FIELD, Hon. Treasurer.

5, Cannon-row, Westminster.
9th February.

"A QUEEN ANNE SQUARE."

SIR,—Mr. Seddon affects to be much amused by the buildings on the Bedford Park Estate. Judging from designs that have appeared in the BUILDING NEWS, these erections are most picturesque and substantial-looking, and seem to be the "right thing in the right place."

Any thought of introducing "a Queen Anne Square" at Westminster could not occur to any but your correspondent, who should "stick" (with the pitch) to his own ideas of æsthetics, and never make the attempt.

If he fears soiling his hands with dirt, why be so ready to throw it broadcast at others who happen to differ from *his* views of things? I should be glad if such an able and recognised an exponent of art as the architect on the Bedford Park Estate would introduce some of his picturesque designs into our country, and relieve, to some extent, the cold and formal monotony of our buildings!

The "Queen Anne" style has decidedly a very homely, comfortable, English appearance, and blends well with the landscape of a suburban locality.—I am, &c., E. CALVERT.

Edinburgh, 9th Feb.

TERRA-COTTA ORNAMENT.

SIR,—I have read the letters of your correspondents with great pleasure. The key-note struck by Mr. J. Roddis was not sounded a moment too soon, when architects are looking out for another material than stone, in which their designs can be worked out faithfully and well. This can be done in terra-cotta, as I will try and show. I never had an idea that it was through bad burning that ornament in terra-cotta was so horribly bad, but that it was due to the bad workmanship of the modeller, and the ignorance of the moulders at the works. There are two churches near Manchester, in terra-cotta, of splendid architectural design; the traceried windows and mouldings are excellent in casting, but the ornament is distressing to look at, through the modeller not understanding architectural foliage. There is another job in Manchester, where the groin bosses were carved in Bath stone, for models, with plenty of relief in the foliage, so that they would show out from the roof, but when they came back in terra-cotta from the works, they were one solid mass. Up they went and were fixed—specimens of bad casting, due to ignorant and careless workmanship. Whose fault is it that this bad work is produced? The architects have it in their own hands. Let them, in what ornament they require for any work, give

it direct to the man who understands the style of ornament that is adapted. Thus the architect will be sure of his ideas and sketches being faithfully carried out on his exteriors and interiors, without any detriment to his work. Let terra-cotta manufacturers employ skilled moulders and skilled workmen in architectural foliage, that can work together. Then will they be able to turn good work out that will suit architects, and improve their own positions. Mr. Pulham says, in your issue of the 30th January, that he is not aware of any great demand for architectural ornament in terra-cotta. The reason why, I have tried to show: architects will not have works spoilt by questionable ornament. Let every terra-cotta producer pay a visit to the Architectural Museum. All the beauty they see there can be produced in terra-cotta, if they will only employ the right stuff and the right men.—I am, &c.

Manchester, Feb. 11th. PLUTUS.

CONCRETE BUILDINGS.

SIR,—I should not have presumed to address you again upon the subject, had not Mr. Potter, in his second letter, given a grossly inaccurate description of my patent, calculated to cause unjust prejudice in the minds of those readers of the BUILDING NEWS who do not take the trouble to compare the two patent specifications for themselves, as asked in my former letter. Please allow me again to ask your readers to compare, and also to notice, that in Mr. Potter's pretended description of my patent he states it to be for "ordinary plain slabs, having indents or grooves formed in them." The words of my patent specification being, as quoted in my last letter, "having roughnesses, indents, or *projections* made at their inner faces." And the drawing attached to my specification shows the slabs with a projection at each end (precisely as shown in Mr. Potter's drawings), and also a projection in the centre, thereby forming two indents at the inner face of the slab. Mr. Potter's drawing, showing also a projection at each end of the slab, of precisely similar dovetail shape, as shown in my drawing, thus forming one dovetailed indent instead of the two dovetailed indents shown in my drawing.

The object attained in each case is to make the slab a self-fixed facing of a monolithic concrete wall: the means to attain this object being in each case projections or indents made at their inner faces. If a patent may be avoided and thus rendered valueless by another using one more or less "indents or projections" of similar "peculiar shape" for the self-same purpose than shown in the drawings, it surely seems that no patent can have any value at all, unless it is held that there should be drawings attached to the specification showing every possible number of projections or indents that could be used. Surely our patent law is not such an absurdity.—I am, &c., CHARLES DRAKE.

[We will insert no more letters on this subject from either party; if either has infringed the other's patent the remedy is obvious, and is not to be found in a discussion in our pages.—ED. B.N.]

PATENT COLLAPSIBLE WINDOW-GRATING.

SIR,—Amongst the items included under the head "Our Office Table," Feb. 6, 1880, is a curious instance of the trifles that are sometimes patented.

I refer to the collapsible window-grating invented by Herr Born.

It caught my attention, because about two years ago exactly the same thing was designed by me for a job I had in hand.

It was, however, never carried out, because the manufacturers applied to asked too great a price for making the speciality.

However, until now I had no idea of such a simple contrivance aspiring to the dignity of an invention.—I am, &c.,

J. BINDON CARTER.

Nottingham, Feb. 8.

MORE DESTRUCTION AT EXETER.

SIR,—"Another Exonian," who, in the current number of the BUILDING NEWS, takes exception to a letter upon this subject that appeared in your issue of the 16th ultimo, endeavours to correct it by appending to his own epistle the most curious collection of mistakes I have seen altogether for some time. The communication he dubs as inaccurate deplores the wilful destruction, now in progress, of the fine old building in the Exeter High-street known as St. John's Hospital; and it refers, amongst other things, to the old oak ceiling of its chapel. This is an obvious error. The ceiling in question is, or rather was, a waggon-shaped one, of not any particular interest. Ceiling, in this case, was probably written inadvertently for *seating* (?) the framing and panelling of which was very good. "Another Exonian," however, passes this by unnoticed, and contents himself by making statements so at variance with real facts that the thought suggests itself that his knowledge of Exeter is of the most cursory character.

1st. He refers slightingly to Exeter's second chief glory: her old houses; buildings whose quaint outline and curiously pleasant construction go so far to give that peculiar charm to the High-street, and to the more ancient parts of the city generally. One by one, these venerable structures are passing away, and as each in its turn makes way for "modern improvements," a drop of the old city's life-blood flows in silent protest to the ground. The old house at the corners of High and Goldsmith-streets is, at present, the last victim. It has long been one of the most picturesque bits of grouping in what is in some respects an altogether unique thoroughfare. From time to time it has fallen to my province to point out to visitors, many of whose names are amongst the best known in the architectural, scientific, and literary world, the various points of interest in this city; and the old house just departed has, as a quaint example of domestic work incorporated with an ecclesiastical building, always been an object of peculiar interest. This old building—which was an apothecary's shop, when in the last century Sir Matthew Wood, afterwards twice Lord Mayor of London, served his apprenticeship therein, and which continued to be a chemist's to the end—has just been destroyed, and that anyone can deplore its destruction, and that the BUILDING NEWS possesses sufficient antiquarian sympathies to pay a passing tribute to its memory, fills "Another Exonian" with surprise. People with art feelings so dormant as these deserve to be socially transported to some town such as Croydon, Birkenhead, Aberdare, or Saltaire, where nearly everything has sprung up mushroom-fashion in the night of the last quarter of a century, and where nothing in the streets exists to remind them of those soul-stirring days of which Kingsley tells us with such vividness in the word-pictures he has so brilliantly painted in the pages of "Westward Ho!"

2nd. Your correspondent says that it is a "startling" thing for him—as a resident (?) in Exeter—to read there are about thirty architects in the city. He can only "screw up"—that's his expression—17 or 18. This is probably right so far as his knowledge goes. I can, however, mention off-hand the names of 27 members of the profession having offices in the city. These are Messrs. Appleton, Ashworth, R. W. Best, W. R. Best, Boulnois, Chudleigh, Churchyard, Crocker, Doble, Edwards, Ellis, Medley-Fulford, Farley, Gwynne, Harbottle, J. Hayward, Pearson Hayward, Jerman, Packham and Croot, C. Pinn, J. Pinn, Tarring and Wilkinson, Ware, Webb, and Wills. And this list, long as it is for a city numbering less than 35,000 inhabitants (according to the last census), residing in 6,000 houses, does not include Mr. Luscombe, the stonemason, who, as the cathedral and diocesan surveyor as well, forms a sort of connecting link between the profession and the building trades of Exeter.

3rd. Your correspondent ventures the remarkable assertion, and he writes it in italics to make it the more prominent, that Mr. Luscombe is by trade a carver. Here, again, "Another Exonian" has blundered. A quarter of a century or so ago Mr. Luscombe—who, I am sure, will be the last person to mind me saying so—lodged at the house of a relative of my own, and then earned an honest livelihood as a journeyman walling-mason. His succeeding career is one that many a young man may look up to with the hopeful resolve of going and doing likewise; for it illustrates how it is possible for a workman in the lowest branch of the building trade to raise himself, by sheer hard work and industry, to a most honourable position. All honour is due to Mr. Luscombe for what he has done as the architect of his own fortune.

An allusion, however, has been made by your last correspondent to Mr. Luscombe's association with Exeter Cathedral. This is, perhaps, from one point of view, unfortunate; but, for all that, it forms an excellent example of Mr. Luscombe's manifold abilities.

During the recent restoration, Mr. Luscombe, in his practical capacity of Cathedral Mason did the necessary works upon that ancient fabric. These he did not allow to clash with his professional duties, and as Cathedral Surveyor he saw the works in question conscientiously and correctly carried out. This double duty was, at first sight, an onerous one, but it was rendered less difficult, may-be, owing to the fact that, during the latter portion of the restoration, Mr. Luscombe's intelligent son acted as the Cathedral Clerk of Works.

I will not, at present, say more, except to endorse the first letter which appeared upon this subject. I urge that it is deeply to be regretted that in an historical city such as Exeter the old buildings should be systematically destroyed.—I am, &c.

Exeter. HARRY HEMS.

Intercommunication.

QUESTIONS.

[6041.]—**Paint Cement.**—I have specified Young's (Plymouth) patent paint cement in lieu of plaster for finishing interior of a hospital, but the contractor cannot find out anything about it. I should feel obliged for information or particulars of a good substitute.—OWEN EDWARDS, Architect, Rhyl.

[6042.]—**Drainage.**—A local board of health order their surveyor to clean out and arrange the bottom of certain ditches within their district, so that the roads shall be drained and the water in the ditches shall pass off to the river, and not stagnate as heretofore. The squire who owns the land on both sides of the road forbids the surveyor to touch the ditches, and puts the matter in the hands of his lawyers when the surveyor has done his work, according to the orders of the board. He (the squire) claims the ditches and roads as his freehold, her Majesty's subjects only having the right over. I notice the Public Health Act is silent with regard to ditches. The board did not intimate to the squire that they intended to clean out the ditches, but the board do not claim the ownership, only the right to the ditches so far as the sanitary law calls upon them to amend nuisances. Will some one kindly reply who have had similar experience? The road two years ago was a turnpike road.—WILLIAM JACKSON.

[6343.]—**Settling-Tanks.**—What is the best material for facing the walls of settling tanks, filters, &c., of sewage works? Has any correspondent tried glazed bricks? Have been shown some that are salt-glazed on the sides and ends, the beds or top and bottom being free from glaze, but as such bricks are made of fireclay, which is absorbent where unglazed, and as all bricks laid in cement or mortar require to be well watered before being laid to enable the cement or mortar to set properly, a doubt arises whether such bricks when so laid would not, from the amount of moisture thus hermetically sealed up in them, expand, and blow away the face when exposed in frosty weather. The result of experience would be of value to your readers. Staffordshire blue bricks, being non-absorbent, are free from the above danger, but they are not so easily kept clean, nor do they look so well. Stone is too absorbent, and shows dirt.—E. J.

REPLIES.

[6003.]—**Old Irish Cemetery Crosses.**—I may add to my last that I see by a recent Irish paper that the merits of Irish granites and limestones having been thoroughly discussed, the latter has been deemed most suitable for the requirements of the proposed national monument to O'Connell. It further states that the particular stone selected is the limestone from the quarries of Messrs. Hammond and Co., at Sheephouse, Drogheda.—HARRY HEMS.

[6006.]—**Old Irish Cemetery Crosses.**—As I have always been in the habit of considering any communication in your or other columns signed "Harry Hems" as deserving implicit confidence, I think it the more necessary to now draw his attention to the inaccuracy of his reply in your last issue. By accepting "hearsay" he has helped to perpetuate the error that Chicago suffered so much because granite was what all its buildings were composed of. Now, I being deeply interested in promoting the more general and extended use of granite, went specially to Chicago to investigate the matter, and found that, as a matter of fact, there had been no granite to consume. I searched among the débris, and could not find an atom, and was informed on all hands that there was not a single granite building in Chicago. I communicated this fact to the *Builder* on my return in 1877. And now, as to granite building, our architects do not know what they lose in ignoring granite save when they use it for a few paltry polished columns or pilasters. These cost rather more than soft stone, and then they cry out, "Oh, granite is so expensive!" but if any architect will go in honestly for the use of granite from basement to eaves, and plan his ornament and construction to suit his material, he will find that by using it as thoroughly as he would good sandstone, he will have a splendid building at a cost very little exceeding what it would be in the softer material, and the reason is this in part, that a small quantity of granite must be shipped specially by steamer or by railway at very high, almost prohibitive, rate of carriage, while if there be a cargo of it used the cost in carriage alone is reduced by something like 1s. 6d. per cube foot, no small item. If any of your architectural readers really want to introduce granite—and the Aberdeen buildings referred to by "H. H." illustrate what can be done—I will be glad to go into the matter with him and enable him to compete with sandstone and introduce a new era in English architecture. In America (where, by the way, all the granite mischief by fire is said to have taken place) they go in for most beautiful and extensive structures in granite, as those who have been in Philadelphia or Washington can testify. In the latter place the new War (?) Offices are entirely granite, while in New York the grand pile of granite on Broadway, the Post-office, is a standing memorial of what can be done in granite and of confidence in it as a building material. And now a word on Irish granite, and I have done. I say that there is in Ireland granite superior to any granite found in any other part of Great Britain for beauty and for strength. The reason that many ancient Irish and Scotch crosses have decayed is that they were made out of decomposed or decomposing granite, such as could be worked by ordinary chisel and mallet, while that we supply can only be worked with hardest steel and heavy hammers weighing 6 to 8lb. each.—THOS. M. H. FLYNN, of Bessbrook Granite Co., North-Western Hotel, Liverpool.

[6023.]—**Rendering Casts Washable.**—Although I cannot give Mr. Swan the results of any personal experience, I can do the next best thing and refer him to the recipes given by Dr. Reissig, of Darmstadt, to whom the prize offered by the Prussian Government was awarded. These he will find on p. 230, Vol. XXVI., No. 660, of the *English Mechanic*. Most likely that journal has its appropriate niche in St. George's Museum, but if not it can surely be seen in Sheffield. As, however, the matter may be of interest to others, I make the following précis.

After many experiments, Dr. Reissig concluded that the only practical method was to convert the sulphate of lime into sulphate of baryta and caustic or carbonate of lime, or into silicate of lime by means of silicate of potash. Casts made with old and poor plaster are useless for silicating. The process with baryta water is described as the simplest, easiest, and cheapest method. The solution is made by putting pure hydrated oxide of barium and a small quantity of slaked lime into the water, which is held in a zinc vessel having a tight-fitting cover, and a grating on which to rest the casts. As soon as the solution becomes clear, the casts are placed in it and allowed to remain from one to ten days, according to the thickness of waterproof coat required. The casts are rinsed with lime-water when taken from the bath, and are then wiped with clean white rags and left to dry. They are then ready for painting with the soap solution, which is to be obtained under the name of spiritus saponatus, but the finest surface is obtained by the use of a solution of stearate of soda in strong alcohol. The cast and the solution must both be warm, so that the latter may penetrate as deeply as possible. By these two solutions the cast is provided with an insoluble coat, and the pores are filled, thus preventing the ingress of dust. The casts can be washed with soap and water, luke-warm, not hot, and if they are then rinsed with water and oil of turpentine and placed under glass shades in the sun the latter will bleach them. The silicate of potash solution is made by preparing a 10 per cent. solution of caustic potash in water, heating to boiling, and then adding pure silicic acid as long as it continues to dissolve. Place in well-stoppered glass vessels to settle. Just before using add a few pieces of pure potash, or 1 to 2 per cent. of the potash solution, and if the casts are large the solution can be diluted by adding one half its volume of pure water. Dip the casts or cover them by means of a sponge or a spray-producer. When dry, treat with the soap solution as above.—S. R.

[6026.]—**Architects' Responsibility.**—The facts related by "Anxiety" are certainly vexatious to an architect or builder who desires to conform to the instructions of his client but finds his authority overruled by an interfering gardener. The question is, Who took the gardeners' authority to deviate from the line directed to be built upon? He is certainly responsible, as he was not authorised after instructions to make any alteration. It seems to me the foreman was in error in not declining to obey the gardener. The client who gave the order to build the wall on the line of old fence cannot, of course, be called upon to pay. The foreman and gardener being merely servants of the principals in the matter, cannot be looked to, so the loss would fall upon the builder. "Anxiety" ought to have insisted upon the line he was instructed to keep, or to have got from gardener a written indemnification. It is an instance of the importance of insisting upon authority for alterations.—G. H. G.

[6029.]—**Church Spire.**—I should use lead at the angles in the same manner as hips are done. I do not think slates, however well cut at angles, would be secure. Openings may be left in the shape of spire lights. The framing should be securely bedded upon two plates of timber, an outer and an inner framed together, in a similar manner to those of roofs resting on thick walls. This frame or curbing should be well tied and braced, and bolts should be screwed into iron sockets let into stonework. I should advise "F." to look at some wooden spires that may be accessible to him. The great aim should be to obtain a good bedding for the spire on the stonework, and to securely tie and brace the timbers.—G. H. G.

[6029.]—**Church Spire.**—I erected a spire similar to the one referred to in 1865, close to the coast, and very exposed to south-west gales; the height from the ground to the apex was about 96ft., and as it is standing now, I presume it to have been a good job. I had never seen one constructed before, but the way in which I proceeded was to build stone corbels through the tower walls (brick), about 10ft. down from the top, and upon them to bed a wood sill. From this I reared posts at each angle, connected together on top, with a headpiece of similar scantling to sill piece, and the posts were cross-braced together and strongly bolted. The tower being rectangular, the framing followed the same lines, and fitted close up against the inside face of walls. Similar framing, consisting of head, sill, posts, and braces was continued in diminishing sizes up to the top of spire, the "set-back" of each tier being found by the hip lines. The geometrical elevation of spire framing would resemble in outline boxes of diminishing sizes piled one upon another. Spars (rafters) and hip-pieces were used as in ordinary roofing and notched at the foot to a strong plate bedded on outside edge of top of tower wall, iron bolts passing through this plate within the thickness of wall, and through the corbels before referred to, and dragon pieces connecting it at top to the framing held the whole together securely. Three-quarter rough boarding was then firmly nailed on over the whole exterior surface, and covered with slates of small sizes. The hips were covered with lead rolls, but there is no objection to cutting the slates to a fair mitre if preferred. I believe it to be a stronger job without wind apertures, and in the case referred to I left none. The vane should have a long iron rod (say, 15ft.) continued down inside framing, and securely bolted to it.—MANCUNIAN.

[6030.] — **Timber Measuring.** — "Liverpool," "Lincoln," and "Kyle" do not answer William Phelps' question. Hoppus's tables are correct—not mathematically correct. There is a great difference between the real content and the content according to custom. The rule of one quarter girt which is commonly used gives the answer about ¼ less than the true quantity in the tree, or nearly what the quantity would be after the tree is hewed square in the usual way, and is intended to make an allowance for the squaring and waste. Hoppus's tables are according to the rules of trade.—WILLIAM JACKSON.

[6030.] — **Timber Measuring.** — Your correspondent does not appear to be aware that there are two methods of ascertaining the content of logs of timber, consequently Hoppus is quite correct in his calculation—viz., 270 cubic feet in a log measuring in length 30ft. and girthing 144in. This is arrived at by the general method adopted, which gives the content of the log when squared—that is, the waste in squaring is not included in the calculation. The rule is, multiply the length (30ft.) by the square of the quarter girt (36in.). The other method obtains the true content of the log before being squared. The rule is to multiply twice the length of the log by one-fifth of the girth squared. This gives the content of a log 30ft. long, and girt 144in. as 345′ 7″ 2‴.—JAMES WILLIAMSON.

[6030.]—**Timber Measuring.**—"B." is the only one who seems to have understood the question, inasmuch as he demonstrates that which I had supposed every timber measurer knew—viz., that Hoppus does not profess to give the real cubical contents of a tree, but simply furnishes tables based on the quarter-girth custom. How this custom arose I know not, but I can quite understand that it may have begun as a "rule of thumb" process for saving elaborate calculations, and as it is in favour of the buyer and gives him a liberal allowance for waste, it got into general use, and a ready reckoner adapted to the purpose being required, Hoppus was the result. Round timber measurement is well known to be a "long tally," the same as slates, lime, &c., is in the building trade, but why it should be so I cannot say. The whole process of round timber measuring is at the present moment being discussed by representatives of the Government and the railway companies, with a view to charging duty and carriage upon the real contents (computed on "B.'s" principle) and not per Hoppus as at present, and if carried out new tables will come into existence and Hoppus cease to be.—MANCUNIAN.

[6030.]—**Timber Measuring.**—If "Liverpool" will kindly read No. 6030 question again, in January 30th, BUILDING NEWS, he will perhaps not think "I have adopted a most remarkable method of my own." I said "a log of timber measuring in girt (or circumference, not scantling) 144 n., or 36in. ¼ girt, 30ft. long," which is equal to a side of 40½in., not 36in., as "Liverpool" facetiously imagines to be a mystery to him, falling, as many others do, into Hoppus's error, and if he will please refer to Hoppus's system of measuring solid contents of cases and chests, p. 25, year 1837, he will find that Hoppus says, "Take a line or pack-thread and girt the package, and take a quarter of that girt," and he gives as example "36in. long by 96in. girt, making it equal to 12ft. solid contents." This mode I say is wrong, as the following will show: A case measuring 36in. long by 30in. deep and 18in. wide, being the same girt as above, viz., 96in., equals, as every schoolboy knows, 11ft. 3in. solid contents, making Hoppus 9in. in excess, and this system is the same with all measurements made by Hoppus. I again ask why Hoppus's tables are adhered to? I perceive that Kyle also falls into the same error. Thanks to "B., Lincoln," for his nice explanation, and, to my mind, the true one.—WILLIAM PHELPS.

[6031.]—**Architects' Charges.**—If the tracings were absolutely required, of course the committee ought to pay architect for them, and the same with the specifications, but "Perplexed Architect" might have invited all the parties to take their own particulars from one set of drawings and specifications, and so have saved expense. For the 3 per cent. commission an architect engages to supply all contract drawings, but for heating and other special fittings he can charge extra for drawings or tracings necessary.—G. H. G.

[6033.]—**Scholarship.**—I should advise "Aspirant," seeing that he has plenty of spare time on hand, to attend the classes held in connection with the Architectural Association, and thereby prepare himself for passing the voluntary architectural exam., which is held biennially. For examples of the subjects required to be studied he should get copies of the questions set at the last exam., held in May, 1879. These can be obtained from Mr. W. H. White, secretary, R.I.B.A., 9, Conduit-street, W., price 1s. 6d. The above, in my opinion, is the best "scholarship" that one destined for the profession can prepare himself for."—J. WILLIAMSON.

[6035.]—**Perception of Beauty.**—I am glad "Student at Home" has raised this question, and think it deserves more attention than it appears to get; I have given much thought to it and will gladly discuss it with "Student," either in these columns or by private letter. Much has been written upon this question well deserving careful reading, the following works among others: Hogarth's "Analysis of Beauty," Burke's "Essay on the Sublime and Beautiful," "Essay on Beauty," by Addison. There is an old and rare work by Richardson, an essay on painting, which contains much upon beauty well worth study. It was to this work that Sir Joshua Reynolds attributed much of the influence that moved him throughout his artistic course. The following writers should be consulted, as being the best teachers to follow: Dugald Stewart, Sir W. Hamilton, Goethe, J. Ferguson, Sir Joshua Reynolds ("Addresses to Royal Academy"), John Ruskin ("Modern Painters"), and Wyke Bayliss ("Witness of Art and Higher Life in Art"). But the one work which sums up into an intelligible whole all the most reliable teaching upon the subject by both ancients and moderns is a volume published by Simpkin and Marshall entitled "On Beauty: Three Discourses by Professor Black e." This work not only contains an analysis of ancient and modern theories of beauty and an exhaustive inquiry by the author, but an exposition of the theory of Plato, and is certainly the best work to study so as to learn. In the last-named work the author quotes a passage from Augustine which, I think, supplies a good key-note for our inquiries; it asks the question, "What is beauty?" and, in reply, states that, that which we acknowledge to be beautiful must have both a *form* and *adornment* in which a *fitness* and *accommodation* of the parts to the whole is at once discernible. I cannot help thinking there is in the opening line of Keats' poem of "Endymion," "A thing of beauty is a joy for ever," a depth of meaning which reaches down very nearly, if not quite, to the core of the matter; for what is meant by "a joy for ever"? Is it not that *something* which satisfies the inner and higher life of the soul of man, and is even co-eternal with that life? Beauty, therefore, is that self-same joy."—JNO. PERRY, 7, Grove-terrace, York.

[6037.]—**Squint Quoin.**—A quoin or corner, not square, in building. A wedge beneath the breech of a gun. To raise or lower the muzzle in artillery.—WILLIAM JACKSON.

[6038.]—**Catesby Abbey:**—The references in my "English Minsters," II. 92, will give the full history of this convent of Benedictine Nuns. The site, 28 Henry VIII., was given to John Only. The descent may be traced through the Ministers' Accompts in the Record Office. See also Tanner's "Notitia" and Dugdale's "Monasticon" (1673), III. 897.—MACKENZIE E. C. WALCOTT.

STAINED GLASS.

PAISLEY ABBEY.—The east window of the sounding-aisle of Paisley Abbey, which was built up with bricks and mortar, has now been opened out, and filled in with stained glass. The large centre quatrefoil portion of the tracery is enriched by the monogram "I.H.S."; the two smaller ones by "A" and "Ω" respectively; the main portions of large openings of window are filled with patent stamped and stained glass in diamond-shaped quarries, with separate designs on each, of the rose, thistle, shamrock, and fleur-de-lis.

STATUES, MEMORIALS, &c.

THE LATE MAJOR WHYTE MELVILLE.—A memorial cross has recently been erected by the friends of the late Major Whyte Melville, over his grave, at Tetbury. The memorial consists of a large foliated and carved marble cross, about 7ft. high, standing on an enriched base, at the head of a marble sarcophagus, on which is inscribed, "Erected by many friends, in affectionate remembrance of George Whyte Melville," and the whole is surrounded by a low wrought-iron railing of appropriate design. The marble-work has been done by Mr. Thomas Earp, of Kennington, and the railing by Messrs. Hart and Son, from the designs of Mr. Robert W. Edis, F.S.A., architect, of Fitzroy-square, from whose design, also, the large memorial fountain, to be erected in the market-place at St. Andrews, the birthplace of the deceased gentleman, is being carried out. In the latter memorial, a portrait medallion, and other sculptured medallions, representing War and Literature, by Mr. J. E. Boehm, A.R.A., will be inserted.

LEGAL INTELLIGENCE.

ARBITRATORS' CHARGES.—WYNN v. FENWICK.—This action, tried last week at the Leeds Assizes, and to which attention was called by the plaintiff in our last issue, raised an important question respecting the position towards each other of umpire and arbitrator. Mr. Forbes appeared for the plaintiff; and Mr. Cave, Q.C., Mr. Wills, Q.C., and Mr. West for the defendants. The case was heard by the Judge without jury.—Mr. Forbes, in opening the case, said the plaintiff and defendant were both civil engineers practising in Leeds. The action was that of an arbitrator against an umpire who had a knowledge of the arbitrator's charges, and who parted with the award, whereby the arbitrator lost his lien for costs. The action was a novel one, and there was no precedent. In the year 1877 there was an action in the Queen's Bench Division, Lock v. Widdop, in which Mr. Justice Field referred all matters in difference to the plaintiff and Mr. Johnson, and in the event of their failing to agree, to the defendant, as umpire. The nature of the action was partly claims upon bills of exchange, and a counter-claim for work and labour done in the erection of Drax Abbey, near Selby; and the question in dispute was the valuation of the work done and the way in which it had been done. Accordingly, the two arbitrators, in the absence of the umpire, went over the work in great detail, measuring it and ascertaining the quality, in which work they were occupied some seventy-four days. They agreed as to measurement; but they disagreed about prices; and Mr. Fenwick, the defendant was consequently called, and he was in the position to make his award in the month of February, 1879. On the 18th of February the defendant wrote to the plaintiff asking him for his charges; and the plaintiff sent in a bill for £415, less £40, which he had received on account from the defendant. Mr. Johnson's bill came to nearly the same amount.—His Lordship: What was the value of the property in dispute?—Mr. Wills: £1,200.—Mr. Forbes: No; it is between £7,000 and £8,000.—Mr. Wills: the contract was for £1,200; and the award was for £1,700.—His Lordship: What are the umpire's charges?—Mr. Forbes: £149; and he was only occupied three days. On the 2nd of May the defendant wrote to the plaintiff that Mr. Lock refused to take up the award, though it was in his favour, on account of the excessive charges; and that the defendant in the action was unable to do so, as he had gone into liquidation. The defendant feared that unless the award were taken up none of them would get their costs. He therefore asked if Mr. Wynn could suggest any means by which Mr. Lock might be induced to take up the award. Eventually a consultation took place between the two arbitrators and the umpire, and the result was that the arbi-

trators wrote to the defendant as follows:—"With reference to our conversation this morning regarding the costs in the case of 'Lock v. Widdop,' and wishing to have a settlement of the matter, we beg to make the following offer, but which must be understood to be entirely without prejudice to our rights to take any proceedings we may think fit to recover our accounts (should the offer be refused), not only as arbitrators appointed from the Court, but also under Mr. Lock's personal and repeated promises during the progress of the measurements, &c. When we wished to cut the matter shorter, he (Mr. Lock) would have everything and every item thoroughly investigated, and if he did not get a shilling from (1st) Mr. Widdop, he would take up the award—Mr. Lock to pay us £100 each down. The award then to be handed to him on the following agreement. 2nd. The award to be put in force against Widdop and his estate, and whatever sum Mr. Lock shall receive shall be divided amongst us in payment of the balance of our accounts, or towards the settlement of them in equal proportions. 3rd. Should the amount received from Widdop not be sufficient to settle the balance of our accounts, Mr. Lock to pay us the said balance, less 50 per cent. on such balance, on the delaration of any or no dividend." The result was that Mr. Lock made a counter proposal, comprised in the following draft of an agreement:—"We, the arbitrators, hereby agree, in the event of the award being taken up by Mr. Lock, to waive our claim for the full amount of our respective charges, and to accept the following in full discharge, namely: The immediate payment of £50 to each of us, and after the affairs of the said Robert Widdop, now in liquidation, have been wound up and dividends paid to his creditors, a further payment on account of the balance legally due to us as such arbitrators at the same rate in the pound as the dividends which may be realised out of the estate; and we further agree that after the payment we shall not be entitled to obtain any further sum from Mr. Lock than the dividends due on our respective balances from the estate of Robert Widdop. I, James Lock, one of the parties to the arbitration above referred to, agree to the terms specified." Upon the receipt of that document from the defendant the plaintiff saw him, and declined to consent to the award being given up upon those terms. He told the defendant that he was not to part with the award except upon the terms which he had sanctioned. Eventually the arbitrators learned that the umpire had got his own costs in full, and had given up the award.—The Judge: Was it made by the umpire alone?—Mr. Forbes: Yes. The umpire had got his claim in full, and the arbitrators had been left to get what they could. It was a question of considerable importance, and his client was anxious to have it settled, for it never had been decided. His contention was that the costs of the umpirage in an arbitration of this kind included not only the costs of the umpire, but of both the arbitrators. Mr. Forbes proceeded to cite several authorities in support of this point, and added that if the umpire chose to throw the arbitrators overboard, they had no remedy. Mr. Wills, for the defendant, said that what Mr. Fenwick felt that he could not lend himself to such a scandal as the charges made by the arbitrators in this case, and he did his best to secure them reasonable remuneration. But as to making himself a party to receive the charges of the arbitrators on their behalf, he would rather fail in this action than lend himself to such a thing. He denied also that any demand was made upon him to hold back the award until the arbitrators' fees were paid, and, indeed, there was no such duty resting upon him. His Lordship said he felt no doubt that this action was entirely without foundation, and that there was no such duty on the part of the umpire as that he should keep back the award until the fees of the arbitrators were paid. There was no such relationship between the umpire and the arbitrators as placed him in the position of a trustee on their behalf. The arbitrators must get their charges as they best could. There was, therefore, a verdict for the defendant.

CARR V. METROPOLITAN BOARD OF WORKS.—This action, tried on Monday in the High Court of Justice, Chancery Division, before the Master of the Rolls, involved an important question upon the construction of the Artisans' Dwellings Act.—The Plaintiff was owner of leaseholds required by the Board of Works for their improvements in Bedfordbury, under a scheme framed in accordance with the provisions of the Act. The schedule to the Act sets forth the procedure conferred upon local authorities who are desirous of exercising compulsory powers. Amongst other things such bodies are required to appoint an arbitrator and to publish a notice requiring the owners of lands sought to be taken to come in and make their claims before such arbitrator, whose duty it is to adjudicate upon the claims sent in, and make a provisional award stating the compensation payable. He is then to hold meetings after notice, "to hear and determine any objection which may then and there be made to such provisional award by any person interested therein, and may take any measures which he may think proper for ascertaining the compensation payable in respect of any such lands or interest, or the justice or propriety of any other matter of such provisional award." The plaintiff's interest had been omitted from the provisional award, but the mistake was discovered before the final award was made, and the arbitrator then called upon the plaintiff to make a statement of his claims for compensation; the plaintiff accordingly appeared before Sir Henry Hunt, the arbitrator, and stated that if the award were sufficient he would not avail himself of the technical objection. The sum of £1,100 was awarded, and the plaintiff objecting to this as not sufficient, brought the present action to restrain the Board of Works from taking possession of his property.—The Judge said the plaintiff must be held to be a person "interested in the provisional award," although his name did not appear in it. Even if he were not "interested," the arbitrator had power to take such measures as he thought fit to ascertain the compensation. The proper steps had been taken by the arbitrator to ascertain the plaintiff's claims, and the proceedings were, therefore, so far regular, and the plaintiff had no cause to complain.—The action would be dismissed with costs.

LIABILITIES FOR COST OF NEW ROADS. — A number of persons owning property in Northcote-road, Battersea, were summoned on Tuesday, at the Wandsworth Police-court, by the Local Board of Works, for the cost of making up the roadway. A test case against Mr. Miller, for over £100 was taken. For the defence it was urged that the charge, which was at the rate of 23s. a foot for each side of the way, was a monstrous one. The Magistrate thought he could not go into that question, and could only make an order for payment, but eventually the summonses were adjourned for the purpose of considering a case for the opinion of a superior court.

Our Office Table.

IT seems, from a letter addressed to the *Furniture Gazette* by the Science and Art Department, that the label which was attached to some of Mr. Bitmead's furniture in the South Kensington Museum, and which described it as the work of Chippendale, was "temporary" and "erroneous." Information was unnecessary as to the *error* of the label; but how and why was it *temporary?* Till the blunder was discovered, or till the Science and Art Department could afford to procure *bonâ fide* specimens, meanwhile amusing the public with modern imitations? The latter is probably the true meaning of the official reply, and we fancy it applies to a few other objects in the Museum besides Chippendale furniture.

AN International Exhibition of Earthenware, Chalk, Cement, and Gypsum Industry is to be held at Berlin this year, from June 29th to August 10th. Only such objects can be sent to the Exhibition as are directly or indirectly made of brick, tiles, earthenware, chalk, cement, or gypsum. The committee has to decide about the named objects, and as to the amount of space granted to the exhibitors. Application must be made before the 15th March, 1880. The forms of application are to be made in duplicate by each of the exhibitors, and to be sent to the president of the committee—Herr Paul Loeff, Privat Baumeister, Berlin, S.W.

A NOVEL system of sewage disposal has been invented and patented by Mr. G. Barnard, of Edinburgh, called the "earth column." It consists of a number of earthenware vessels or cylinders placed one on the top of another, each having a layer of earth at the bottom, and placed under the soil or other discharge-pipe, which enters the top vessel, which is of iron. The several vessels communicate with one another by apertures in the bottom of each, and each of them has an overflow-pipe, the object of which arrangement is that the solid matter is separated and retained by the earth, while the liquid portion is successively filtered through the series of receptacles and enters a chamber at the bottom, where a discharge-pipe is fixed, through which the liquid can be drained off as a comparatively clear effluent into the sewers. The upper receptacle—about 4ft. high, and 18in. diameter—is proposed to be made of galvanised iron, and has a conical top. The discharge-pipe enters at the top, made air-tight by an indiarubber ring round the neck of cover, and the latter has a water-joint with the body of receptacle. This iron vessel rests on a second vessel of similar construction made of earthenware, and with an indiarubber or water-joint, which again, in its turn, fits into a similar joint on the top of the third vessel, and so on. The drawing before us shows five of these receptacles, one under the other, which gradually increase in diameter to the bottom. Of course the top iron vessel collects the solid contents of the closets, and the gases escape by a pipe leading to a long box filled with charcoal; as the sewage matter filters through the lower vessels, less solid matter will be retained in the layers of earth, but which will take up the soluble organic matter and salts, so that the valuable part of the sewage is preserved in the earth. The upper receptacle is proposed to be removed about once a week, the upper earthenware one about once in two months, and the lower ones less often in proportion. Means are provided by Mr. Barnard's invention (by slides and covers) in removing these vessels, to prevent the escape of gases or waste, and special carts are suggested for placing them in upright rows for transport to the land. The tier of vessels may be fixed to the side of the house, encased in brickwork, and so made to represent a column, or it may be sunk in a well, and communicate by subways in cities. The latter plan, of course, would have to be adopted for closet discharges in basement stories. This description will convey the principle of Mr. Barnard's invention. It is ingenious; but we do not see how it can be applied to the soil-pipes of ordinary houses unless the closets are on the upper floors. We cannot see the utility of so many receptacles, as shown in the drawing, which is a column of vessels upwards of 20ft. in height, and we are afraid, unless it is simplified greatly, sanitary authorities will hesitate to give it a preference over the present modes of the dry earth system.

THE drawings for the Pugin Travelling Studentship, and other prizes, have been on view at the Institute of British Architects. Mr. L. Stokes wins the Travelling Studentship for some admirable drawings, including several sketches of old work in Norfolk and a brown ink drawing of an arcade at Ely. Mr. F. Hemings, who received the second prize last year, has been awarded a special silver medal of merit for several excellent drawings and sketches. We more particularly note the drawings of Ely Cathedral, St. Leonard, Hythe, Kent; the old house and St. Margaret's Church, Ipswich; and a feeling sketch of Whittlesea Church. The same prize has also been given to Mr. J. Lansdell for some vigorous ink and coloured drawings, consisting of the bays of apse of the well-known Early French Gothic Church at Norrey, near Caen, in Normandy, and some sketches of half-timbered houses at Rye, Sussex, &c.

THE Asylum Committee of the Hull Corporation held a meeting at the Town Hall on Wednesday. A discussion arose as to the engagement of Mr. Payton, architect, Bradford, to examine the plan of "Lucidus Ordo," with a view of ascertaining whether it met the requirements of the Lunacy Commissioners, and the chairman stated that it had been found that that gentleman was one of the competing architects in connection with the new asylum. The town clerk had written Mr. Payton, asking him if he would undertake the examination of the plan for 30 guineas, and that offer was accepted. It was now resolved that the town clerk should withdraw his letter to Mr. Payton, on the grounds stated above, the committee being of opinion that Mr. Payton's report would be rendered valueless in the eyes of the Lunacy Commissioners by the fact that he was one of the competing architects.—A letter was read from Mr. Iveson, the clerk to the magistrates, stating that the instructions given to Mr. Hartley were that he should examine the relative merits of the six selected plans, and say which he considered were entitled to the first, second, and third premiums, with instructions to architects, together with the requirements of the Lunacy Commissioners, and that the justices had not received any notes upon each design taken by Mr. Hartley. The town clerk was also instructed to write to the justices, asking them to inform the committee when the selected plans had been sent to the Commissioners in Lunacy.

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THE BUILDING NEWS.

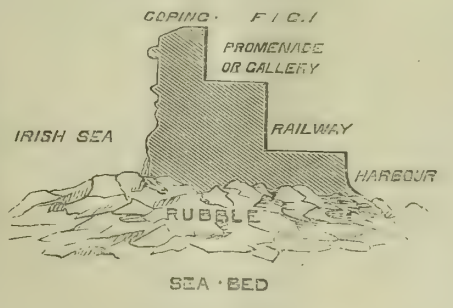
LONDON, FRIDAY, FEBRUARY 20, 1880.

HARBOUR WORKS PAST AND PRESENT. — A CONSTRUCTIVE CONTRAST.

MUCH has been done by England in the work of harbour construction, resulting in great benefit to our trade and commerce. Plymouth and Portland breakwaters are successful examples of this class of structural engineering, but perhaps the most gigantic of our day is that of Holyhead. This great national undertaking was begun in 1843, and finished in 1873, covering in its progress a period of 30 years, during which time a sum of one million and two hundred and eighty thousand pounds was expended. From the exposed situation of that portion of the Welsh coast brought into importance as the embarking point of the principal passenger traffic between England and Ireland, it was for a long time evident that shelter should be provided for the shipping passing through this division of the Irish Sea. After a great deal of deliberation, and consequent procrastination, it was finally determined in 1843 to begin this great undertaking, and its execution was entrusted to the late Mr. Rendle as engineer-in-chief, with whom was associated the late Mr. Dobson as the executive authority.

The simple problem which was set these engineers to solve, was to erect a long stretch of substantial barrier to check the storm-waves of the Irish Sea, and, on its land side, to provide shelter for a large fleet during stormy weather. It was decided to accomplish this object by removing so much of the adjoining mountain, one mile distant, as would by its submergence effectually meet the object desired. The task was surrounded with many natural difficulties, which were, however, easily overcome when the means were supplied by a national exchequer like that at the command of England. The exact line of the mole or dyke having been accurately defined, the necessary quarrying plant and transit appliances were speedily arranged, and the work of removing the mountain to the bed of the sea was begun.

The scheme or plan of construction was to deposit a rubble or irregularly-sized stone base, on which to erect the superstructure of worked masonry. To accomplish this preliminary or foundation-work, strong timber staging was erected, on which traversed the rails to receive the trains of loaded waggons, the contents of which were "tipped" into the sea. This branch of the design did not involve any harassing amount of engineering ability, for it only required an administrative application of the best means of reducing the rock, and taking its fragments in the most economical manner to its sea-bed destination. Powder, dynamite, or other explosive agents provided the means of accomplishing one division of this task, and steam, in the form of the locomotive driven along a well-laid system of railway, easily accomplished the other. But for the occasional destruction of the timber staging during exceptionally violent gales, this division of the work was an easy one, and comparatively uninteresting, but, nevertheless, it was a costly operation, and from first to last involved an outlay of £150,000 for timber and labour in shaping it alone. Starting from the shore at zero, as it were, the depth increased by degrees along the whole extent of the course, until, at its extreme distance, the vertical face was upwards of 10 fathoms at low water. As the depth increased, the base of this mound, or mole, widened, and, where deepest, was something like 450ft. from side to side. As the stone was tipped it gradually accommodated itself to the profile of the sea-bed, and after sufficient time was allowed for the subsidence of these great masses the superstructure was begun. The method thus described may be regarded as one most primitive in character, involving no engineering ability further than was necessary to regulate and control the output of the quarry and its deposition in the sea. There was no skilled labour required during the first division of the work, for the stones in all their irregularity of shape and size were merely transferred from their natural source to the sea; weight, indeed, was thus deposited, but in, we fear, too fragmentary a manner, and ill-suited to resist the continuous action of a resistless and turbulent sea of never-ceasing violence, even during comparatively calm weather. The Roman engineers resorted to a somewhat similar expedient for a base on which to build their piers, but they concreted their masses, and thus prevented any movement or travel from the swell of the sea. English engineers of the present time (at least those who have been entrusted with the construction of the Holyhead breakwater) have apparently disregarded this danger, and in consequence we now have to deplore an approaching degradation of this great national structure. Before, however, pointing out the character of the destructive agents of never-ceasing activity, we will more particularly describe the form and extent of the superstructure. The section of the breakwater, which is simple in character, is shown in Fig. 1.



On a bed formed by the "tipped" rubble random courses of masonry were laid in the internal portions of the wall, and faced externally with carefully-dressed ashlar. The dressed stone was obtained from near Amlwch, in Anglesea, the same source from which Telford quarried the stone used in building the piers of the world-famous Menai Suspension Bridge, and Stephenson also for the masonry of the no less celebrated Britannia Tubular Bridge, both spanning the Menai Straits; the packing, or internal stone, having been obtained from near Runcorn, on the Mersey, being the well-known Cheshire red sandstone; not very durable, however, for external work, but quite suitable for the position in which it was used. In point of work and finish this superstructure may compare favourably with any engineering work of modern times, and it might well be of a good character, for it cost something like £33 per lineal foot, or a total cost of upwards of a quarter of a million pounds.

The plan form of the breakwater is zigzig in character, and extends to nearly a mile and a half from shore to the point on which is fixed the lighthouse. This lighthouse is equipped with the latest improvements in machinery, and other appliances, and has also a bell for use during fogs. The light-keepers experience, during violent storms, considerable shaking from the vibratory motion of the house; but whether that unpleasant action is due to the elasticity of the building itself, or its breakwater foundation, is not accurately determined. This is not, however, to be regarded as a dangerous symptom, for even the Eddystone column has its tremors and shakings during high gales.

A careful examination of the present lines of this carefully-constructed superstructure shows a slight vertical settlement of about 3in. in depth, accompanied by a lateral divergence of nearly the same extent. It is not difficult to find the cause of this degradation, for the agent of destruction is found on looking over the parapet in ceaseless action. The loosely-packed stones are mere toys in the grasp of the relentless sea, which tosses them about like so many cockle-shells. The consequence of this mechanical disturbance is to manufacture from the stones, by abrasion and attrition, a large amount of débris, which travels along the sea-face of the breakwater, and round the mole, into the harbour—a somewhat alarming state of things, which has been acknowledged by the controlling powers, and its harmful action was attempted to be checked by placing, it is said, one thousand tons of iron cable along the face, so as to become embedded in the travelling shingle, and thus check its tendency to move by the "fetch" of the rolling sea. All this cost and forethought—or rather afterthought—fails, however, to check the mischief; and it appears to us only a question of time to utterly cast to the winds this costly structure of misdirected engineering. An ominous-looking group of concrete blocks (22 in number), perched on the top of the parapet near its extremity, and adjoining the light-house on the "Mole," indicate approaching danger. They are placed in a situation to be readily launched into the sea, we suppose, when a breach is made. These blocks represent about 660 tons, their weight being 30 tons each. They remind us of the buckets ranged in public buildings, and of about equal efficacy to stop the progress of a fire. We wonder if the engineers who planned this elaborate *prevention* ever thought of the prospect of these blocks when launched. Even had they been solid blocks of good stone, the chances would be greatly against their reaching the foreshore in a solid form, and certainly the concrete masses, of doubtful character, would be shivered by their own weight in falling. It is said that some experimental blocks met such a fate on being turned over.

We know not what attention is being given to this important question; but we sincerely trust, for the reputation of the country and its engineering staff, that a remedy will be sought against coming disaster, and speedily applied. We thus take leave of a great Government structure of incalculable advantage to commerce, and cross the Channel to suffering Ireland, and describe what is being done there, by less powerful influence, in harbour works at the estuary of the River Liffey.

In the good ship *Munster*, commanding the assistance of engines of 750 horse-power, we crossed the Irish Channel, in a somewhat severe gale, and in the midst of its violence, when the timbers of the well-knit vessel shivered from stem to stern from the shock of breaking waves, thought of the unprotected breakwater at Holyhead.

For some years the Dublin Harbour Commissioners have, in the interests of their city and country, deemed it necessary to provide dock accommodation for the increasing commerce of Dublin port and harbour. The works, in furtherance of this praiseworthy object, have been entrusted to their own engineer, and we will endeavour to show that the results realised fully warrant the conclusion that the engineering ability thus directed is of a high and original order.

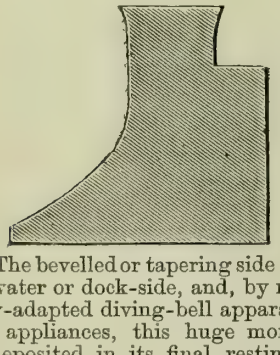
For the purposes of contrast we will limit our observations to the works now in progress in the construction of a dock 50 acres in extent, which are at present partially protected by an extemporised breakwater from the violence of the Irish Sea.

At Holyhead the most primitive means were adopted by the engineers of the breakwater, but at Dublin a new and unprecedented system of concrete blocks has been resorted to, and with a success hitherto unexampled. Concrete blocks, as we have already stated, have been in use for marine works during many centuries in this and other countries, but of comparatively limited dimensions and weight. Indeed, it was only during quite recent times that the ponderosity of these blocks became a subject of serious or careful study, and it may be said that attention was first directed to the subject by the peculiar action of the swell of the Bay of Biscay wave. It was found from observation that the force of this sea "fetch" was competent to turn over and pass on for considerable distances during heavy storms, concrete and stone blocks of 40 tons or more in weight. The engineers, to counteract this destructive agency, increased the weight of the blocks to 50 tons, or so, and thus rendered futile the utmost efforts of the hitherto destructive wave. Such examples of ingenious study has borne good fruit, and we will now describe concrete blocks seven times greater than those used on the French coast, and, more wonderful still, of Irish origin, conceived and executed by Irish agency, the whole being controlled by Irish finance of home growth—indeed the whole self-supporting, and of native origin.

A concrete block of 350 tons weight is something so much beyond our notions of what is possible in this direction, that it is at first somewhat difficult to realise the dimensions of such a mass, approaching in size a moderate cottage, and exceeding it greatly in weight. Not only are blocks of these hitherto-unheard-of dimensions easily possible, but something like three hundred of them have been already accurately deposited in the walls of the new docks now under progress at the mouth of the River Liffey, Dublin. That quantity represents roundly 16,500 tons of concrete deposited without waste or accident in an exposed situation on the Irish coast, and with such apparent ease and precision as to warrant us in passing our heartiest eulogium on the great ingenuity and patience of the controlling engineer.

The blocks are of special form, as shown in Fig. 2, having a 20ft. base and 27ft. in

FIG. 2



height. The bevelled or tapering side is placed on the water or dock-side, and, by means of specially-adapted diving-bell apparatus and pontoon appliances, this huge monolith is safely deposited in its final resting-place. These blocks are carefully built up on shore, and when three months old are hoisted up and deposited in the short space of eight hours. To avoid delay from accidents, there are always a number of these monsters, ready built and seasoned, much ahead of the requirements of the work. The top of the blocks, when finally laid, are somewhat under the level of ordinary low-water lines. The superstructure is of granite (Dalkey, near Bray) on the harbour side, so as to be able to contend against the abrading action of the shipping moored alongside, and the land side is built of concrete blocks of about three tons weight, securing by this arrangement an economical harbour-wall of undoubted excellence.

The component parts of these concrete masses are of varied character, the cementing or binding-agent being the best quality of Portland cement. Into the mould or shaping agent are passed, by a steam-crane, the materials, in the following order. First—A quantity of what may be called mortar, composed of seven parts of shingle, from the bed of the adjoining river, and one part of Portland cement. The shingle is composed of round stones, weighing, probably, from one to three pounds, and fine sand, which, with the quantity of cement, is passed through a specially-constructed mixer, having knives fixed to a revolving horizontal shaft, working in an open iron cylinder. Large irregularly-shaped pieces (weighing sometimes a quarter of a ton, perhaps) of granite and calp limestone are then placed in the mould, and men with tamping-irons ram the mortar well home to every crevice and cranny of the imbedded stones. By this means the blocks are fabricated, and receive no finish or external dress, but are deposited as they come from the mould, which is in due time taken to pieces and rebuilt for further operations. In the top and bottom of the blocks are inserted cast-iron collars, between which are left channels for receiving iron rods of great strength, which take the weight of the block, adapted to lift it, and, after its deposition, they are removed, but the collars are allowed to remain. These huge blocks may be termed conglomerat-concrete in charater, and differ from the ordinary concrete fabrications of less size and weight. Their formidable dimensions enable the introduction of large pieces of aggregate without risk, and the careful and ingenious manner by which they are deposited certainly precludes any possibility of jar or concussion to endanger their solidity or coherency, and their ponderosity secures an almost instantaneous settlement on the bed carefully prepared for them through the agency of the diving-bell and its apparatus.

It may be well supposed that the mechanical appliances for handling these blocks must be of a high order of excellence, and we shall shortly refer to the locomotive agents used for this purpose. As in every other detail of this block-manufacture, the pontoon and its internal mechanism had to be of special design, and it is more especially in this direction that the high mathematical ability of Mr. Stoney has been displayed. The pontoon in itself may not be regarded as of special or exceptional excellence or originality, but when we consider that a 14 horse-power steam-engine is the extent of force applied in lifting up, carrying some distance, and lowering a mass of concrete weighing three hundred and fifty tons, we may well realise the ingenious character of the mechanism at work under the circumstances we have described. It is not our object to describe this useful and original carrying vessel, for to do it justice a much larger space would be required, accompanied by drawings of an elaborate character, which our available space prevents. We have, however, thus hurriedly constrasted the rise, progress, and present condition of two great engineering works of the present and the past, in the hope that the dangerous condition of the Holyhead breakwater may be carefully studied, and its impending ruin averted by timely remedies.

THE ENTRESOL.

It is rather remarkable that so little has been done by the architects of commercial buildings with the entresol, but that all architecture or attempts at design are cut off at, and end with, the shop-window or its breastsummer. We seldom see the façade of a building devoted to business which does not affect the palace above the ground-story or shop-window. The shop-front must, as a *sine qua non*, be all plate-glass, while above it the building may assume the most monumental appearance of solidity and bespeak at once the genteel residence of its occupant, The entresol, literally an inter-story, is the French word for mezzanine or middle story, but its proper meaning architecturally is that it should form a subordinate story within the larger or higher one. In the following remarks we desire simply to show its proper place as an architectural feature. Many of our recent buildings in the City, where this feature is employed, show a decided misapplication of it, and their architects appear to have adopted a common French expedient of pronouncing the mezzanine between strongly-expressed horizontal features, as cornices and balconies, the effect of which is to cut up and destroy the unity of the composition.

One of the usual modes with us of making an entresol is by forming an arch above the shop-window, the effect of which arrangement is to unite the two openings and also to make the shop-cornice appear as a transom. This method is common in the United States, and we have several examples in leading thoroughfares in London. It may be seen in the Strand, in Cheapside, and the most recent instance of it we know is at the new Mercers' Hall, in Cheapside, where the architect has formed a series of flat elliptical arches springing from the piers, the general appearance of which is an arcade with a transom running through at impost level. Of all usual arrangements this is, probably, as good and as architectural as any; but the difficulty is in treating the arch and making it unite agreeably with the upper stories. A semi-circular arch seldom so unites; there is a recent instance of this near Anderton's new hotel in Fleet-street. The semi-circular opening does not unite well with the upper part, and the shape of the arch itself has an unmeaning effect for the purpose of lighting. A segmental-headed opening is not open to this objection so much, but it always appears to want a good abutment at the sides, or a weak, unstable effect is produced; and an other difficulty occurs in sub-dividing the opening for windows, and we have seldom seen, in either of these forms, any suitable filling-in for the glazing. It appears to us far better to abandon the idea of having one undivided opening under a single arch, and to arch it in three or more divisions, with small piers between, which would rest on the entablature, or be carried down the front below. With, say, three arches of segmental form, the elevation of the house is not increased; the mezzanine may be kept lower, and the architectural composition above not sacrificed. A horizontal line or cornice can be run through above the arches, and the first story can be made to unite in a less awkward manner to the mezzanine. For the purpose of separating the mezzanine from the first story, a common mode is to have a bold cornice or a balcony of slight projection, as in the new premises in Ludgate-hill; but it is a mistake to mark distinctly the separation between the shop windows and mezzanine. In a few examples this story is treated as a kind of attic to the lower order, with good effect. A still better arrangement is to make the entresol an integral part of the shop-front, if the building is intended for commercial purposes, that is to say, to let the framework of the ground-story window run through, only marking the separation by a kind of transom. It is possible, in this manner, to make the entresol a transition between the shop-front and the more solid upper stories of the building. Square or straight heads are

better than arches, and can be made to adapt themselves with more agreement to the composition above. They also agree better with the horizontal cornices, balconies, or other features that may be placed above them.

The Italian architects seemed to be alive to this arrangement for combining two stories, so that the windows, while appearing separated, were yet connected architecturally. We may mention the celebrated Pesaro Palace at Venice, where Longhena has shown how the mezzanine can be made to appear an intermediate story without destroying the unity or gradation of the composition above. The basement of that building (see Fergusson's "Handbook of Modern Architecture") is an excellent study for architects. Its two central archways or entrances are made the keynote of the horizontal division, for the mouldings which form the imposts of the arches are continued through as a string-course, and divide the lower ground-story windows from those of the mezzanine. The vertical pilasters are carried directly over one another, as architraves, and connect the two openings, while both the ground-story and entresol are comprised in the rusticated basement, the effect of which is to give a lofty solid base to the two stories of columns and arches above. A similar treatment is seen at the Tursi Doria Palace, Genoa, also illustrated by Fergusson. In Cornhill and the Poultry, two examples of the same principle may be seen applied to business architecture. The ground-floor and mezzanine are united, and form one composition; the horizontal divisions are kept back from the front of the façade, and the effect is to give unity to the design. Architecturally, we think the design is always more satisfactory when the ground and mezzanine, or inter-story, are combined, and appear to form one part of the composition, than when the latter is cut off and is made to look like a low story between two lofty ones. What looks better than a wide façade, with broad piers or pilasters running up to the top of the entresol, the horizontal division or floor being marked by a bold interrupted entablature, or band of masonry? The piers are strengthened actually and visibly, while a certain dignity of effect is obtained. In Mr. Peebles' new business premises in Fleet-street, illustrated in our last volume, this kind of treatment is partly adopted; the entresol is divided from the shop-story, though it forms more distinctly a part of it than an upper story. In this case, however, we find the mezzanine windows are slightly canted in each division, making a kind of flat bay-window between the vertical pilasters. Strictly speaking, however, the entresol should always be treated in the manner we have indicated, and not affect a separate and intermediate story of low height. In a future paper we may illustrate these remarks by some recent examples, in which the entresol is made an element of considerable value in street frontages.

LEADING ARTISTS' CONCEPTION OF BEAUTY.

THE proprietors of the *Graphic* newspaper recently invited a few of our leading artists to record their ideas of female beauty, and last week the Press were afforded an opportunity of inspecting the result of the competition. The very various conceptions, in oil, of the several masters furnish an instructive comparison of the exceedingly opposite impressions of our greatest painters, such as Sir Frederick Leighton, P.R.A., Alma Tadema, E. Long, P. H. Calderon, G. D. Leslie, and Philip Morris, many Academicians or Associates of the R.A. The heads on view at the "Graphic" Gallery, 14, Grafton-street, are all admirable paintings, with more or less elaboration and finish in their execution. The very amusing diversity shown by the different artists might suggest the thought that they all failed to produce the beautiful when the attempt was made. Many of them, indeed, have painted infinitely more perfect feminine faces in their pictures, and we do not hesitate to say any one might pick out from an ordinary crowd of women types much nearer the perfect outline and features we are accustomed to regard as beautiful in the abstract. But let us more minutely examine the faces. We may begin with Sir Frederick Leighton's classically-conceived study, rather under the life-size, which is certainly one of, if not the most, satisfactory conception of beauty. The artist has selected Selene, one of the goddesses of the Greeks, bathed in moonlight; the treatment and painting are quite idealistic in character, removed from the ordinary and natural rendering of a portrait; in fact, the painter has chosen a sculptor's rather than the accidental model of nature; it is, in a word, an effort of the imagination, an abstraction from individual forms. The curly hair is rather conventional and stiff, and the colouring perhaps weak—faults, it may be, when compared with the other more finished paintings, but a mode of treatment that, to our minds, is to be preferred for a subject of this kind to a portrait rendering. The painters were not asked to submit portraits of their own wives, or their ideas of pretty and fancifully-dressed portraits of women, but "heads typifying their conceptions of beauty." We must place C. E. Perugini's head as equal to Sir F. Leighton's in many respects. The face is symmetric and intellectual, the features essentially agreeable to our notions of womanly grace and beauty, the eyes are regular and expressive, though there is a touch of scorn in the mouth. The picture is highly finished and softly painted. At some distance from this in point of merit, Mr. Philip Morris, A.R.A., has painted a delicate small-mouthed fragile-looking bride of fair complexion, with a veil. The face depicts rather the lineaments of sweetness and delicacy than beauty, though as an ideal conception, and not a painted reality, it is admissible. Mr. Frank Dicksee has painted, with his accustomed feeling and depth, a pretty face, upon a dark background of myrtle. The features are almost classic and quite intellectual, though sharp; the mouth and chin are well formed, and the general expression meditative and sad. Mr. P. H. Calderon, R.A., has selected quite another type. It is a smiling, happy, pretty face of a girl in her nightdress. She is shown with light curly hair; the features are good, but the face is ordinary. The same mistake in giving us a portrait of every-day life, is committed by Mr. G. D. Leslie, R.A., and Mr. G. Storey, A.R.A. Both have given us portraits of good-looking women with dark hair, such as we might see by the dozen anywhere; added to which, the artists have depicted them with a minuteness of dress and toilet only becoming portraiture. Mr. Storey's is dressed in a sun-bonnet and cape, and, as a picture, we may say it was a pretty study of a girl. We cannot see much feminine beauty in Mr. Long's Hebrew type. The turbanned head-dress and large dark eyes are finely formed, but there is a lack of womanly grace. Mr. Hopkins exhibits a countenance of more pleasing type; but the large cast-down eyes, and the unnatural flush on the cheeks, suggestive of consumptive tendencies, can scarcely be said to realise the conception. Mr. Alma-Tadema has painted a portrait of his wife, rather than an ideal of feminine beauty; but the painting, as a portrait, is one of the best in the room. We can hardly praise J. J. Tissot's artificial-looking girl's face in a large hat; the lips and mouth are not good, and there is a want of naturalness and grace in the treatment. Mr. Marcus Stone, A.R.A., has given us a languid-looking girl with large upturned eyes, in a prodigious hat, leaning upon a gate. We cannot call her beautiful, though she has certainly a sentimental expression. Our notes would be very incomplete without a word on Mr. J. E. Millais's admirable picture called "Cherry Ripe." It shows a little girl, life-size, clad in white, with pink sash, and with a large mob-cap, seated on a trunk in a bower of foliage. The blue eyes are wonderfully searching, and cleverly painted, and equal to anything Mr. Millais has ever done; and there is a charming expression of good-temper in the face, not unmixed with humour.

ARCHITECTURAL ASSOCIATION.

THE fortnightly meeting of the Association was held on Friday last, the President, Mr. S. Flint Clarkson, in the chair. A vote of thanks was passed to Mr. Geo. B. Williams, the architect of the new Mercers' Hall, in Cheapside, for having accompanied the members in their visit to the building on the previous Saturday. It was announced that the next visit of the Association will be made on the 21st inst. (to-morrow), when Mr. Robert Walker's new Vestry Hall for Kensington, opposite the High-street Station, would be visited at 3 p.m. Mr. W. H. Brewer then read the following paper on "The Domestic and Civil Architecture of Germany between 1500 and 1700." The paper was illustrated by a very large display of water-colour and pencil drawings of the principal buildings described, which were hung on the walls of the room. At its close Mr. Florence proposed, and Messrs. Hilton, Nash, and J. Sulman supported, a vote of thanks to the lecturer, which was carried by acclamation.

DOMESTIC AND CIVIL ARCHITECTURE OF GERMANY BETWEEN 1500 AND 1700.

I think we must all be struck by the fact that a somewhat remarkable change has taken place in the course of architectural studies during the last few years. Formerly we were advised to confine our researches almost entirely to the purer and more perfect examples of art, and thus the exquisite works of the Greeks, the architecture of Northern Europe during the 13th and 14th centuries, the Romanesque of Lombardy, and the fully developed revived Classic of Italy, absorbed nearly all our attention; and when we did study the works of other periods, it was in order that they might assist us in illustrating or understanding the favourite styles. Now, however, we are turning our attention to what may be termed "transitional periods of art," and to those styles which we formerly looked upon as exhibiting rather the decline of architecture than any special excellence or remarkable quality. Whatever may be the practical result of this change, there can be no doubt that it will add greatly to our theoretical knowledge of architecture, and will remove a somewhat unreasonable prejudice against what are called mixed and impure styles.

Sir Walter Scott makes his antiquary, Jonathan Oldbuck, say that "the architecture of James I.'s time, when all orders were confounded, and columns of various descriptions arose side by side, or were piled above each other as if symmetry had been forgotten, and the elementary principles of art resolved into primitive confusion, is absolutely dishonourable and disgraceful to the arts." And there are still people who pretend to think that there can be no architectural propriety in any building the whole of which is not erected in one style. Yet I would ask, who prefers the somewhat monotonous severity of the interior of Salisbury Catheral, where everything is in the purest 13th century style, to the interior of Westminster Abbey, with its rich confusion of styles of every date. A drawing on the walls represents a view from the chapel of St. Edmund, with arches and columns of the 13th century, screens and canopies of the 14th and 15th centuries, and monuments of every conceivable date between the years 1100 and 1800. Yet will anyone venture to say that the whole building formed of these different elements is not intensely harmonious? whereas the only discordant and inharmonious objects in the church are the stalls, probably

because they were designed to be in harmony with the building. And who is there that does not admire our old Elizabethan and Jacobean houses, which probably owe their great charm to the mixture of styles. In fact, as far as domestic architecture is concerned, we must certainly look for its most magnificent developments at a period when Gothic architecture was in its decline, or was intermixed with Classical elements, so that the very finest examples of domestic architecture, both here and on the Continent, exhibit a mixture of two distinct styles. Although many interesting examples of domestic architecture of a date previous to the year 1500 are to be found in Germany, yet it was about this time that it assumed its greatest magnificence. Previous to this period, although the houses are often striking and solidly built, yet they are not quite devoid of a certain character of defence, which gives them the appearance of castles rather than dwelling houses, and renders them internally somewhat dark and gloomy. This will be at once understood upon looking at the examples of 13th century houses at Ratisbon and Boppard, and those from the 14th century from Frankfort, Troves, &c. (Several sketches of houses of these early dates will be seen on the walls.)

At the commencement of the sixteenth, or rather the close of the preceding century, the inhabitants of the German cities erected houses and municipal buildings which are well worthy of study and imitation. Lubeck, Dantzic, Münster, Brandenburg, and many other cities in the north; Nuremberg, Landshut, Rothenburg, Olm, and Ochsenfurth in the south, abound in examples of this date. The domestic portions of many of the German castles also offer valuable examples of this period. Coburg, Wartburgh, and the ancient palaces of the Archbishops of Bamberg and Salzburg, the House of the Knights of St. George at Limberg, the castle of Marienberg, may be specially mentioned. It should be noticed that, as a rule, there is no difference between the domestic and municipal architecture of this date in Germany. The French Hôtel de Ville and the noble structures which answer the same purpose in Belgium have a character which is quite distinct from the surrounding houses. Not as the Rathhauses of Germany, they are simply enlarged editions of the houses of the ordinary citizen. This is particularly the case in the south. The Rathhauses of Dettlebach, Rothenburg, Ochsenfurth, and Volkach are excellent examples of such structures. They consist simply of a large oblong building with a lofty gable at either end, and an external stone staircase leading to the council chamber, which is generally on the first floor. At Dettelbach and Volbach this staircase is double, and leads to an open porch which forms the substructure of a semi-octagonal building, which served as a private chapel or oratory. These Rathhauses, as a rule, have little clock turrets, or *flèches*, upon their roofs. The one at Ochsenfurth is a pretty example. In larger towns like Cologne, Aix-la-Chapelle, Wurzburg, Prague, and Nuremberg, the Rathhaus was of course more pretentious, and was furnished with two or more towers, but even when this was the case the treatment and the detail are very domestic in character. Other municipal buildings were treated in the same domestic manner. The custom house at Kitzingen, the covered meat market at Ratisbon, the great granaries at Nuremberg, the public hospital (now disused) at Ochsenfurth, and the correctional tribunal and prison in the same town, are good examples.

The ordinary town houses of the close of the 15th and commencement of the 16th century were generally of great size and magnificence, and there is perhaps little exaggeration in the declaration of Erasmus that a merchant of Nuremberg was better lodged than the King of Scotland. These buildings are frequently five or six stories high, and face the street with one vast gable. At other times the flank is turned to the road, and grand features are made out of the dome and windows of the roof. As a rule, however, this treatment is found rather in houses of the 17th than the 16th century. Town houses of the larger sort frequently inclose courtyards, which are surrounded by open arcades. Several examples of this are to be seen at Nuremberg and Ratisbon. The ground-floor apartments, entrance-halls, and staircases are not unfrequently vaulted in brick and stone. This is especially the case at Ratisbon and Landshut. In fact, although the houses at the former town were for the most part rebuilt during the seventeenth and eighteenth centuries the old vaulted entrance-halls are often retained, and they are remarkably interesting. In one case the hall is divided into three aisles, by rows of slender piers, and in another the vaulting springs from a central shaft. The ribs are generally well moulded, and the bosses richly carved. A house opposite the cathedral at Ratisbon contains a most charming vaulted staircase. The acute form of the vaulting gives the impression of an earlier date to this building, but the detail shows it to be 15th-century work. A pretty little group of statuary, representing the Fall of our First Parents, adorns one of the angles of this interesting staircase.

Some of the houses in Landshut are almost equally rich in vaulting. The elaborate way in which these entrance-halls were treated renders it not improbable that they were, as in English country-houses of the same date, used as dining-rooms by the family. This is still the case in some parts of South Germany.

The staircases of the 15th century and early sixteenth century houses are generally of stone, sometimes carried up inside a turret thrown out from the side or angle of the building, as in the house at Warzburg, said to have been occupied by Tilman Reemenschneider, and several of the larger houses in Nuremberg. The newel is not unfrequently twisted into a kind of corkscrew form. Wooden staircases of this date are, however, to be met with. Good examples are to be found at Coburg and Ratisbon. The upper chambers are generally very large, well-lighted, and charmingly-proportioned: that excessive height, which is so unbearable in modern rooms, is always avoided.

Rooms of this date are usually ceiled with wood, either showing the constructive beams and joists supporting the floor above, or these are concealed by a "sheeting" of boards, and geometrical patterns formed by small ribs are nailed on to the face of the boarding. Excellent examples of both kinds of ceiling are to be seen in the old castle at Coburg. Sometimes the ceiling is arched or waggon-headed. The upper rooms of the Rathhaus at Dettelbach exhibit a good example of this treatment. The ceiling here is composed of arched principals, united by a number of moulded purlins placed about a foot apart. These members have no connection whatever with the external roof; in fact, there is a loft 40ft. high between the roof and the ceilings. At what date the Germans first began to heat their rooms with closed stoves or ovens is doubtful, but I should be inclined to fancy that it originated during the latter half of the 15th century. There is an interesting stove of cast iron in the castle at Coburg, and another of the same material in Castle Fransnichts at Landshut. In one of the rooms of the town-hall at Ochsenfurth is a most singular stove, composed of tiles and earthenware, which probably dates from about the year 1510 or 1520. Sometimes these tile-stoves have a recess forming a seat. A stove of this description may be seen at the South Kensington Museum. The windows of the chief rooms in houses erected of stone and brick have generally very pretty carroles or window-seats, and the jambs of the windows are carved and moulded in stone. There are no wooden architraves or shutter-boxes, as in our modern houses. The mediæval architects of Germany were too wise to put their shutters inside their windows; they placed them outside, where in summer they prevented the windows from getting hot, and in winter they kept away the cold. The rooms in the Rathhaus at Dettelbach afford good examples of carroles; but there, was a very few years back, an hotel called the "Roemerhof" at Cologne, the principal room of which contained a series of carroles which were unequalled, as far as I know, in all Germany. This room had four large two-light windows at the end facing the street, and these were combined together by a series of the most elaborate interpenetrating mouldings and shafts, which were pierced with open-work tracery and adorned with carved crochette and double cusping. The fronts of the carroles or seats were ornamented with elaborate tracery panels. This was the richest piece of domestic architecture I ever recollect to have seen anywhere, and it was in the most perfect state of preservation. Unfortunately, I was in a hurry, and had to leave by an early morning train. I determined, however, next time I visited Cologne to made a sketch of this most interesting example; but, alas! when I again visited Cologne, after only an interval of three years, the Roemerhof was gone and absolutely forgotten. I made inquiries, but could obtain no information respecting this singularly beautiful room, and one man absolutely suggested that I went to sleep and dreamed this room, for that, to his knowledge, nothing of the kind ever existed. It is, however, by no means an uncommon thing, both in Germany and even nearer home, when people have destroyed some beautiful old building or monument, of which one has a perfect recollection, to be told that you are entirely mistaken, and that its merits existed alone in your too-lively imagination. Alas! I fear that in Germany, in a very few years, the beautiful Mediæval domestic architecture of that country *will* exist only in the lively imagination or recollection of enthusiastic antiquaries; for if the rage for destruction, which set in with the Franco-German war, continues for another twenty or thirty years, there will be nothing left. Cologne has been converted into a modern city. Picturesque old Boppard is rapidly becoming a kind of "Margate-on-the Rhine." Mainz, Frankfort, and Wurzburg have their hideous "Ring-Strasses," and the few old gabled houses which are left are being transformed under the hands of the plasterer into the new Berlin or Munich style. Nuremberg is being cut in half with a great boulevard, and of course Albrecht Dürer's picturesque fortifications will soon disappear. The splendid old walls and towers, which rendered the walks round Augsburg so truly romantic, are disappearing, and have, in fact, for the most part ceased to exist. The beautiful moat, so clear that you could see the fishes trying to hide themselves under the weeds at the bottom, has been filled up; the pretty little valleys and grass slopes, the cool glades, through which one gained every now and then a peep of the ruddy old brick walls and the tile-roofed towers, have been levelled and converted into a wide, hot, bare, macadamised road. Wurzburg has fared even worse. Gone are walls, gates, bridges, towers, and the pleasant "anlagen" which was one of the glories of the town, and in its place are a series of hideous streets, and, horror! that I should have to relate it, *villas*—yes, absolutely th e villa, the sash window and the underground kitchen have found their way into the Fatherland. And such villas! There are no Queen Anne houses to enliven the scene, no Bedford Park, no Melburg-road, nothing but the downright cockney plaster villa in all its native hideousness and more than its native vulgarity. There was a beautiful old fountain in this town, of which Prout made a most charming study. About three years back, it gave way to a cast-iron pump, in what is called the "Byzantinish" style. The Fatherland has indeed entered upon an age of cast-iron ugliness.

To return to my subject. I must not omit to mention that beautiful form of angle window called the Esker. This consists of a square, circular, or octagonal projecting bow window, bracketed out from the corner of the house. It is impossible for anyone who has not seen one of these windows to imagine what a charm they give to a room. Beautiful examples are to be seen at Augsburg, Wurzburg, and Rothenburg. They probably had their origin in that great love of looking out of window which is and always was a feature in German life. To show how inveterate a habit this is, I may mention that at Amberg, in Bavaria, I noticed that the splays of the windows were all arranged either to look up or down the street, as the case may be, and in nearly all the Bavarian houses one will notice that cushions are placed upon the window-sills to lean the elbows upon when enjoying this national diversion. In Germany it is not considered at all *infra dig.* to bow to one's friends out of window, or even to hold conversations with them. I fear the "new villas" will put an end to this pleasant old custom. In fact, the Germans are every day losing their simple habits. There are two features in old German houses which deserve special attention. These are the roofs and the dormer windows. The former are often very lofty, and contain four or five internal floors, dividing them into as many stories. These are not generally used as dwelling rooms, but as lofts and store-places, laundries, &c. The dormers which give light and air to these lofts are often exceedingly ornamental. This is especially the case at Nuremberg, where, as previously noticed, the houses for the most part turn their flanks to the street.

Down to about the year 1550 the houses in the German towns are exclusively Gothic, but about this date we find an admixture of Italian detail creeping in.

Some writers have supposed that it was chiefly owing to the influence of the prince bishops, who were frequently in communication with Rome, that the Italian style of architecture first found its way into Germany. I cannot, however, find any facts to corroborate this view; and, if it were true, surely we should find this style first influencing ecclesiastical architecture; but this is not the case, as whatever question there may be as to which is the earliest example of Renaissance work in Germany, no church appears to have been erected in that style until the year 1583, when the great church of St. Michael at Munich was commenced, not by a prince bishop, but by the Duke of Bavaria. Now we have many examples of secular buildings in the Italian style of an earlier date than this. Notably the Coronation Hall on the Bradschin at Prague, 1493, exactly ninety years earlier; the Belvedere of Ferdinand I. at Prague; the Otto Heinrich Bau, on the east side of the courtyard of the Castle of Heidelberg, 1556; the portico of the Town Hall at Cologne, 1569-1571; the Stadtkeller at Münster, 1569-1571, and others.*

It is true that we find monuments in the churches very shortly after the year 1500 in the Renaissance style, and they are mostly the works in bronze by Peter Vischer and his pupils, the most notable example of which is the splendid shrine of St. Sibald at Nuremberg. This dates from the years 1505-1519. Italian architecture was, however, in churches confined to the fittings, and did not affect the structure of ecclesiastical bulidings until about the year 1570 or 1580. It seems soon, however, to have become the favoured style for domestic purposes; and although we find Gothic parapets holding out for some time, yet Italian ornamentation very soon had it all its own way. A distinction should, I think, be drawn between such works as the Rathhaus Porch at Cologne and the Belvedere of Ferdinand I. at Prague, the Otto Heinrich Bau, which are certainly imported architecture, and the Renaissance of the houses of Nuremberg, Wurzburg, &c., which are clearly of native growth. In the former case the style made no attempt to assimilate itself with the old Gothic forms, and in the case especially of the Rathhaus Porch at Cologne one can distinctly see what part of the work is carried out from the design of the Italian architect, and what was added by the native workman, so that while the colonnade and its frieze are quite Italian in character, the dormers, &c., are Gothic, and no attempt is made to unite the two works, except where, by a singular accident, the workmen found they had not sufficient width for a semicircular arch, and so they made it slightly pointed.

But in the Renaissance, which I have described as of native growth, it is curious how the two styles seem to have become amalgamated. Thus the richly-pierced tracery of the gables becomes a pierced Italian arabesque; the pinnacles become obolisques; the cuspings of the openings become delicate scrolls; the Gothic shafts swell out and become Corinthian or Ionic columns; the string-courses become bands, and so on. With this change of style the interiors of German houses became more luxurious; the walls of the rooms are richly panelled, and often inlaid with mother-of-pearl, ivory, and wood of various colours; the ceilings are sometimes of wood, panelled and inlaid, but, not as during the earlier part of the century, showing the construction. At the Schloss, in the great street of Landshut, there are some very interesting rooms of this date, and the state apartments of Castle Waushichts date from quite the end of the century. The walls are painted with arabesques in fresco by Peter de Witte, and the stoves, which are of earthenware, are very elaborate and handsome

Most of the timber houses of Helderheim date from the close of the sixteenth and commencement of the seventeenth century. They are, beyond exception, the most elaborate examples of wood construction in Europe. Unlike the post and pan houses of our own country, and of other parts of Germany, they are completely covered with panels richly carved with subjects, heraldic devices, busts, arabesques, foliage, &c., whereas the bresima are charged with inscriptions, hunting-scenes, representations of the work and implements of the various trades to which their possessor belonged, and every conceivable form of architectural ornament. These houses are constructed of oak, and have become magnificent in colour from 300 years' exposure to the weather. A more perfect mediæval town than Helderheim it is difficult to conceive. Although it is not so fine as Nuremberg, it is infinitely more singular in appearance.

The German castles of this date are very numerous; in fact, what may be called the habitable portions of most of the castles in Germany were rebuilt towards the middle or end of the sixteenth century, probably owing to the destruction of the previously existing edifices in the Bauerkrieg or Peasants' War. This terrible outbreak occurred in 1525.

A large portion of the castle of Heidelberg belongs to this period, and nearly the whole of the picturesque castle of Wertheim, the forecourt and gateway of the castle at Remhle, the domestic buildings of the castle at Wurzburg, the greater part of the castle at Mainburg, and the whole edifices at Rimpar, Archaffenberg, Schwenfurte, Weeberg, and Walburg. They are generally a kind of compromise between the old castle and the modern Schloss, capable of making a short resistance to an armed force, but still not erected for purposes of offence or defence, and thus they possess gables, large windows, dormers, and other features which we are more accustomed to associate with the ideas of domestic than military architecture. Yet they are defended with towers, and frequently, as at Wertheim and Rimpar, have moats and external defences, such as outworks pierced for cannon, ramparts, drawbridges, &c. The apartments are often very splendid, and are adorned with carved woodwork, stucco ornamentation, fresco painting, parqueterie, and, in fact, differing in no way from those in the houses belonging to great families in the towns.

Shortly after the year 1600 the mansard roof seems to have made its appearance in Germany. One of the earliest examples which I know is a house at Boppard (or which was at Boppard a year or two back). It is a very interesting late example of post and pan work, with the angle beams richly carved, moulded bresima, &c. Here the gable follows the outline of the mansard. This form of gable is not very pleasing, and, after a short time, we find the gable given up, the house being covered with a mansard roof, returned and hipped at the side. Much was, of course, lost in picturesqueness by this change, but still the houses retained a good deal of character; probably, owing in a great extent to the fortunate circumstance that the most detestable of all inventions, the "sash window," never found its way into Germany, at least, never became used to any extent, and thus, even to the present day, the much more picturesque and far more convenient casement window is still in use. Happy Germans, not to have the night's rest perpetually disturbed by the everlasting "joggle-joggle" of those hateful sashes! Happy German servants, who are not bound to risk their lives by having to scramble out and clean these abominations every week! This is really no exaggeration, for I recollect reading in a report published about ten years back, that as many as two hundred unfortunate servants had been either injured for life or killed by falling from these windows, whilst attempting to clean them, in the space of a twelvemonth. How immensely the casement has the advantage over the sash in the point of opening and shutting! The casement closes with a rabbeted edge, and is thus quite air-tight. When you open it and look out, you are not in danger of some rotten old rope giving way and having your brains knocked out, which is always possible with a sash window. Then, even when you do open the sash window, you can never have more than half of it open at a time, whereas the whole of a casement window can be opened. Then, who ever heard of a sash window closing tight or opening easily? Yet, so infatuated are we, that this form of window is absolutely used behind Gothic mullions, and then people complain that Gothic windows are dark and heavy! Nothing can possibly be more hideous than these sashes attached to a Gothic window, and I believe that one of the reasons why the Houses of Parliament look so well is that they do not possess these horrible disfigurements. Of course, in the Queen Anne houses, where the sashes are very much subdivided and the woodwork painted white, they don't look so bad from the outside; but talk of Gothic windows, what Gothic window ever rendered a room so gloomy?

The roofs were still lighted by dormer windows, which, however, ceased to be gabled. The doorways were inclosed between columns supporting an entablature, or surrounded by an architrave. Very often the head was of very eccentric shape, forming a kind of scroll. The eaves of the roof projected, and were supported upon heavy wooden cornices. Parapets are not very common, except in public buildings, palaces, &c. The houses were adorned externally, either with stucco ornaments or with fresco painting, as at Augsburg.

The curious barb-shaped roofs and spires are a peculiarity of German seventeenth-century architecture, much as they have been abused, and false as they are as to construction. They are undoubtedly picturesque objects in a landscape.

During the seventeenth century there was a decided attempt made to revive Gothic architecture for ecclesiastical purposes, and, singularly enough, the chief movers in this revival appear to have been the Jesuits. Their churches at Coblentz, 1520, at Helderheim, at Munster, 1600, at Paderborn, are not unsuccessful attempts to revive the style, whereas their church at Cologne, 1625, is really a most splendid building. The latest of these is the Jesuit church at Rome, completed as late as the year 1700. Of Gothic churches not erected by this order, St. Gertrude, Wurzburg, and the church at Wolfenbuttel, are good examples. Another remarkable feature of this revival to be noticed is the quasi Romanesque towers of this period—those of Matthias, at Treves, the great church at Cologne, &c. Whether the Gothic and Romanesque buildings of this date were really revivals, or the last expiring efforts of the style, it is somewhat singular that during the sixteenth century Gothic seems to have been looked upon as an ecclesiastical architecture, and Italian to have been generally accepted as the correct style for secular buildings. With regard to the Romanesque works of this date, I think it would not be difficult to prove that that style kept up a kind of concurrent tradition side by side with the Gothic, and that it never died out until it was absorbed by the revived Classic. The curious stove at Ochsenfurth Town Hall is a singular example of this, for in this interesting example of furniture we find the regular Gothic square-leaved ornament, and the Romanesque intersecting arcade.

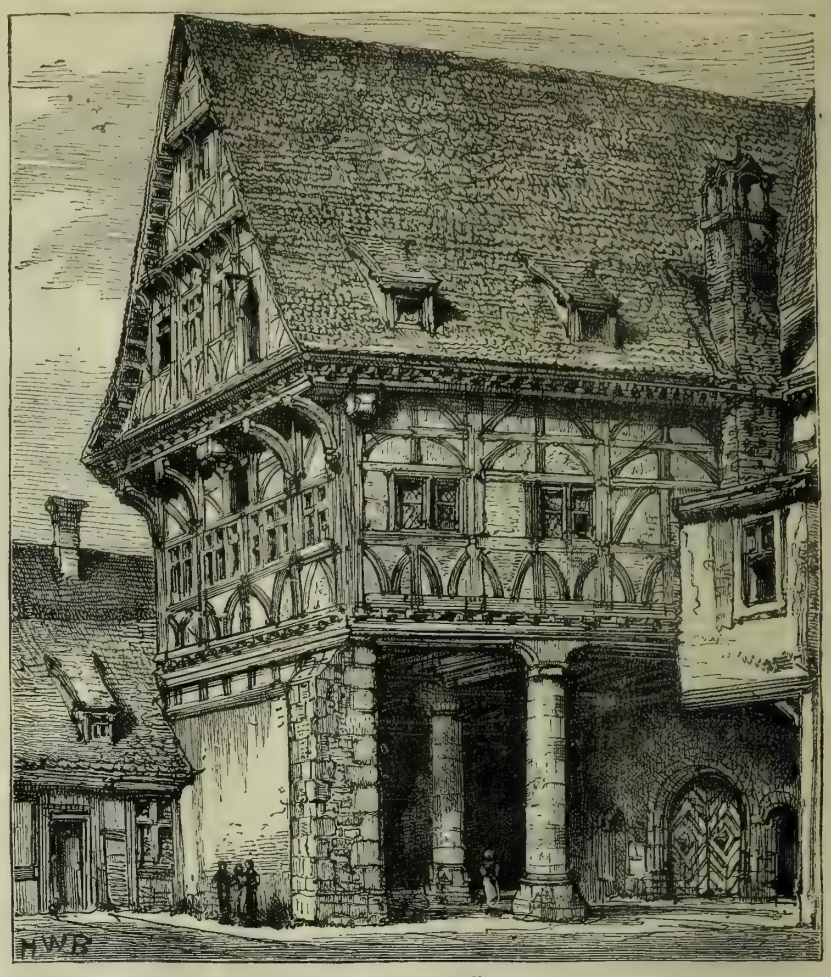
It seems that in the seventeenth century in Germany architecture was in a position which greatly resembled that of our own time. Some men were attempting to revive the Gothic, and others took up the Classical style, whilst the Romanesque was not without its admirers and imitators. In Gothic churches which were erected at this time all the altars, fittings, &c., are purely Renaissance, and yet there is no reason to suppose they were not works of the same architects. In fact, the plan of erecting a church in one style and furnishing it in another was common during the sixteenth and seventeenth centuries; and the Continental restorers who are removing Renaissance fittings out of their Gothic churches, under the impression that they are restoring these buildings to their pristine appearance, are absolutely undoing the work, and obliterating the intentions of the original builders. The fact is, probably, that there is nothing incongruous in several styles existing in the same building, provided they can be properly amalgamated. In ancient buildings time no doubt helps to do this; in modern works an intimate knowledge and careful study of the elements of each style, and a matery over their practical difficulties, might perhaps accomplish it, though probably not in our day.

However, there can be no doubt that the careful and exhaustive study of ancient styles, which has been so marked a feature of the last seventy or eighty years, must bear its fruit in the future. The various "revivals" through which we have passed may possibly be looked upon as sowing the seed. Let us trust that that seed may grow up, and although it is tedious, and somewhat dreary, for us who are watching and waiting, yet let us not be discouraged or impatient. We have done our best, and if it is not reserved for us to gather in the harvest, let us hope that those who come after us will reap the fruit of that which has been sown with so much honest toil, and tended with such unceasing care.

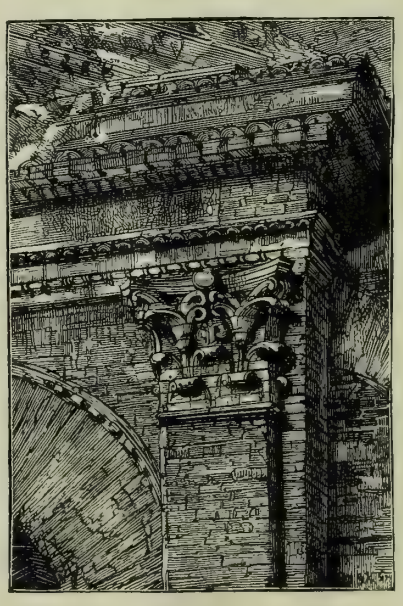
* See the remarkable "altana" of the castle at Wertheim, where a Gothic parapet is supported upon a plain Renaissance arcade.

HOUSE ARCHITECTURE, &c.*

A NEW work, in two volumes, under the title of "House Architecture," has just been published by Macmillan and Co. Its author, Mr. J. J. Stevenson, F.R.I.B.A., is a gentleman who has recently become known to the profession by his advocacy of the recent revival of Queen Anne, and his championship of the Anti-Restoration movement. In both these Mr. Stevenson has shown undoubted ability and energy. He now comes before us as the author of a work on domestic architecture, in which his views are very definitively expressed. The first volume treats of the architectural principles and history of the subject, and the second deals with house-planning and construction. It is to be regretted, perhaps, that Mr. Stevenson has not confined himself to the more direct work he had set himself to accomplish, that implied in the title of "House Architecture," instead of being led into a comprehensive treatment of historical styles. From the introductory chapter to his work, however, we learn the author's aim is to educate the public taste in house-building, not to supersede the services of an architect. As a great question with those about to build houses is the determination of style, Mr. Stevenson has thought it desirable to furnish information that will enable employers to understand the architectural question for themselves. As our present task is to give our readers a general idea of the volumes before us, we shall limit our remarks to the views and opinions of the author. The introduction deals in a general way with the scope of the work: it discusses the requirements of a house, and gives a summary of the various books that have been written on the different branches of architecture, with a view to show that they are of little practical use to anyone who requires information in a digested form upon house-building, and then they leave a gap. The writings of Mr. Ruskin, Mr. Fergusson, Sir Gilbert Scott, Mr. Eastlake, Professor Kerr, Sir Edmund Beckett, and Viollet le Duc, are critically reviewed, though it is difficult to see what bearing some of these have upon the subject of house arrangement and design. Mr. Stevenson acknowledges his indebtedness to Mr. J. Parker's "Domestic Architecture," of which work he has availed himself in the history of house-planning, and has borrowed many of the illustrations; he also says he has gone over the same ground as Professor Kerr in the chapters on planning. Of course, on the subject of architectural style, Mr. Stevenson is at variance with his authority. He says: "Mr. Kerr's designs fail in giving the nicer characteristics of the various styles. They have all a family likeness, due, no doubt, to their common parentage. They remind me of a fish-dinner, at which cod, skate, and haddock, all tasted the same, having been all cooked with the same lard." Reference is made also to a plan of a house given in Sir E. Beckett's book, designed, it is said, by that gentleman, though we are informed Mr. Martineau was the architect of it. Mr. Stevenson, if we understand him rightly, would allow every individual to build his own house, provided he did so upon well-understood principles of architecture; the evils of bad building and pretension in art are pointed out, and as the author observes, modern houses are architectural failures as a rule; the art in them usually stops short at the outside. No one can disagree with Mr. Stevenson so far. The reader is further informed that in old times the same art and style governed not only the outside but the inside of the house; that these results were accomplished not by a specially-educated profession like architects of the present day, directing the tradesmen by means of drawings, but by common tradesmen without any superintendence. Village-masons could build houses and churches that we vainly attempt to imitate—a fact only a few will dispute. The author says it is not because we are too poor that our buildings are bad; no, it is, we think, in spite of expenditure, that they are so. There is truth in the remark: "Old churches are pulled down for the mere pleasure of building new ones (more's the pity) . . . in many cases the building motive being the desire of increased magnificence, and the pleasure of building rather than the necessity." We must lay a great deal of this to the door of competition, and as we have elsewhere said, to those in the profession who will take more than they can properly do, thereby reducing art to a commercial enterprise. The author's remedy for this state of things is to hang a few architects, though even this severe penalty, he confesses, would be inadequate. If Mr. Stevenson is right, starvation would perhaps be effectual, and is more probable. The second guess at the cause of the bad architecture of the day is, perhaps, truer than the first—namely, that we "know too much about architectural styles," a proposition, however, that is not stated here for the first time. We are satiated with styles and fragments; we have too many sketches and scrap-books; these bewilder, and distract, and prevent us doing what is natural. We quite agree in the concluding remarks to the effect that the conditions under which architecture works at present give a facility and expression to pretentious form and cheap material altogether disproportionate. What constitutes good architecture forms the subject of another chapter. It is needless to say Mr. Stevenson travels over the usual ground of controversy in answering this question, and that his arguments are already pretty well known to our readers. The fundamental principles of architecture are discussed with ability and moderation, and it would be difficult for us to take any exception to the manner in which this part of the book is generally treated. Some very sensible remarks will be found under the head of "Truth," which might be read with profit by the Gothicist. The only doubt we have is whether it was necessary to go over ground that has been more fully covered by Fergusson, Garbett, M. Veron, and other writers. One of the best illustrations, displaying the style the author admires most, shows the element of proportion in archi-

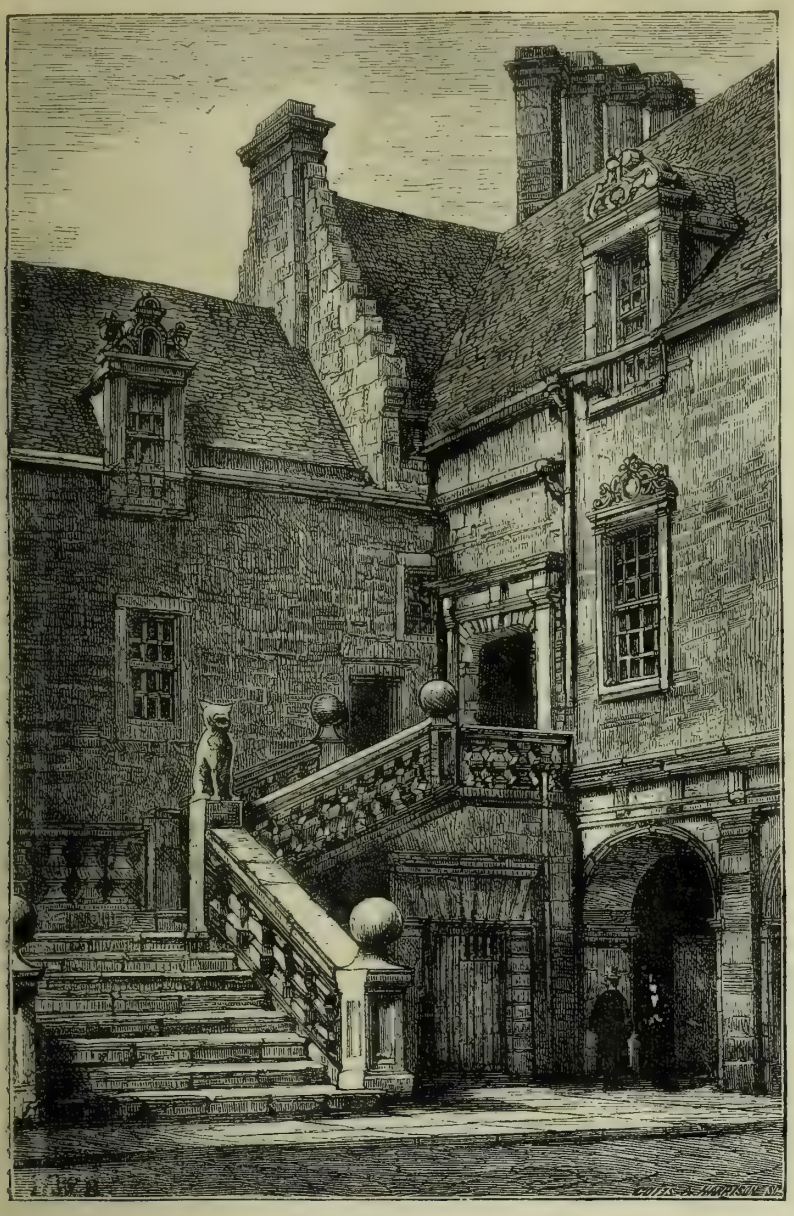


NEU-MUNSTERHOF, WURZBURG.



ROMAN CAPITAL, CARVED IN BRICK.

* House Architecture. By J. J. STEVENSON, F.R.I.B.A. In Two Volumes. London: Macmillan and Co., 1880.



OLD GLASGOW UNIVERSITY; STAIR TO FORE HALL.

tecture. The subject is two gabled houses at Münster, and they are certainly excellent examples of the value of divisional lines in giving architectural expression. The effects of contrast, symmetry, and harmony, are also illustrated. Ruskin's remarks on ornament are easily shown by the author to be contradictory, and opposed to every style. Some general remarks on Egyptian, Greek, and Gothic, and Renaissance architectural expression conclude the chapter. There is an excellent engraving of the Church of St. Etienne du Mont, that famed example of the irregular and picturesque mixture of Classical with Gothic forms which marked the Renaissance. We do not know whether it is given here in answer to the question, What constitutes good architecture? but the writer does not come to any other conclusion than that the public are not educated enough to appreciate good or refined architecture; and as for art criticism, they do not know in whom to place their confidence. In another chapter the author enters into a consideration of the causes of our inferiority in works of architecture, and the conditions necessary for good architecture; he shows that the cause of our failure is that we work in no one traditional style as our ancestors did; that in fact, we work in too many different styles to know one thoroughly. Our readers will not find anything new in this statement, though, like all truths, it bears repetition. The system of copyism, in vogue since the 15th century, has been the deathblow of real living art; but let us see what the author proposes as a remedy. We readily endorse the remark that "ordinary architects have about as much knowledge of the different styles they practise in succession as couriers have of the half-different languages they profess to speak. . . . . While we confined ourselves to Classic there was a standard which, though a dead one, recognised as essential an adherence to laws of proportion and harmony which experience had gradually perfected. Correct dulness was often the result; but we were, at least, saved from the utter defiance of these laws, which make some late specimens of modern Gothic the most impudent and offensive erections which the depravity and ignorance of man has perpetrated." This is strong language, but it is not stronger than that used by Mr. Fergusson in his "History of Architecture," nor—need we add—stronger than it is true. The author proceeds to show that all early societies and their arts were traditional, and that the individual was lost, a fact which Fergusson has taken to prove why modern architecture was a failure, but which Mr. Stevenson regards in another light. Again, Mr. Stevenson observes: It is erroneous to say that the true system of architecture prevailed everywhere till the Reformation, and that since that time the so-called false system has been prevalent. He defends this denial by the fact that the rise of Gothic architecture in France took place during a period of remarkable social and mental activity, when the towns threw off feudalism; and he refers to the names of many masters who directed Mediæval work to contradict the assertion that in what Mr. Fergusson calls the "true style," the names of architects are unknown. We may question the conclusion, however, that at the "rise of Gothic architecture buildings were designed by architects having much the same functions as those of the present day." Again, the author essays the refutation of the assertion that the decline of architecture has taken place since the Reformation. He observes: "Architecture took a new start, the old problems had been worked out, and the Gothic in England stiffened into Perpendicular, and the pointed arch, for reasons logically good, flattened into a straight lintel." It is very true that the great palaces of Rome and Florence were not mere copies of Classical works. The conclusion arrived at seems to be this,—that in periods of mental activity like the Renaissance architects invent original buildings, which are in time imitated by ordinary workmen in a traditional sort of way till a new "epoch-making" period occurs again, giving a fresh start. The anonymity of the true styles is declared to be an accident of ignorance not inherent in architecture itself. The Queen Anne is instanced as an example of this kind of progress; with the qualification, "Although those whom accident may have caused to be accounted its leaders may not be those who first started it. The London builder is adopting its features with more chance of success than in Gothic, since it is the natural outcome of London materials and modes of work; but it is to be feared that both he and the more ignorant architects, in attempting to avoid commonplace, may run into vulgarity, to keep clear of which, in this style, requires the constant restraint of good taste and refinement." In this manner, Mr. Fergusson and the *Quarterly* Reviewer on the "Hope of English Architecture," are demolished. We have no time or space to examine the soundness of the arguments, but pass on to what the author says are the causes of the unsatisfactory state of architecture. It is frankly admitted there are incompetent men in the profession; that many enter it who have no inclination or taste for the art; and that the larger part of young architects are trained too much at the desk among drawings, and have no training in the actual materials of building. Many sensible remarks are made upon these points, such as the misleading effects produced by drawings and cross-hatching. All that an architect needs is to convey his impressions to the workmen in plain working details, like the Middle-Age builders did, and many of the Cinque-centists. Mr. Stevenson, in short, endorses what we have often urged in these pages—namely, that the thinking faculty of workmen is lost in furnishing drawings for everything, and that architects are turned into drawing machines. Proceeding to discuss the merits of the different styles, in which the author is unnecessarily prolix, he tries to show the advantage of taking some old style, mastering it, so that we can use it in spirit, rather than in form. In this way, he thinks, we may, in time, have a style of our own. To fulfil the conditions, Mr. Stevenson would adopt a style that would utilise traditional modes of work, in which workmen have been trained; that is, not tied up with rules, but capable of development, and of incorporating every kind of materials.

We reproduce, with the publisher's permission, a few of the engravings in Mr. Stevenson's volumes. They illustrate the remarks made upon the various styles. The first woodcut we give represents a street in

Ratisbon, and is intended to convey an idea of the house architecture of a Middle-Age city. The tower was built for defence. The author observes: "There is no attempt at symmetry or regularity; the windows are of any size required, and are placed wherever convenience dictates. In the application of Gothic to house-building, from the earliest period, the window openings were made square-headed. Numerous instances occur where, under a pointed arch, the window openings are square." The chapter on Gothic architecture, with many of the diagrams, is based on a former paper by the author, and appeared in these pages at the time. We give another cut, showing a Roman capital and pilaster, carved in brick, which the author reproduces, to show that this treatment was not a "special curse" of modern architecture, as Mr. Fergusson says it is. The last-named gentleman, if he were Chancellor of the Exchequer, would put a tax on every pilaster. Mr. Stevenson does not see why we should be deprived of this means of obtaining vertical lines. The Renaissance of France is touched upon at some length, and we reproduce a fine engraving of the Chateau d'Azy-le-Rideau in the department of Indre-et-Loire, an example furnished by the author, to explain the very common mode of window treatment in the early Renaissance, suggested by the use of vertical lines in Gothic design. The builders of the Renaissance were particularly fond of enforcing the vertical features, as we see in this example. As a specimen of the Renaissance of Germany, we give an old house, Neu-Münsterhof, at Würzburg, the chief feature of which is that the living-room is on the first floor, the ground-floor being used as a store, or left open to the street, as in this instance—a feature common to German houses, and derived from the Gothic. Chimneys are not made the important feature they were in France and England, owing to the use of close stoves. The last example we give is Fig. 128, showing the stair to fore-hall of Old Glasgow University, a very interesting bit of Scotch Renaissance of the 17th century. The author refers to it more particularly to illustrate the ornamental pediment to the dormer, a characteristic of the style. These buildings are said to date from about 1657. "At the Restoration, in 1660, Principal Gillespie was deprived of his office, without the satisfaction of being allowed to complete the great work which he had carried on so far with so much success. Not till 1690 was the great staircase leading to the fore-hall completed by 'a rail of stone balusters with a lion and a unicorn upon the first turn. The cost was £12 sterling, the college furnishing stone, lime, and materials.'" Though it has Roman Doric in the cloister-arcade and other Classic features, the national style has asserted itself, and the author points to it as a good instance of national architecture. The buildings of Old Glasgow University are now, unhappily, destroyed, and replaced by a modern Gothic building of elaborate detail. Other illustrations are given of the old buildings of Scotland, as well as England. Some of these are borrowed from different sources, but the larger number of them have been entrusted to Mr. H. W. Brewer. It is unnecessary to add they are all engraved by competent artists, and many of them are exceedingly vigorous and feeling productions. We have no space left to say much of the second volume; it is, perhaps the least satisfactory of the two, and the plans are, to our minds, unhappily chosen, as representing the aims of good house-planning. The history of planning is followed by remarks on the characteristic features of modern house arrangement: the several rooms and offices are discussed at length, and eight chapters of the volume are devoted to materials and construction. There is a good index at the end, and the volumes are admirably printed and got up. From what we have said, the reader will have no difficulty in arriving at the opinions of the author. He has endeavoured to show that the so-called debased styles of the Renaissance had a natural origin; they grew out of Gothic traditions accepting the forms of Classic Architecture, and, in answer to the question, What style is best suited to our use? Mr. Stevenson gives us a large variety to choose from. He believes the attempt to introduce the Gothic style into domestic and civil architecture has failed. He says:—"The traditional habits of our daily life are too deep-seated to be altered, and Classic has still remained the domestic style of the country. Let us accept it as the basis, the material of our style, but infuse into it the Gothic spirit and freedom which we have lately learned." He says architects even of the staunchest Gothic principles are attempting the new style, and builders are adopting it; the great risk is that it may become vulgar, from the ignorance of those who use it, and he admits that the forms known as the "Queen Anne," and "Scotch Baronial" give great "facilities for the expression of clumsiness, crude form, and vulgarity, which may make even good examples of it seem disgusting, and put it out of fashion." We take leave of Mr. Stevenson's two handsome volumes with the hope that what he has written may awaken an interest in the subject, and with a final word of praise to the publishers for the manner in which the book has been produced.

ART LEGENDS AND SYMBOLS.

(*Continued from p.* 204.)

PROBABLY, in all the symbols we should find none more nearly alike than the Greek Strong-man and the Christian Strong-man. Both were giants, devoting their strength to gigantic labours for the common good, and the humble mental capacity of both was amply satisfied by the performance of such honest labour. Neither aspired to dominion over others, for both were faithful servants. In art each one is represented with the body semi-nude, a face of stern and massive proportions, and the hand in each case grasps the trunk of a young tree. The worship of St. Christopher arose long before the last embers of the sacrificial fires to Hercules were dead, and we might almost say that the Greek symbol merely changed sides, and brought its worshippers with it into the fold of Christianity. The legend of St. Christopher took deep root and flourished throughout Western Europe. The sight of his figure was supposed to inspire courage, and was generally accompanied with the inscription, "Whoever shall behold my image on that day, shall not faint or fail." Devout travellers by sea or land wore on their breast a medal or image of St. Christopher; a fact noticed by Chaucer in his "Canterbury Tales." Our time is too short to go much farther in considering this part of our subject, or it would not be difficult to trace many other such parallels in the symbols of antiquity, and, perhaps, few more clearly marked than the legends of the beautiful singers, Orpheus and St. Cecelia; the one charming the grim King of Shadows from his infernal realms, and the other bringing the angels down from heaven. It is a very remarkable thing that as the spirit of symbolism began to decay in this country, the arts began to decay too. With here and there an exception—exceptions very rare, and conspicuously bright as meteors in the long night of an arctic winter—we had no artists worthy of the name from the Reformation until the middle of the last century. In the reign of Edward VI., artists were petitioning for bread; and in the time of Elizabeth it became a fashionable taste to sally forth and smash sculpture and pictures. In the reign of Charles I. all pictures containing representations of the Redeemer were ordered by Parliament to be destroyed. Walpole tells us that a man named Blessie was hired at half-a-crown a day to break the painted-glass window at Croydon Church. And from June the 9th, 1643, to October the 4th, 1644, a Parliamentary agent, named Dowsing, destroyed 4,660 pictures. Flaxman truly says:—"The commands for destroying sacred paintings and sculpture prevented the artist from suffering his mind to rise to the contemplation or execution of any sublime effort, as he dreaded the prison or a stake, and reduced him to the lowest drudgery of his profession. The civil wars completed what fanaticism had begun; and English art was so completely extinguished that foreign artists were always employed for public or private works." One path was open, and only one—that was portrait-painting, and the great master of the school, Sir Joshua Reynolds, was never so happy as when representing his sitters as symbolical personages. But what is most surprising is that the spirit of symbolism would not die out of the common people. Hunted out of the high places and public ways, it sprung up again in Bedford Gaol as fresh as in the romantic age which gave birth to the legend of St. Christopher. There is hardly an incident in Bunyan's charming allegory, that had not been anticipated hundreds of years before his time, by men who used the same means to the same end. The combat between Christian and Apollyon had been fought in half a score of legends long ago; and the struggle of Bunyan's hero in crossing the river, from the moment he sets foot in the stream until he is accepted on the other side, is so like a passage quoted a few moments ago that the words "Christian" and "Christopher" might almost take the place of each other. Bunyan unconsciously introduced into the cottages of England the soul of early Christian symbolism as clearly as the early Christian church transplanted the beautiful myths of the Greeks, and this alone is sufficient to make his name venerated in the eyes of his countrymen so long as Englishmen are capable of serious thought. Now, it may be said, these things are not in harmony with the present age. The legends, for the most part, are forgotten, and if represented would be understood only by a few. Even allowing this, the principles they inculcated, the principles of right, truth, chastity, courage, justice, and charity are, or should be, in harmony with this as with every other age. The human family is the same now as in all ages of the world. When we see Mr. Irving on the stage we know very well that he is one of ourselves, that we can meet him in the streets and hardly distinguish him from one of the crowd; but when he represents the melancholy Dane we sympathise with Hamlet as an idea, not with the actor as a man. What emotion is it that moves us to pity or admire? Why, exactly the same as that which in other ages made the miracle-plays, or the tragedy of Sophocles popular—that natural longing in the human mind to exchange for a season the hard methodical bonds of reason for those happy fields of imagination, where noble fancies, harmless joys, and pleasant make-believes are its playfellows. True, the mind of genius is sometimes lost by living wholly there; but, on the other hand, the narrow little system of craft and greed which passes for *mind* in that dull human-machine, the mere money-grubber—Bunyan's typical "Man with the Muck-rake"—is condemned never to enter these golden gates of sweet illusion at any time. His food is facts. He believes nothing that he cannot understand; and his understanding is so limited that he necessarily believes next to nothing at all. Now, if we could only help to lead those who might otherwise fall into that grubber's hole; if we could only make up our minds to show them the means of possessing a little ideal life—a little mind-garden of their own as it were—I have no manner of doubt that we should be doing the State some service. We need not strain far for materials, for our poets have given us themes in abundance; and if architects follow the feet of the poets now it will be by no means a novel position for them to hold. The classical poetry of Pope introduced the Greek mythology into the sculpture and decorative features of every mansion of note in England. It did more: it steeped the upper class of society in Greek, until it became the mode to mount English thoughts on Grecian stilts; the young squireen, in love with his cousin, Polly, wrote amorous verses, not to Polly, but to "Iphigenia"; and she sighed back, not to Jack, but to "Orestes." Sir Walter Scott did much to clear away these absurdities, and by means of his Mediæval poems and romances, brought the English taste back again to England, and in a very great measure prepared the way for the great Gothic revival which has so distinctly marked the architecture of these latter

days. In our time Tennyson has done more than most modern poets to supply symbols well suited to painting and sculpture; indeed, I believe I am not far wrong when I say that it is greatly due to his influence that Anglish art-work has a greater national individuality now than at any period since the days of the Tudors. Now if we had time to survey, even in the most perfunctory manner, the many beautiful types of manhood, womanhood, and childhood presented to us by the Anglo-Saxon poets from Chaucer down to Tennyson, we should find such a happy hunting-ground as the literature of no other race could afford. But such a review is impossible in the short time remaining at our disposal this evening. Still, I may in another way briefly illustrate my meaning of employing English poetry in the decorative arts of English buildings. There are, for instance, board-schools springing up in every great city in the kingdom. They are part of the vast machinery of education, the workshops where young minds are moulded and formed into fashionable shape; and it is the fashion, just now, to quit what some people call "narrow tradition." Though, for my own part, I never yet heard of any long-cherished tradition that had not some good in it; for without that portion of good, that wholesome salt of truth to preserve it, no words or thoughts, spoken or written, could ever become tradition at all. But that is aside from the subject: we are considering now the best means of shaping the minds of young children. All the schools I have seen in different parts of the kingdom seem well arranged for light and air, and in them children will, no doubt, gather the elements of order and neatness; this much the well-considered architectural arrangements will, no doubt, do; but for the decorative part I know none that bears anything higher than the usual crop of leaves; perhaps in a few solitary instances a bird may be introduced here and there, generally in a very stuffy attitude, and always without meaning. The same cost would have made the same creatures illustrate a pretty fable; but that would have been decoration with a useful purpose, and we seem not to have advanced to that stage at present. There can be little doubt that a few panels illustrative of legends, such as children delight to listen to, would have their advantage as a pleasant means of instruction. Take, for example, the pathetic old ballad of "Llewellyn and his dog." The noble courage of the faithful hound defending the child from the wolf; the sudden unreasoning fury of the master, who kills the dumb protector of his heir; and the bitter unavailing remorse which follows a deed so rash and cruel. I know that, as a child, those old rhymes were the means of many a morsel passing from my hands to the mouths of several hungry dogs of my acquaintance. Take subjects like this, or some of the fables of Gay, say "The Cur and the Mastiff," "The Hound and the Huntsman," "The Gardener and the Hog," "The Bear and the Boat," and many others, all full of wisdom, sugar-coated with innocent fun, such as our race enjoyed six hundred years ago, when the grand old builders knew how to make their carvings read like poems in stone. They were a means of education then, and could be so now. We learn that John Wesley received impressions of Sacred History from the old Dutch tiles in his mother's bedroom, such as, he believed, could have been imparted so well from no other source. The images were always before him, they became part of his mental furniture, simple in design and easy to be understood—not to be torn up and cast aside like a picture-book—they stamped his young mind with impressions never after forgotten. I have seen recently the symbols of the four winds represented, and the artist fell back upon the Greek myths, picturing Boreas, Notus, Eurus, and Zephyrus, without even the excuse of style. In Longfellow's great natural poem, "The Song of Hiawatha," the same images appear, but in a far more charming dress. There the mighty West Wind—Mudjekeewis—is represented as the destroyer of the enemies of man, and Father of the Winds of Heaven. The East Wind—Wabun,

> "He it was who brought the morning,
> He it was whose silver arrows
> Chased the dark o'er hill and valley; . . . .
> And whose voice awoke the village,
> Called the deer and called the hunter."

And the fierce North Wind—Kabibonokka—who

> "Had his dwelling among icebergs
> In the everlasting snow-drifts"—

how he stained the leaves in autumn with his tints of red and yellow, sent his snowflakes hissing through the forest, and drove the cormorant and curlew from his frozen lakes and rivers. Again the quaint image of the South Wind,

> "Shawondasee, fat and lazy,"

living in his "home of drowsy sunshine" with the blue bird and the swallows. Surely no better images of these natural forces can well be found. Certainly not in the Greek personations of the same, and why we should discard gems in the living literature of to-day in favour of something inferior, raked out of a dead language, I am utterly unable to say. In the time of Pope there seems to have been some excuse for it. Shakespeare was not so well understood then as now, and Burns, Byron, Scott, Keats, Shelley, Wordsworth, Tennyson, and Longfellow had not seen the light. Besides, the upper classes affected book-lore in contra-distinction to the lower classes, who were altogether unlearned. "The languages" were the distinguishing mark of high caste, and if a man's utterances were no wiser than the braying of an ass, they would be accepted as words of profound wisdom so long as he brayed in Latin or Greek. But in our time, when knowledge and book-learning are no longer the exclusive property of any section of the people; when dukes become traders, taking their luck in the markets, in railways, and in mines, and miners enter the House of Commons, and may rise to be Prime Ministers and the makers of dukes, there is no need for any further affectation in learning or in the arts that represent it. And happily there are signs of a change in this respect. There are signs that architectural sculpture will once more take its true position in the circle of the arts, not as a mere adjunct, but as a thought-compelling symbolical power, interwoven, as it should be, with the aim and meaning of the structure. In cultivating this new growth, architects are simply attempting to restore the old spirit, the old soul, which has given animation to architecture in every refined epoch of the world's history. We can see the examples of this in any old cathedral in the country. In such buildings it is by no means an unusual thing to find old capitals, panels, and wall spaces filled with figure subjects, and animal forms intermixed with leaves; but the leaves were subordinate to the things higher in nature. They were used as a foil more than a main feature. These sculptured subjects may be rude in execution, but they always bear evidence of close study and a keen appreciation of emotions; the animals may not always be correct in drawing and proportion, but they are full of quaint conceits such as no ne but true observers could impart. As a mere matter of drawing we can probably carve more stately-looking figures, and more graceful animals to-day than some of the carvers of the Middle Ages could do; but, some way or other, modern subjects of the kind are too apt to appear like elaborate dolls, and the animals like stuffed specimens. If invention and imagination be of any value, to compare the value of two periods of work would be like comparing a performance of the Lyceum Company with a marionette show. And how does this come about? Is it that English art-workmen have no longer the power to observe nature? No; it arises from the fact that those who command their services have been so long content with the meaner forms of ornament, mere leaves of questionable origin, or abominable acanthus scrolls, that it could not end otherwise than in barrenness and poverty of thought. But a better day is dawning. It cannot fairly be expected, perhaps, that after the soil has lain so long fallow, we should have a sudden spring of life—a summer of excellence before the seeds you are sowing have had time to germinate—there will, doubtless, be disappointments for those who expect too much in the beginning, but as the demand is made so the supply will respond, and in making the demand, persisting in it, and insisting upon its performance, architects are but taking their true position again, which is to make architecture in the future what it has been in times long past, not a mere science of construction, but the great foster-mother of all that is poetical, true, and instructive in the decorative arts.

On concluding, a vote of thanks was proposed by the chairman, Mr. R. B. Morgan, and unanimously accorded to Mr. Roddis.

A BOOK ON BUILDING.*

THIS little octavo volume looks bulkier than before, and we find many new paragraphs in the thousand odd topics, ranging from agreements with architects and builders, to an account of the Great Pyramid. In the first part we have some suggested conditions for competition, a useful form of contract; some sensible remarks on window-mullions; on the impossibility of a new style; and a few words on the now historic discussion at the R.I.B.A., which arose out of the *Quarterly Review's* article on the "Hope of Architecture," in which the author plainly says that architects in large practice cannot look after their work as they should do. We may not altogether agree with Sir Edmund Beckett on all he tells us about style; but we find him saying a good word for the Dutch, or Queen Anne, style for house-building. He says, "the most comfortable and substantial-looking houses since the real Elizabethan times are generally not Gothic, but probably more in the Dutch or Queen Anne style than any other, or somewhat later. I certainly do not mean that modern version of the so-called Queen Anne style which is just now in fashion with some architects, but something much solider and plainer." The author defies all the architects in the world to make a decent-looking building out of white bricks in any style, and he condemns as absurd waste the use of special-made bricks smaller than the usual size. The remarks on "sham stone painting, and the fallacy of skinning our walls of plaster," are sensible, and may be read even now with profit by a few of those who like to be primitive before everything else. Mr. Street's Law Courts tower design is designated as the climax of lopsidedness; and the author further on finds fault with that gentleman's treatment of substituting boards for plaster in the vaulting of the south transept of York Minster. A few sound observations on "Proportions," and the value of length in churches, follow. Chapter III. treats on house-building, and is full of useful practical advice; we find, however, the same faulty plan introduced that we found in the last edition. Speaking of the slope of stairs, the easiest for human legs is said to be a rise of 6in. with a tread of 12in., and for back stairs 7in. by 9in., or 7in. by 8in.; these are, however, ordinary proportions. The proper section for hand-rails; the best positions for fire-places; smoky chimneys, the position of doors, size of rooms, bow windows, discharging arches, concrete floors, hollow walls, decay of stone, the making of mortar, and various other practical points are dwelt upon. The sizes and positions of rooms at St. Alban's Rectory, which we lately illustrated, are given, and the readers of this book would do well to turn to the plan we then gave to see how the author has practically carried out some of his suggestions. We find, amid the various sundries, a suggestion for an improved window-latch, and a paragraph on the construction of dinner-tables and seats. Spring-bottom chairs are condemned as not being suitable for people of varying weights; while the modern fashion of painting rooms and doors dark, dingy colours, and the general taste prevalent under the name of fashionable furnishing, is ridiculed. We may just, in conclusion, call attention to a paragraph on "Spire Beds," in which the author says, though the beds are almost invariably worked horizontal in spires, the right-angle to the slope method of making them is the true construction, being the strongest against storm, and because every section of the spire lies in a kind of cup, which prevents the stones spreading. Our readers will remember a discussion in our pages on this point some years ago, in which we took precisely the same view as the author, who, however, says he has never seen the point noticed in any book. Altogether, the second edition of Sir Edmund Beckett's book contains in its 390 pages a fund of condensed practical advice about building which will be read with profit by all.

At an early hour on Monday morning a fire broke out in the paint-room of the Huddersfield Theatre Royal, and in a brief period the whole of the building, with the exception of a block recently added, consisting of a refreshment and buffet and retiring-rooms, was completely gutted.

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* A Book on Building, &c. By Sir Edmund Beckett, Bart., LL.D., Q.C., &c. Second edition, enlarged. London: Crosby Lockwood and Co., Stationers' Hall Court.

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ILLUSTRATIONS.

FIGURE SUBJECTS FROM MOSAIC PAVEMENT OF CHANCEL IN CORK CATHEDRAL.—WEST DEVON AND EAST CORNWALL HOSPITAL.—NEW FONT AND COVER AT ROTHERHAM CHURCH.—CHURCH OF ST. CUTHBERT, HUNSLET.

OUR LITHOGRAPHIC ILLUSTRATIONS

MOSAIC PAVEMENT IN CORK CATHEDRAL.

We this week complete our series of illustrations of this fine work of Mr. Burges. The marble mosaic pavements in the apse and chancel of Cork Cathedral cover a surface of about 100 yards, and are of the most elaborate kind of work, known as opus vermiculatum, the tesseræ varying in size from half to one-eighth of an inch on the face. The subjects depicted are illustrative of Scriptural allegory and parables. For the principal design in the apse Mr. Burges has taken as his text Matthew xiii. 47: "The kingdom of heaven is like unto a net, that was cast into the sea, and gathered of every kind." The surface of the apse pavement is divided into hexagonal panels, in three rows, with diamond-shaped panels between, surrounded by bands of red and green colours, formed of several lines of graduated tones, joining at the sides of the hexagonal and points of the diamond panels with circles, the whole artfully arranged by the interlacing of the shaded bands, to form, as it were, the net (the panels being the meshes), which, fastened by cords to corks within the pillars, floats upon a greyish-white ground, while within the corks the water rolls up in curling waves. The hexagonal panels, 2ft. 11in. at longest point, contain figure subjects pourtraying the various conditions and callings of men. In the front row is the King, a well-drawn figure, with crown of gold, and wearing a red robe and yellow tunic; from his shoulders descends a green mantle with ermine collar, and in his hand are the insignia of regal state. To the left is the Doctor, in a grey gown lined with yellow; the expression of this figure is very fine, the face lighted with animation as he reads the book he holds in his hands before him. The third figure in first row is Artifex—the particular workman a carpenter; the action and position are well rendered. In the second row above Artifex is Servus, in attitude of supplication, hands clasped and chains depending from his wrists. Then comes Agricola, in the act of reaping, the left hand gathering the corn he has just cut, with the sickle in his right. Next is Venator, in red dress; in the left hand he carries a bow, in the right an arrow, while over his shoulder is slung his quiver; the figure full of life, as he runs in search of game. In a line with these are Piscator, in simple fisher's garb of grey colour, holding up a net containing two fishes; and Rusticus, with his left hand on the stem of a tree he is about to fell with the axe he holds in the right. The last figure of this row is Infans, holding in his hand a child's toy. The graceful simplicity of this figure is very pleasing. In the third row, at one side of the altar, is Mercator, a well-studied figure, seated at a desk, writing, and at the other side is a warrior in armour, in the act of drawing his sword from its scabbard. In the diamond-shaped panels are representations of various kinds of aquatic life. Beyond the Communion-rail the subjects illustrated are—in the centre the grain of mustard-seed, on one side the sower, on the other the Good Shepherd, the three united into one design by an elaborate fret border. The chancel pavement is in the same style, but of a simpler treatment. These pavements have a claim upon our attention, not only for their highly-artistic qualities, but as showing the progress of the revival of one great branch of the decorative arts, for many generations neglected in this country. A history of the revival of the art of mosaic is out of place here; it will be found in the various works and lectures of the late eminent pioneers, Sir Digby Wyatt, Owen Jones, and others. But in the material part of this mosaic work we may note a very important fact, viz., that whereas in many old mosaic pavements we find the artist and mosaicist, when at a loss for certain colours, employing enamels and terra-cotta, in the Cork pavement only nature-coloured materials, that is marbles and limestones, collected from various foreign and home quarries, have been used, but with these Messrs. Burke have produced a wonderfully varied pallet of different tones and colours—yellows running through many shades, from brilliant Sienna marble to the more subdued tones of the French limestones; greens, from the vivid green of Connemara to the sombre green of the Alps; reds, from the pale pink of Portugal to the dark-coloured Rosso Antico of Greece and the purple tones of Rhondona; whites, from the different Carrara marbles to the cream limestones of France and England; neutral colours and tones from the limestones of Burgundy and Provence, and the lithographic stones of Germany. In producing this varied pallet of coloured tesseræ it will be easily understood that a great deal of marble is cut to waste to obtain the tone required; but thus procured, many are almost equal in richness of colour and texture to the more valuable hard stones employed by jewellers. In the pavements above described the figure subjects demanded a very extensive range of colours, all of them running through three or four tones. The green, red, and yellow bands of the interlacing guilloche border; the grey, white, and green of the wave fret; the yellow and brown of the floats; the reds, purples, and delicate colouring of the branches and birds in the "Grain of Mustard Seed" subject required not only a great amount of patience, but of thought and research in collecting together the forty or fifty different kinds of marbles and limestones necessary for the purpose. The process of making and laying mosaic pavements by Messrs. Burke and Co., on the same principle and methods as obtained among the ancients, has been previously described in the BUILDING NEWS.

THE SOUTH DEVON AND EAST CORNWALL HOSPITAL.

We this week give an engraving of the selected design for the South Devon and East Cornwall Hospital. The competition for this building took place last autumn, nine architects being invited to compete, and the committee having consulted Mr. T. H. Wyatt, as referee in the matter, selected by his advice a design marked "Westward Ho," and subsequently appointed its authors, Messrs. Coe and Robinson, of Furnival's Inn, architects for the new building. The site for the proposed hospital is admirably situated, sloping to the south and overlooking Plymouth Sound; but, from its awkward shape and confined area, presented considerable difficulties to a good plan. The authors of "Westward Ho" have met these difficulties by placing the women and children in a two-story block on the east, and the ordinary men's wards in a corresponding block on the west, thus obtaining a symetrical massing of the principal buildings, and leaving the accident wards to fill up the triangular piece of ground on the extreme west; by this means all the wards have a south aspect and sea view, and the back portion of the ground being left free for future extension, will allow the number of patients to be increased cent. per cent. in the future. The patients are principally accommodated in large wards, a few small wards being arranged *en suite* with these for special cases; detached wards for infectious cases are placed in the rear of the centre building. The administrative department is in the central block, having the kitchens, &c., in the basement, the usual officers' rooms and out-patients' waiting-room and dispensary on the ground-floor, and bed-rooms for nurses and servants, &c., on the first and second-floors. The wash-house buildings are placed in the north-west corner of the ground, and will be fitted with steam machinery. In the extreme south-west corner is the nurses' institute, a building intended as a home for trained nurses devoted to private nursing in the town and neighbourhood. The buildings externally will be entirely of grey limestone with slated roofs; the architects have adopted the Villa Italian style as being most suitable to the materials at hand, and most compatible with the limited sum at their disposal. The hospital will accommodate 102 patients, and the estimated cost is £16,450.

FONT AND COVER, ROTHERHAM CHURCH, YORKSHIRE.

The new font and cover, which we illustrate today, is to be erected as a memorial to the Rev. William Newton, M.A., the late vicar, from the designs of Mr. John P. Seddon, architect, of 1, Queen Anne's-gate, Westminster. The position the new font is to occupy is the same as that of the present insufficient font in the south aisle, to the west of the south doorway, in the magnificent Perpendicular Church of Rotherham. The steps will be in dark local red sandstone, and the font itself in red Mansfield stone. The carving will be in character with that of the very curious diaper handwork which is so unique and effective throughout the capitals of the church. The cover is to be of cedar wood, and the metal-work connected with it has been so arranged that the cover, when lifted, should have the appearance of being suspended by it, as it is in reality, instead of the mode of suspension being concealed, as is sometimes done with unnecessary ingenuity. The metal-work is intended to be electro-gilt.

CHURCH OF ST. CUTHBERT, HUNSLET, LEEDS.

The parish of St. Cuthbert has been recently formed out of part of the parish of St. Peter, Hunslet Moor, and there is a temporary church of wood erected on the site of the permanent church which is intended to be built of brick, with stone dressings, and covered with Welsh slates. The nave and north aisle are to be built in the first instance. The architects are Messrs. Henry Perkin and G. B. Bulmer, of Leeds.

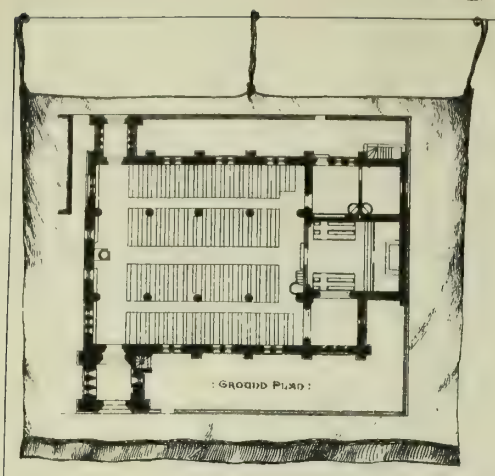
SCHOOLS OF ART.

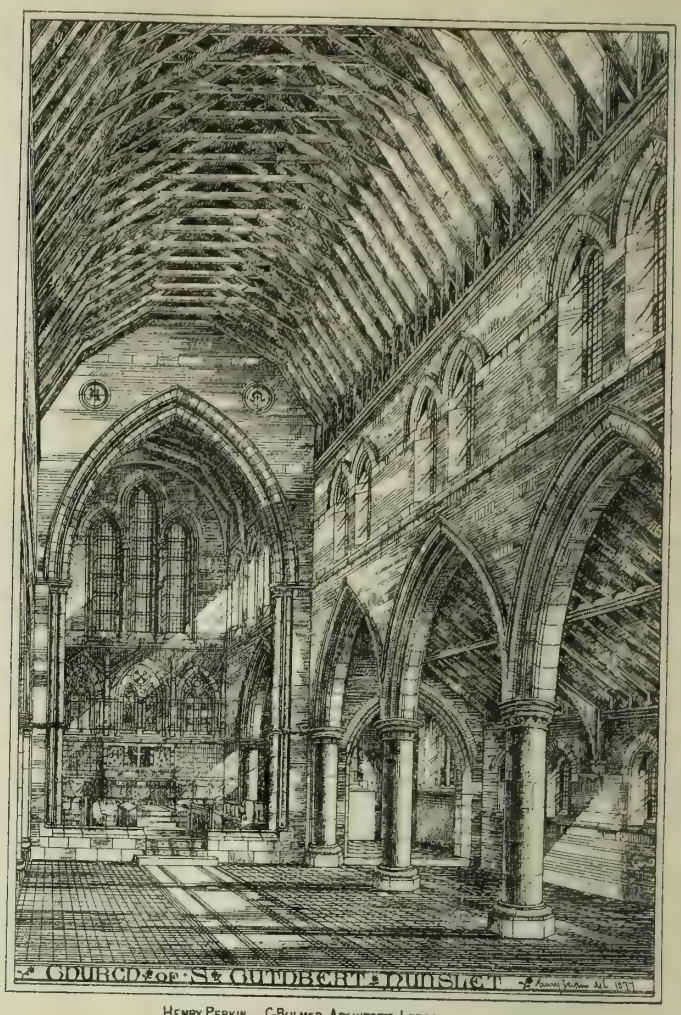
Birmingham Society of Arts and School of Design.—In their annual report to the subscribers, the committee of this institution congratulates them upon the success which has attended the work of the school during the past twelve months. The number of works sent up from the school to South Kensington has again increased, and also the number of students contributing these works. The number of works submitted to Science and Art Department, South Kensington, was in 1877, 6,073; 1878, 10,945; 1879, 13,007. The number of students contributing was—1877, 769; 1878, 1,007; 1879, 1,145. In the national competition for the whole of the country Birmingham has obtained three silver medals, six bronze medals, and twelve book prizes. The number of third-grade prizes is 90, as against 74 last year, and 39 in the year preceding. In the second grade examination 265 students obtained certificates and 76 prizes. In the Central School 43 per cent. passed of the students presenting themselves, and 37·5 of those from the branch schools. The committee has to thank Mr. Lawson Tait and Mr. Roddis for gifts of prizes.

A new church and institute for seamen has just been erected in Princes-street, Bristol. The building is of stone, with freestone dressings, and the style is Early English. At the east end of roof is a turret containing two bells, and at the north-west angle is a niche to be filled with a figure of "Hope." On the ground-floor is the recreation-room, and above is the church, which is seated, in pitch-pine, for 300 persons. The cost has been £4,500, and the church was consecrated on Shrove Tuesday.

At a meeting of landowners held at Carrick-on-Shannon on the 12th inst., it was resolved to constitute the portion of the river Shannon extending from Lough Allen to the Fedrish river into a drainage district, and to ask Mr. Lynam, C.E., to prepare a report, with plans and estimates, relating to the same.

LIBRARY
OF THE
UNIVERSITY

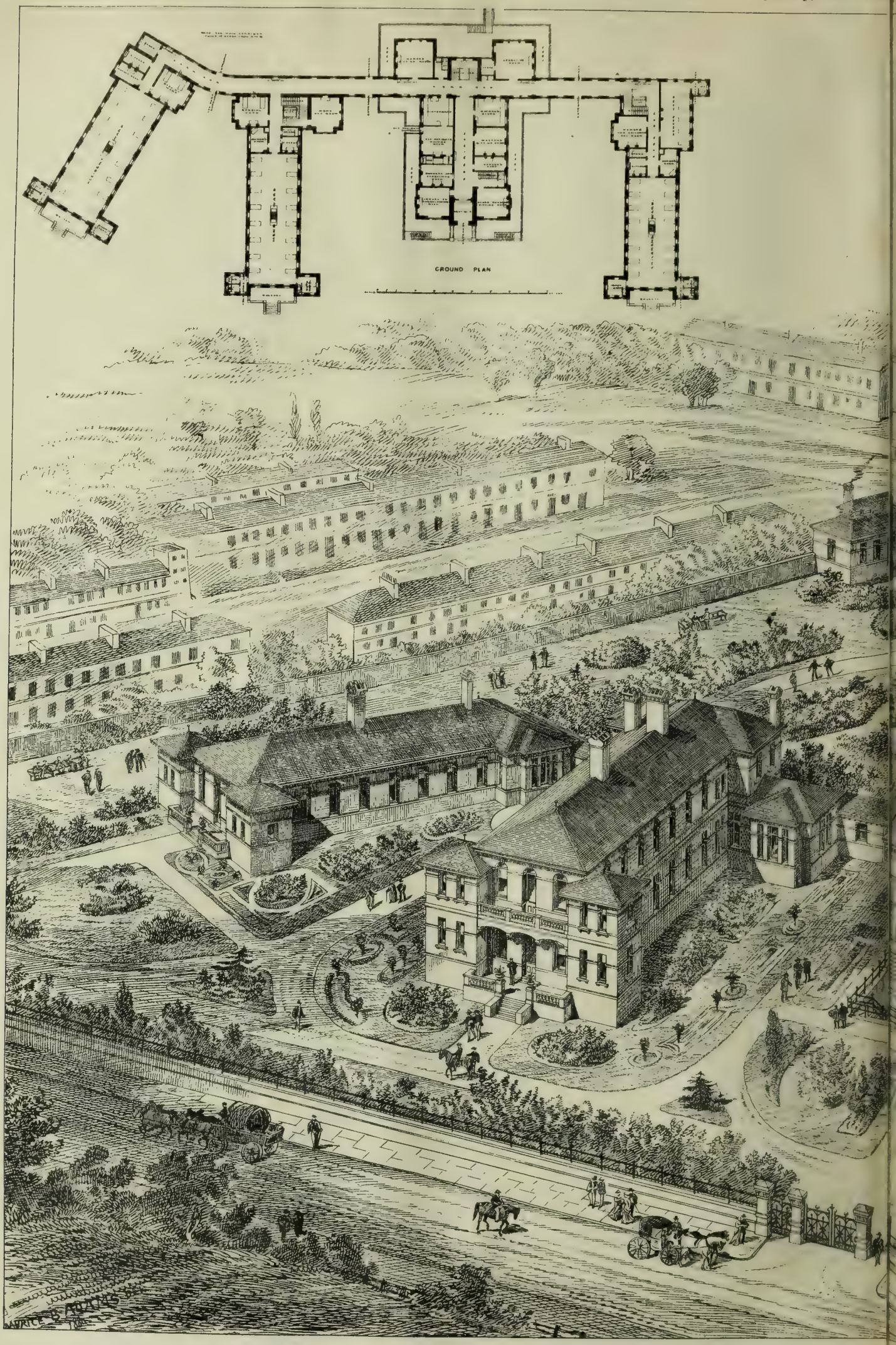




HENRY PERKIN & G. BULMER ARCHITECTS LEEDS



Photo Lithographed & Printed by James Akerman 6 Queen Square W.C.


GROUND PLAN

WEST DEVON AND EAST CORNWALL HOSPITAL

SELECTED DESIGN

COE AND ROBINSON

ARCHITECTS

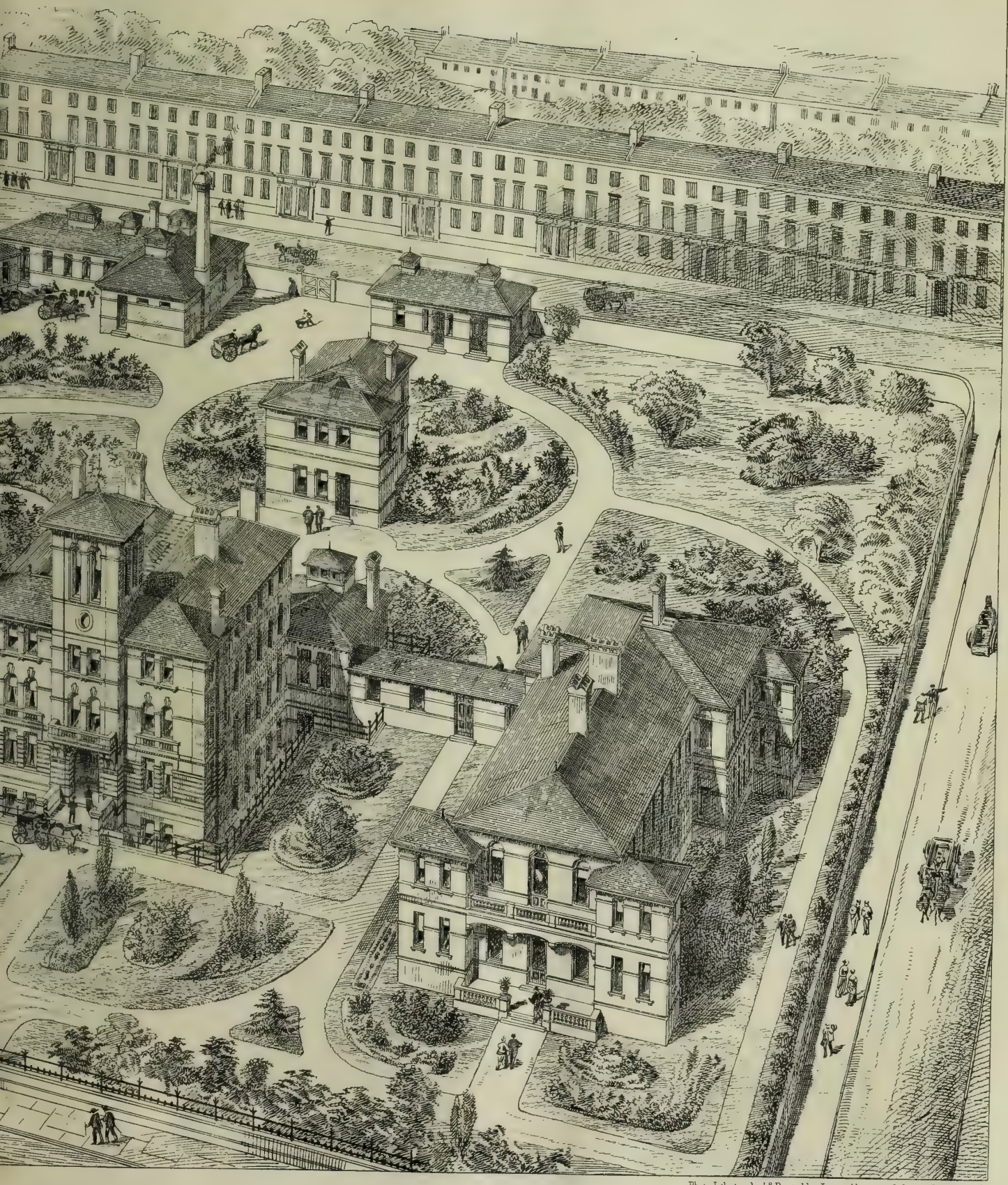
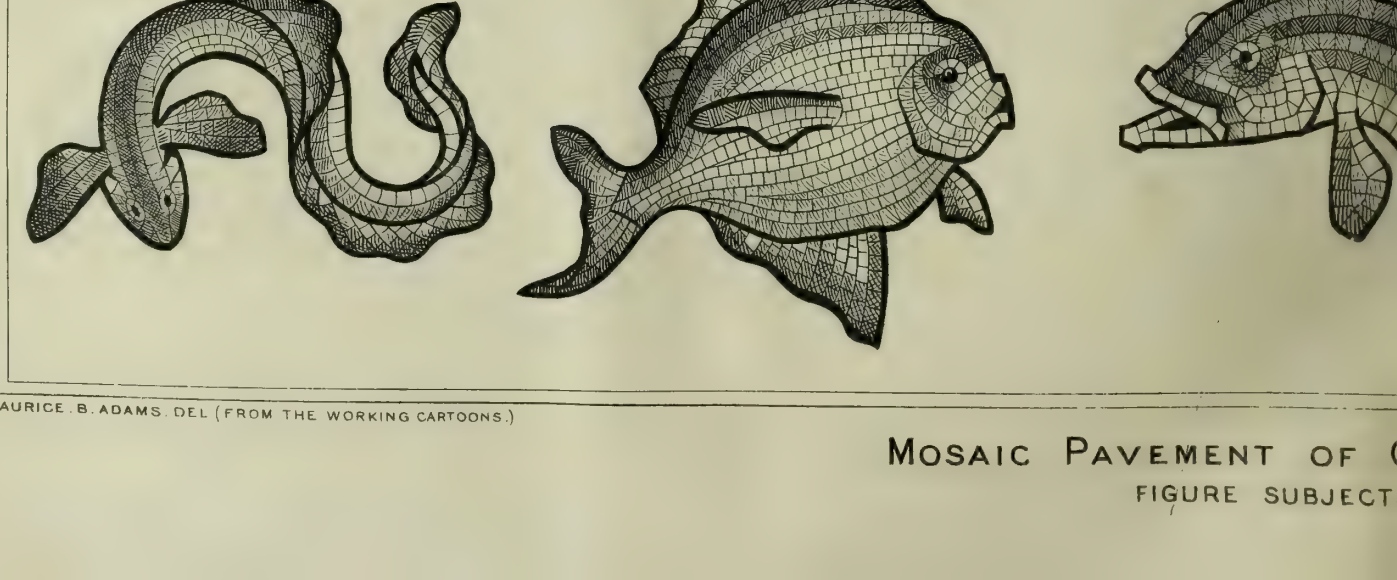


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MAURICE B. ADAMS DEL (FROM THE WORKING CARTOONS.)

MOSAIC PAVEMENT OF

FIGURE SUBJECT



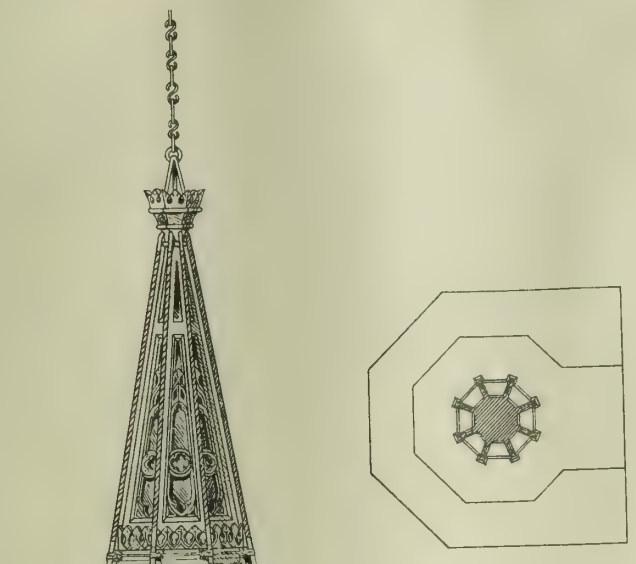
EXECUTED BY BURKE & Co

ANCEL CORK CATHEDRAL.

V. BURGES. ARCHITECT.

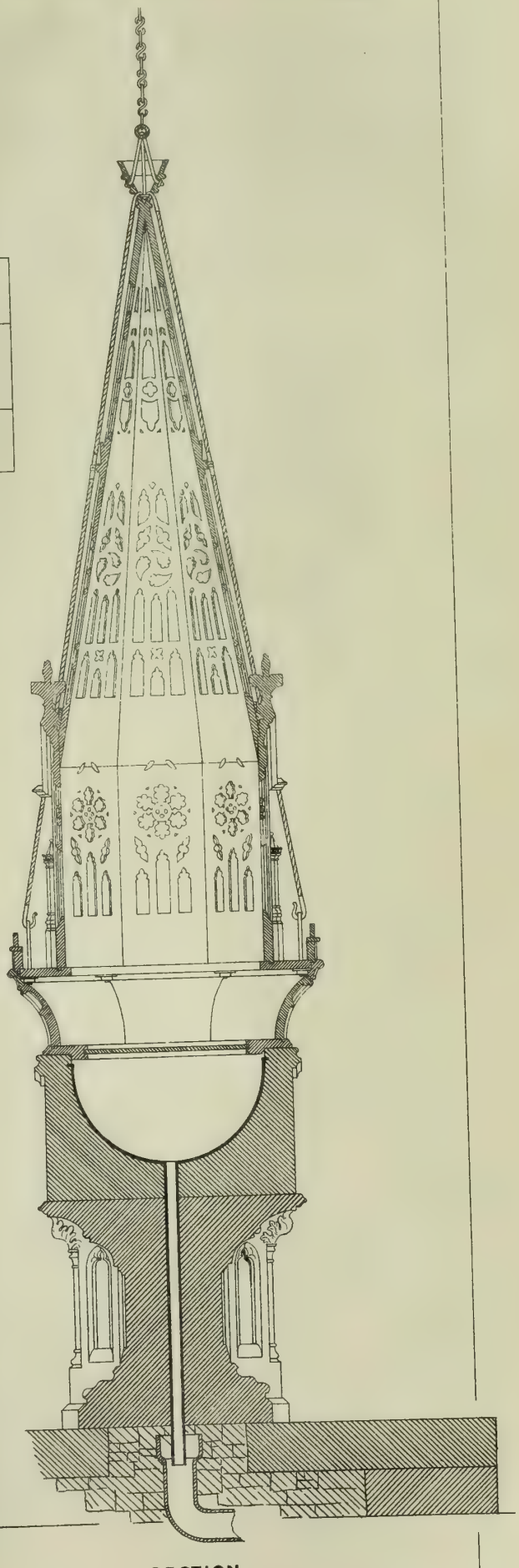
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TO BE ERECTED AS A MEMORIAL TO (THE LATE) REV^{D} WILLIAM NEWTON M.A. VICAR.



PLAN

ELEVATION

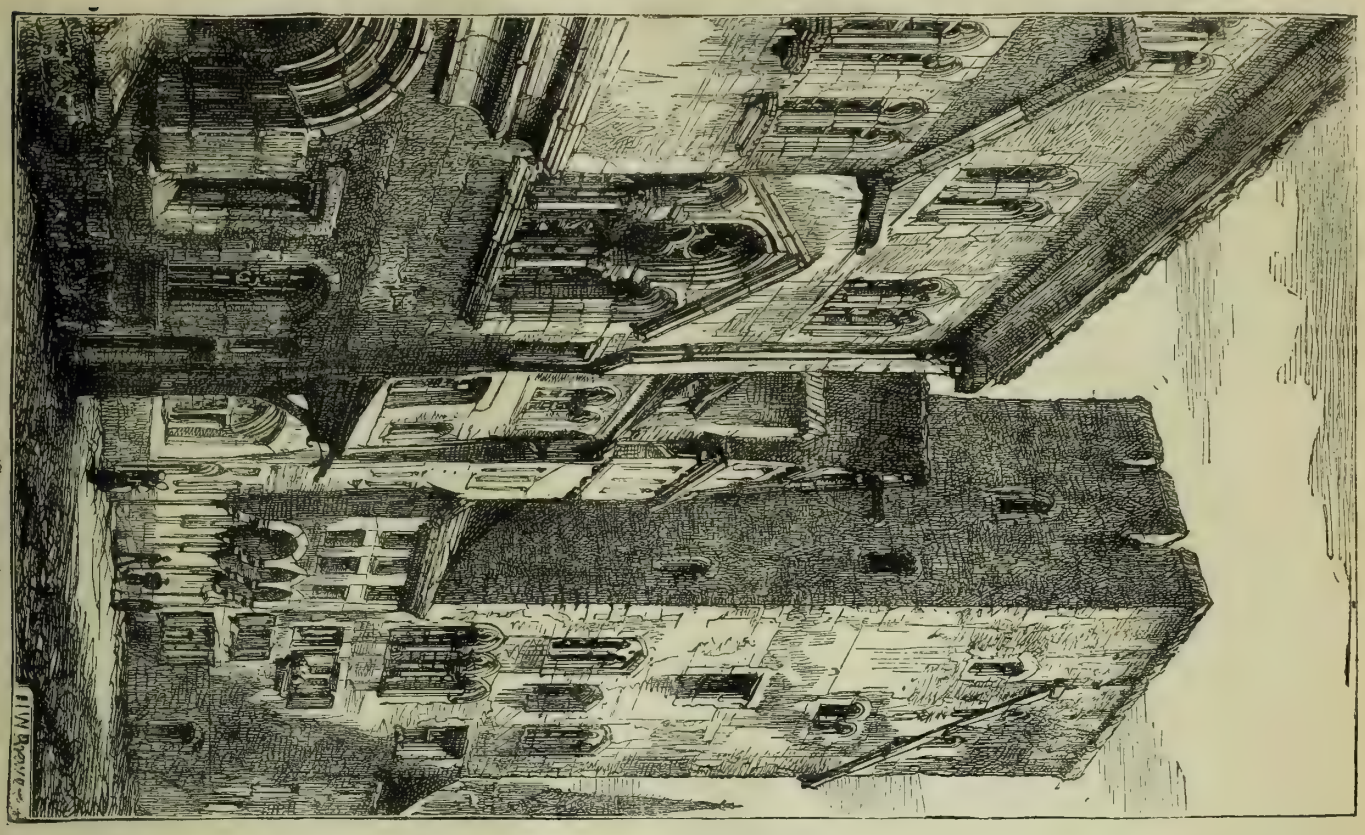


SECTION

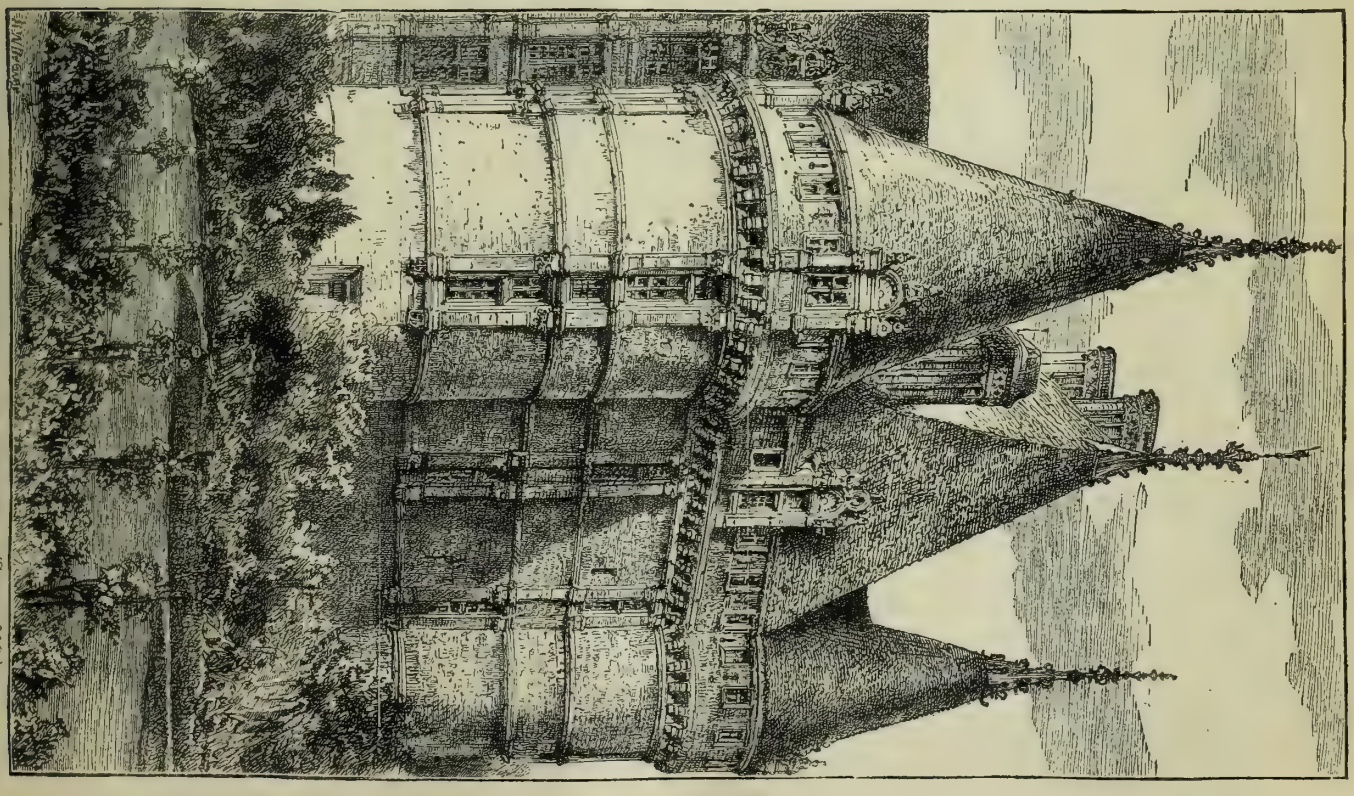
NEW FONT AND COVER ROTHERHAM CHURCH YORKSHIRE

JOHN P. SEDDON ARCHITECT

Photo Lithographed & Printed by James Akerman, 6, Queen Square, W C



STREET IN RATISBON. (See p. 218.)



CHATEAU D'AZY-LE-RIDEAU, INDRE-ET-LOIRE. (See p. 218.)

THE ACOUSTICS OF PUBLIC BUILDINGS.*

By T. L. WATSON.

THERE is perhaps no subject relating to the design of buildings upon which so much uncertainty prevails as upon the principles which should regulate their adaptation to the purposes of public speaking and musical performance. The student is embarrassed by this diversity, and when he has encountered theories which appear to him to be irreconcilable with one another, when facts are brought to his knowledge which none of the theories can explain, and when he finds that the most confident predictions, founded upon experience, remain unfulfilled, it is not to be wondered at if he should, in his practice, adopt something like fatalistic views. It must be admitted that much uncertainty still attaches to the subject, and that there are many difficulties in the way of its removal. As buildings necessarily differ from one another on account of the different conditions under which they have to be erected, and as most buildings have, not one, but several, purposes to serve, we are not able to develop a single type of excellence for universal adoption in the same manner, for example, as the typical form of the violin has been developed by a series of experiments and gradual improvement. Our problem is not the comparatively easy one of evolving a single type of hall for public speaking; it is the more difficult problem of applying the laws which regulate the dispersion of sound to buildings of ever-varying sizes and proportions.

The doubt which attaches to many parts of our subject is not, however, any reason why we should abandon our works to chance in the matter of acoustics. It renders it, on the contrary, more important that we should avail ourselves of every principle of design that can be regarded as certainly advantageous, and every expedient that is even probably so. We must constantly seek to increase our store of ascertained results, and we must endeavour to classify and to found principles upon them. Recent investigations into the nature of sound have been rewarded by the most brilliant discoveries, and by the happy invention of the most beautiful and delicate instruments. It is not unreasonable to suppose that these discoveries and inventions may lead to results which will affect our work in the design of buildings. I do not propose, however, to indulge in speculation on this point, but rather to ask your attention to the application of some of the rules which should enter into our daily practice.

When a speaker addresses an audience in the open air his voice travels from him in every direction at a uniform speed, and diminishes in force in proportion to the square of the distance traversed. Different estimates of the numbers which may be audibly addressed in the open air I have found to vary from 2,000 to 20,000. It is quite certain that the former figure is much too small, and Mr. T. Roger Smith states that he has heard it expressed as a deliberate opinion, by one of the greatest living authorities on acoustics, that there is no possible building equal to the open air for perfection of hearing. The conditions are certainly the simplest possible. A succession of waves of sound emanates from the speaker, and, expanding in every direction, each auditor receives a portion of every wave, a direct ray of sound is carried to every ear. But the waves of sound do not proceed in a horizontal direction only; they go in every direction. Those which ascend are lost unless we suppose a reflector or sounding-board to be placed over the speaker. The waves of sound which descend are perhaps partly reflected to the ears of the audience, and partly lost. In any case it is evident that only a small portion of the sound emitted by the speaker is conveyed to the ears of the hearers, and yet an audience of vast dimensions can be addressed.

The moment that we suppose the speaker and audience to be within a building the conditions are greatly changed. The waves of sound do not go off into space, and yet the hearing is usually more difficult than in the open air. We infer from this that whatever may be the benefit of sound reflected from the walls and ceiling of a building, there is some attendant disadvantage that more than neutralises it. We must endeavour to find what this disadvantage is, and how we may combat it. When a sound is produced in a room the sound-waves or vibrations are reflected again and again from walls, ceiling, and floor, and thus a prolonged disturbance of the air is produced. In some cases this disturbance is distinctly audible to us at first, as echo or reverberation, or as a musical note, called the note of the room. This is most strongly marked in an empty room with plain walls and ceiling of a hard and smooth substance, such as plaster. When the room is filled with furniture and drapery, and when the walls and ceiling are broken up with projections, the disturbance is greatly reduced, and it may be rendered inaudible, but we have still to remember its existence, and that even inaudible waves of sound may exercise an influence upon audible sounds.

Sounds are commonly divided into two classes, unmusical sounds or noises, and musical sounds or notes. Noises are produced by a series of irregular or non-periodic impulses imparted to the air; notes are produced by a series of regular or periodic impulses, and the pitch of the note depends upon the number of impulses in a given time. If a clock could be caused to tick at the rate of 200 ticks per second, the result to our ears would be a musical note. If now a second clock or ticking instrument were caused to give 400 ticks per second, the result would be another musical note exactly one octave higher than the first. There would be a perfect harmony or unison between the two notes when sounded together, and that because each alterate tick of the second clock coincides with the tick of the first. If, now, the clocks are made to tick at the rate of 200 and 300 ticks per second, every alternate tick of the first will coincide with every third tick of the other clock, and there will be a very perfect harmony. If instead of the relation of 200 and 300, we have 400 and 500, there will still be a harmony, but less perfect. If, however, we have no simple relation between two sets of vibrations, so that the waves seldom coincide with one another, we shall have not harmony but discord.

I have supposed the vibrations to be produced by a rapid succession of blows on a hard subsubstance, as in the ticking of a clock. If, however, they are produced in any other way, the result is the same so far as pitch is concerned. We may produce them by the vibrations of a wire or string, as in stringed instruments, or by those of a confined body of air, as in a wind instrument.

Now, in every room or hall we have a confined body of air, which may be set into vibration like the air into an organ-pipe, and in some cases, as we have seen, may produce a musical note by the same means as a note is produced in the organ-pipe. We must consider for a moment the action of such an inclosed column of air when thrown into vibration. It will be found that the waves travel to and fro in the pipe from end to end. As these waves travel at a uniform rate, the number of vibrations in a given time depends upon the length of the column of air, and as the pitch of the note produced depends on the number of vibrations, it also depends upon the length of the pipe. If by any means the vibrations be increased in force, it is found that the air in the pipe divides itself into two equal columns, in each of which the vibrations are carried on separately; but as they have now only half the distance to travel, there will be twice the number produced per second, and a note will be given exactly an octave higher than the other. If the agitation be increased still further, the air will divide itself into three columns, and a third note will be produced. The points of division are termed nodes. There are many beautiful experiments by which their presence in a pipe may be demonstrated.

The advocates of the theory of harmonic proportions assert that by giving to a room dimensions that bear to one another a simple ratio as, 1, 2, and 3, 1, 2, and 4, or 3, 4, and 5, &c., a purer tone and greater distinctness are given to it. If the width of a room be exactly twice its height, and if the length be exactly twice its width, it will be evident that one vibration in the length of the room will occupy the same time as two in the width, and as four in the height. If separate notes could be produced by these three sets of vibrations, the note of the width would be an octave higher than the note of the length and an octave lower than the note of the height, and the three notes would sound together in unison. If the columns of air divide themselves by nodes, the three dimensions may divide themselves into one, two and four columns of equal length. If, however, a room have dimensions that have no simple relation to one another, it will be evident that if the notes of the length, width, and height could be sounded they would produce a discord. I do not know that the correctness of this theory of harmonic proportions has been, or indeed can be, demonstrated. It is only asserted that there is a strong probability in its favour, and that wherever it has been carried out the results have been good. It will be found in practice that in some cases it is impossible to carry it out to its full extent, and that in others it is not desirable. For example, there may be, and usually are, very good reasons for having a curved ceiling, or a rising floor, or for making the end wall of a hall rounded or recessed. In these cases, periodic vibrations will be to a great extent destroyed. It is where we are obliged to have a flat ceiling, a level, partly-unoccupied floor and plain walls, that it seems to be important to have harmonic proportions. It may also be desirable to carry them into the smaller dimensions of the hall, such as the division of bays and recesses of any sort. We must remember that any partially confined body of air gives out a sound in response to the sounds. We may satisfy ourselves on this point by holding to our ears a jar or wide-mouthed bottle, a large shell, &c., when we shall find the sound distinctly audible, and now, where there are deep recesses in the walls or ceiling of a building, the same result takes place and confusion is produced. Many of the most successful among large halls have actually got these harmonic proportions. The most noticeable of these is the Music Room in Edinburgh, designed by Professor Donaldson, where the principle has been most carefully carried out, not only in the leading dimensions, but in all details, the ratio being that of 3, 4, and 5.

The peculiarities of sound in most of our cathedrals, Mr. Smith suggests, may be due to the uniform succession of piers and vaulting compartments offering a system of obstructions at equal distances, the probable action of which will be to establish nodal points, and so favour the production of musical sound. It may be added that the system of proportions is carried out, not only longitudinally, but also transversely, and even diagonally. The vaulted buildings of the middle ages were almost invariably set out in dimensions of simple ratio, frequently that of 3, 4, and 5, and these proportions were accurately applied to the separate compartments of the vaulting. We are not permitted to suppose that this was done for acoustic reasons. It is one of the few points in connection with mediæval architecture, upon which definite information has been left us by a mediæval architect. But although the system was adopted to facilitate the work of the stonecutter, it may have a considerable acoustic effect, and contribute to the great musical richness for which these buildings are distinguished.

It is well known that sound is reflected in nearly the same manner as light and radiant heat. When sound-waves are projected upon a flat surface, they return upon themselves, forming new concentric waves, which radiate as if from a second centre at the same distance from the reflecting surface as the original centre, but on the other side. If we indicate a single ray of sound it will be obvious that it is reflected at the same angle as that at which it strikes the reflector. In other words, the angles of incidence and reflector are equal. It is found, however, in the case of sound-waves, that where the angle of incidence is less than about 45°, the waves are only partly reflected; where it is less than about 30°, they are not reflected, but run along the surface of the object on which they strike. In the case of a long room, with the speaker at one end, it is desirable to round off the angles at which the side walls meet the end wall. If this be not done the concentrated sound-wave suddenly thrown back upon itself is likely to result in echo. In the Free Trade Hall, Manchester, the end wall forms a semicircle. In the Surrey Music Hall, London, the end remote from the platform is contracted in width, and the corners taken off at an angle of 45°. These arrangements undoubtedly contribute to the excellent acoustics of these halls.

The question of transepts in a hall or church is so far included in what I have said about

* Read by the author before the Architectural section of the Philosophical Society of Glasgow.

deep recesses. There is a danger that the note of the transept and the note of the hall itself will be discordant. They are, therefore, rather to be avoided than sought; but where they are necessary it would appear that their length should be one-half, or one-third, or one-fourth, of that of the main building, and that the other dimensions should be in simple relation to one another.

The form of ceiling is a matter of great importance. If the hall be wide, it must not be too high, or there is too large a body of air to be thrown into vibration. If the ceiling be flat, it is much improved by a cove at the sides, to prevent the repeated reflections that would otherwise take place between the walls and ceiling. The cove is again much improved by being groined at regular intervals, as the sound is thus prevented from being carried along that part of the cove upon which it strikes at an acute angle, and is, instead, reflected towards the audience. An elliptical section for ceiling was much used by Sir Christopher Wren, and Gibbs remarks of this form, "I find by experience it is much better for the voice than the semi-circular, though not so beautiful." The old Academy of Music, New York, has a ceiling forming a segment of a circle in section, the centre from which it is drawn being 4ft. below the floor line. This form is very good. In designing a ceiling, a good plan is to draw on the reflected lines of sound, and to shape it so that as much as possible of the sound is returned to the audience by a single reflection. If our building have a steep roof, and the ceiling have to be carried into it, it will be well to give the latter a polygonal form. A steep roof, open right up to the ridge, is, for a large building, one of the most dangerous we can adopt. The sound thrown upon one side of the roof is all reflected to the other side. It is not returned to the audience until it has become too weak to be of service.

(*To be continued.*)

COMPETITIONS.

MEMORIAL FOUNTAIN, OLD MONKLAND, N.B.—On Friday night, the committee appointed to erect a memorial to the late poetess, Janet Hamilton, met at Old Monkland, and examined about forty plans and designs for a memorial fountain proposed to be erected in the West End park at Langloan. It was unanimously decided to accept the design submitted by James Petrie and Co., of Clayhills, Monumental Granite Works, Aberdeen. The *Glasgow Herald* pronounces the selected design to be simple, neat, and chaste, and explains that it consists of a basin of red granite, in the centre of which a pillar rises to a total height of 20ft., "the pedestal being crowned by a Gothic capital and Grecian urn." The cost of this eclectic work of art is estimated at £200. We hope there is some error in our contemporary's description.

PLASTERERS' COMPANY'S PRIZES.—The particulars of the sixteenth annual competition for the prizes offered by the Plasterers' Company, in connection with the art schools of the Science and Art Department, have this week been issued. The first subject named is for a model in plaster of a frame for a large picture in a ceiling. The model to be of full size, 2ft. 6in. in length, 1ft. in width, and in high relief. The prizes for this competition are £7 7s. and £4. The second subject is for a design in monochrome of one bay of large assembly or ball-room, the wall of which is to be divided as follows:—On a dado or pedestal, 3ft. 6in. in height, are pilasters of the Corinthian order, 10ft. high, with entablature 2ft. 6in. in height, and cove rising 3ft. The width of the bay from centre to centre of pilasters is 8ft. 6in. The wall-space, pilasters, entablature, and cove are to be decorated with appropriate ornament in low relief; scale 1in. to a foot. For the best design £8 8s. is offered, and £5 5s. as a second prize. These prizes are open to all students in schools of art, including artisan classes in those schools; but the first and second prizes in either case cannot be taken by students of the National Art Training School at South Kensington. All works in competition for these prizes must be specially prepared, and marked, "In competition for the prizes of the Plasterers' Company of London." They must be sent to the Science and Art Department in April, 1880, at the same time, and labelled in the same way as the other works submitted for examination under the regulations in the "Art Directory." No student may send more than one design for each subject. The prizes will be judged and awarded by the Science and Art Department. The models and designs remain the property of the competitors, but the Plasterers' Company reserves the right of taking copies of them should it be thought desirable.

SITTINGBOURNE AND MILTON JOINT HOSPITAL.—At an adjourned meeting on Tuesday week the designs which had been sent in for the proposed infectious hospital were considered by the Board. Twenty-two architects sent in plans for competition. Some of them were rejected because insufficient space had been allowed, and a committee was appointed to examine the remainder of the designs, and select those which complied with the requirements of the Local Government Board. Mr. Hulburd now stated that the committee had spent three or four hours over the plans, going very carefully through them, and they had turned out all but five, some because they did not comply with the recommendations of the Local Government Board, and others because they were not suitable to the Board's requirements, or were on a too-magnificent scale; in one case, they rejected a plan because the building appeared to be all roof. Two of the five plans they had included in their selection would, he felt sure, be rejected by the Board, because in neither of them was provision made for day-rooms for the sick, a most important feature. These two plans, it afterwards transpired, were the plans of Messrs. Huckvale (Tring) and Wilson (35, Craven-street, Strand) and Mr. F. W. Roper, 9, Adam-street, Adelphi, London. The other three plans which had been selected by the committee were those of Messrs. Weatherley and Jones, of London (estimate £4,200), Mr. Alexander Graham, of London (£3,846), and Mr. W. L. Grant, of Sittingbourne (£3,700). The Board spent some time in examining and considering these, the specification of each being read, and ultimately determined to accept Mr. Grant's design. The decision, it will be seen, is called in question on another page by one of the competitors.

THE NEW BRUNSWICK LEGISLATIVE BUILDINGS.—The prizes for plans for new legislative buildings at Fredericton, N.B., have been awarded as follows:—1st prize (500dols.), J. C. Dumaresque, St. John; 2nd (300dols.), McKean and Fairweather, St. John; 3rd (100dols.), Brown and Allison, St. John.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The sixth meeting of this association for the present session was held at the rooms in Sackville-street, Piccadilly, on Wednesday evening. A paper was read by Mr. T. G. Pinches, of the British Museum, on "Certain Tablets of Terra-cotta found in Assyria and Babylonia," and another paper by the chairman on "A Portrait of King Henry VI. in Eye Church, Suffolk." Before the reading of the papers Mr. Brock brought before the meeting a notice of the proposed renovation or restoration of the chapter-house of Carlisle Cathedral, a building which was formerly the fratery of the monastery. The structure dates from the early part of the 15th century, and has an Elizabethan addition, and the proposed renovation, by refacing the edifice, will, it was asserted, go far towards obliterating all traces of its antiquity. A resolution was proposed, seconded, and carried, conveying the sense of the meeting with regard to the proposed work, and expressive of a hope that the subject will be reconsidered before it is carried into effect. A communication from Dr. Stevens was next read, descriptive of some relics of ancient pottery found in the Loddon Valley, near Basingstoke. Two relics of domestic earthenware dishes of the 17th century found in London, one in the Poultry, and the other in Bishopsgate-street, were exhibited, and the chairman produced two specimens of jade, one of the light and the other of the dark species. Mr. Birch read a communication from Mr. Watling descriptive of some paintings of the screen of Bloxham Church, in Oxfordshire, drawings of which were exhibited and commented on.

PARLIAMENTARY NOTES.

MUSEUM OF NATURAL HISTORY AT SOUTH KENSINGTON.—In answer to Mr. J. Holms, Mr. Gerard Noel said, on Tuesday, the building is now practically completed, and will be handed over to the Office of Works by the contractors in a few days. The necessary fittings for the botanical and mineralogical collections are being made; they will be ready at an early date, and admit of the removal of these collections taking place in the course of the summer, which I believe is the intention of the trustees of the British Museum.

LEEDS CAVALRY BARRACKS.—Colonel Stanley, in reply to Mr. Wheelhouse, stated that the cavalry barracks at Leeds had, technically speaking, never been "condemned." They had, however, frequently been adversely reported on, and he had no hesitation in saying that they were in many respects in a bad state. He proposed to take a certain amount in the Estimates for this year for the purpose of remedying some of the principal defects, but he was afraid the state of things complained of would not be altogether removed.

Building Intelligence.

ARUNDEL.—A new boys' school is in course of completion for the Duke of Norfolk, on a site of a smaller one. It is in the Tudor style, and occupies a frontage of 70ft. parallel to the London road. It is built of red bricks set in dark mortar, relieved by dressings of Ham-hill stone, and is roofed with brown Broseley tiles. In the centre of the north or London-road front is the main entrance door, under an octagonal clock tower with ogee-roof, terminating in an ornamental finial; right and left of the entrance lobby are the master's room and the cap-room, each 15ft. by 12ft., and facing the entrance is the doorway to the principal school-room, the dimensions of which are 70ft. by 22ft. 6in., with a height of 17ft. to spring of roof and 30ft. to ridge. This room faces south, and has an ornamental open roof of eight main and seven intermediate principals resting on moulded stone corbels. It is lighted at either end by a five-light mullioned window, with double transoms, and along the south side by four similar windows with a handsome bay window in the centre. A framed and moulded 7ft. dado, in pitch pine, runs entirely round the window. At either end of the school-room is a door leading to a classroom, 17ft. 6in. square, 13ft. to spring of roof. In all cases the roofs are ceiled against rafters, exposing the main timber from plate to ridge. The rooms are heated by open stoves, and lighted by gas. Accommodation is provided for 270 boys under the requirements of the Education Department. The natural slope of the site from north to south has been walled off to provide, under the main school-room a covered playground, 50ft. by 22ft. 6in., with bath-room at one end and store-room at the other, and on this level is a large open playground with gymnasium, and the offices. At the south-east angle of the building, on a projecting corbel, under enriched canopy, will be placed a statue of St. Philip Neri, the patron of the church and schools. The architects are Messrs. Hanson and Son, Broadway-chambers, Westminster, who also designed the church, and the contractor is Mr. Thomas Claridge, of Banbury. The contract will probably be completed during the second week of March.

CROSSENS, SOUTHPORT.—The memorial-stones of a new school-chapel, in connection with the United Methodist Free Churches, were laid on Shrove Tuesday, Feb. 10th. The building will be capable of seating 250 persons, and will be built from designs by Messrs. Maxwell, Tuke, and Hurst, architects, Southport. The inside dimensions of the chapel will be 42ft. by 28ft., entered from a side porch and vestibule 11ft. by 5ft. At the back will be exit lobbies into boys' and girls' yards respectively, and two vestries, each 12ft. by 11ft. The heating apparatus and tea-making rooms will be in the centre 4ft. below the level of chapel-floor, and over these rooms will be a gallery for the choir and organ. The outer walls will be of brick with a 3in. cavity, and the dressings will be of Cefn stone. The internal fittings will be of varnished pitch pine. The total cost, including freehold site, will be £800.

HOLBECK.—The eight memorial-stones of the new Prospect Chapel, Holbeck, Leeds, were laid

on Tuesday week. A school will be connected with the chapel, and will hold 400 persons, and there will also be room for 50 infants. The style will be Italian, with a circular portico of Corinthian columns in the centre, forming the principal feature; the vestibule being 17ft. in diameter, with tiled pavements and domed ceiling. The inside dimensions of the chapel, from front gallery to organ recess, will be 86ft. long by 46ft. wide. The ceiling will be coved and panelled and moulded. There will be a detached house for the chapel-keeper, and the whole will be inclosed by walls and palisades. The architect is Mr. Ambler, Leeds.

Pool.—The parish-church of Pool, Otley, near Leeds, has been recently reopened, after alterations from the designs of Messrs. Henry Perkin and G. B. Bulmer, architects, of Leeds. A new porch of pitch-pine on stone plinth, and covered with slating, has been erected, and a commodious vestry is being built at the west end. The old square pews have given place to open benches and choir-stalls of pitch-pine. The flat ceiling has been taken down, and the roof timbers have been dressed and opened out to view. A font of Caen stone has been provided, and the windows have been re-glazed with quarried leaded lights. It is hoped shortly to proceed with the erection of the chancel.

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[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

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R. J. Thomas. (We cannot give addresses—in fact, we do not know them.)—Designer. (No. If you really think what you say in the second part of your letter, your acquaintance with London architects must be limited.)—J. L. (Doubtful, considering the terms of your advertisement. You *ought* to recover, of course.)

Correspondence.

QUEEN AN(NE)TICS.

To the Editor of the Building News.

Sir,—I cannot help protesting against Mr. Calvert's horrible suggestion that the monstrosities of the Queen Anne mania should be introduced into Edinburgh. There is already a very distinct style of old Scottish architecture with its quaint crow-step gables, pointed turrets, and overhanging corbels, the outcome partly of intercourse with the Continent, and partly of an endeavour to adapt the method of building to the materials at hand. Queen Anne is dead, and would that the hideous nightmares which bear her name had disappeared also! The only redeeming feature of the whole thing seems to be that honest red brick is employed instead of stucco. As for using small-paned windows in an age of plate-glass, endeavouring to make ellipses and other curves out of arcs of circles, putting up wooden balconies, painted white, to prevent cats tumbling off the roofs, and covering walls with niches serving no purpose;—all these follies refute themselves. However, the so-called Queen Anne style positively bristles with incongruities of every sort; but any attempt to impress them upon those who are bitten with the craze would be hopeless waste of time.—I am, &c.,

J. Romilly Allen.

23, Maitland-street, Edinburgh.

THE RESTORATION OF ST. MARK'S VENICE.

Sir,—Signor Meduna's letter is really no explanation at all, and the rectification which he desires to make as to the intentions of the building committee is quite unimportant, and in no wise affects the question at issue.

Signor Meduna is anxious it should be known that he never contemplated so bizarre an act as the total destruction and rebuilding of the west front, and that it is only intended to rebuild the arch to the right, meaning, as I suppose, the northern doorway, and such other portions of the front as are in an unsafe condition.

In the memorial addressed to the Italian Minister of Public Works by the Society for the Protection of Ancient Buildings, no opinion was expressed as to the conditions of the fabric; but a suggestion was made that even if the foundations of the west front were found to be in an insecure state, that it might be within the resources of science to rectify this defect without resorting to the extreme measure of rebuilding the whole front.

Since that time the society has received definite information on this subject from Mr. J. J. Stevenson, an architect of considerable experience, who was commissioned by the Society to examine the condition of St. Mark's, and in his report, which has been recently published, Mr. Stevenson emphatically denies that the building is unsafe, or that there is any necessity for anything but superficial repairs, which might be carried out with but slight interference with the appearance of the front.

Mr. Stevenson's impression is confirmed by Mr. William Scott, Soane Medallist and Travelling Student of the Royal Academy, who, during a somewhat protracted stay in Venice had unusual facilities for acquainting himself with the facts of the case. Mr. Scott is not a member of the S.P.A.B., and cannot be suspected of taking a partisan view. His statement agrees in a remarkable manner with Mr. Stevenson's report, and completely negatives the assumption that the west front is in any danger of falling, as has been declared, or that any recent movement has taken place in the foundations, the evidence being wholly in contrary direction.

If Signor Meduna should carry out his threat of compiling an historical account of all that has been done with the basilica during the last 40 years, he may perhaps succeed in accomplishing a useful work from an archæological point of view; but such a history, when completed, will not in any way assist the discussion of the question now pending between England and France and the Italian Government, the main points of which are, first, Are the works proposed necessary? and secondly, if necessary, how shall they be carried out?

Signor Meduna complacently refers to the rebuilding of the south front, which has been already accomplished, and wishes apparently to force the conclusion that he should be allowed to treat the west front in a precisely similar manner.

The conditions are, however, entirely dissimilar, and this has been ably pointed out by an impartial critic in a Venetian newspaper.

Il Veneto Cattolico, in a series of articles which have been reprinted in a pamphlet form, under the title of "S. Marco, gl'Inglesi, e Noi."

A copy of this pamphlet is in the library of the Institute, and is worthy of attention as being the unprejudiced view of an Italian, upon a subject with which he is evidently well acquainted.

John Hebb.

Spring-gardens, Feb. 16.

TERRA-COTTA.

Sir,—The correspondence on the above subject having fully proved its adaptability for building purposes, it seems to have drifted into the questions of how to obtain good ornament, and it may be worth while to endeavour to explain how the prejudices of architects against the material in this respect are fostered.

At the present time, architects, in too many cases, leave the choice of the manufacturer to the contractor, who endeavours to find out the cheapest market, not caring whether the ornament is good or bad, "he only wants the stuff." Now, terra-cotta requires considerable care and attention in manufacture, and extreme cheapness with it always means scamping. But architects, learning that terra-cotta is supplied at remarkably low prices, they expect manufacturers, who turn out carefully-made work, to do so at the same prices as those who supply work without much attention to quality, which is impossible.

Seing that terra-cotta, when highly ornamental (out with repetition) is cheaper than stonework sparely carved, besides being indestructible by weather, and how often architects for cheapness have to do away with ornamental stonework, and will not adopt terra-cotta because they think they cannot obtain the ornament good, it is time they took the matter into their own hands. And to accomplish this, they should make personal inquiries of the manufacturers, stipulate the names of good manufacturers in their specifications, and enforce that legitimate samples are deposited with them, and thus becoming more practically directors of the designs and buildings under their superintendence.—I am, &c.,

Feb. 16. Designer.

COMPETITIONS AND THE INSTITUTE.

Sir,—As an architect of 25 years' standing, I am glad to see that the Institute is moving in the matter of competition; but I do not think that any rules that they may make will be of any practical use, as every committee is too fond, whilst they have a little authority, of making their own conditions, and as long as they can get plans on their own terms, they care not who sends in. If the rule is made that no member of the Institute is to complete unless the conditions are after their rules, it will not do one bit of good, but cause rejoicing amongst the black sheep in the flock, who will rejoice that the "swells," as they call the Institute, are out of it. It is a pity the Institute does not, in the first place, make itself wider, so that country architects can be members at a less cost. Some admirable suggestions were made by a correspondent in your paper a short time ago on this point. And the Institute is not well-known, constituted as it is, among the provincials. Not long ago I said to a church committee, composed of educated men, "That would be against the rules of the Institute." "What Institute?" asked one. "The Institute of British Architects," was the reply. "Oh, you can call yourselves an Institute; but we know what we want without being told by your Institute." Competitions have been, and are, the curse of the profession, and I should very much like to see them abolished until we can get a professional standing like all other professions. For instance, the School Board have advertised for plans for schools, and accepted the plans of an architect near here, who sent in a most elaborate elevation; plans of schools much larger than asked for, the number of children being 80, a master's house and walls for bounding rather more than a quarter of an acre. The architect specified Aberthaw limes, and the timber memel and red pine; and said all could be done for £500. The board, composed of tradesmen and bankers of this town, were delighted, and accepted his drawings at once, and when told that it was impossible to be done, they only said they knew best, and when it was brought to their notice that in the specifications provided by the architect to be tendered from, he had substituted common lime, they quite overlooked it. Then the whole of specification was rather different. The architect, too, offered to do the work for £1,200. Well, Sir, whilst we have

such boards and such men calling themselves architects and disgracing an honourable profession, I do not think all the Institute can do will cure the abuse of competition.—I am, &c.,

Liskeard, Feb. 16. CHARLES CLIFTON.

THE RECENT COMPETITION FOR A HOSPITAL FOR INFECTIOUS DISEASES FOR THE JOINT HOSPITAL BOARD FOR SITTINGBOURNE AND MILTON.

SIR,—The haste with which the Board have despatched their duties of selection in this case, as well as other phases of an unsatisfactory character, induce me to ask you to give space to a few particulars.

In reply to an advertisement in your issue of the 12th of December last, I wrote to Mr. W. J. Harris, the clerk to the Board, asking for plan of site and other particulars, at the same time inclosing him my cheque for one guinea, the required deposit, in return for which I was favoured with a stark-naked plan of site, without levels, or any of the usual "instructions to architects." I therefore wrote to Mr. Harris, pointing out the necessity for some instructions, so that all competitors might be in the same boat, at the same time putting several very pertinent questions, among which was, "What is the contemplated outlay?" to which I was not vouchsafed a reply beyond that the several items were left to the discretion of the competitors.

These facts, I admit, should have been sufficient to have made me drop the business, and sacrifice my guinea in the belief that the first loss would be the least; but, having been pretty successful in hospital works, I prepared plans of what I thought would meet the requirements, and they were delivered, as they were required to be, by the last day of last month. I heard nothing of the competition until the publication of the *East Kent Gazette* of the 7th inst., which contained an account to the effect that 22 sets of plans had been received; that a meeting of the Board was held on the 3rd inst.; and that Messrs. Knight, Hulburd, and Pillow were empowered to examine the plans, and report to the Board on the 10th inst.

Since then I have received a *printed* circular, dated the 13th inst. (only 10 days from the date of the first meeting, when all the plans were supposed to be seen together for the first time), thanking me for my design, returning the guinea deposit, and informing me that the successful competitor is Mr. W. Leonard Grant, of *Sittingbourne* (the italics are mine).

Being anxious for some details, I obtained a copy of the *East Kent Gazette* of the 14th inst., which supplies an account of a meeting of the Board held on the 10th inst. (seven days after the first view of the drawings), and Mr. Hulburd comes up with the report that he and Messrs. Knight and Pillow had actually "spent three or four hours over the plans, going very carefully through them" (!) and finally advised the adoption of those of Mr. Grant, to cost £3,700, and "which met the requirements of the locality more closely than any other." The same account, after criticising some of the features of other plans, winds up with the following paragraph: "A beautiful design was sent in from Mr. G. G. Hoskins, of Darlington; it was generally admitted to be the best, but the building was too expensive for the Board to entertain it."

Now what I chiefly object to and consider unfair are the following items:—1st. That the Board *had* some very definite ideas of their requirements, as shown by the account of the meeting on the 10th inst., and should therefore have made the same known to the competitors. 2nd. Considering that my design was "generally admitted to be the best," it was the duty of the Board, not only in fairness to me, but to the ratepayers also, to ascertain from me the probable cost of my building, which I have no hesitation in stating could be carried out for £200 less than the estimated cost of the selected design. You will have seen that I asked for the contemplated outlay, but could not obtain a reply, and, knowing with what suspicion competing architects are viewed, I submitted my drawings with the hope that the Board would probably engage the services of an efficient person to advise them on the question of cost as regarded the whole of the plans, and had the Board done this I should not have feared the result.

Here is more food for Mr. Thomas Porter and Mr. Robert Walker.—I am, &c.

Darlington, February 17. G. G. HOSKINS.

ARCHITECTURAL COMPETITIONS.

SIR,—The subject of architectural competitions being again before the Royal Institute, let us hope that it may not end in discussion only. During the last forty years, the professional journals have given expression to the lamentations of the architects, and the same may be heard wherever they most do congregate, and will continue to be heard until the profession takes the remedy for their grievances into their own hands. Co-operation amongst the younger members, who have much to gain by well-directed efforts in competition, is the first step.

Competition stimulates and draws out dormant power, and any attempt to stop the way to advancement, open to numbers of the rising generation of architests, would be a cruel monopoly.

Those who have worked as competition-draughtsmen know how very few opportunities there are for them if they have to gain their laurels through their professional brethren only. Direct communication, and opportunity to show designs to the public, is what every one is entitled to, be he workman or architect, and it seems to me that to cope with the present difficulty, a central association, with branches, is wanted, whose special business would be the discussion of questions connected with, and arising out of, competitions; to facilitate the obtaining of the necessary information; to give information to those who are about to invite architects to compete, and to furnish them with a code of rules to be agreed upon; to arrange for a yearly exhibition of competition drawings, say, in London, and to promote generally the strictest integrity and honour amongst those receiving, and also those engaged upon, competition drawings; and last, but not least, to combine against and expose competition-mongers, who buy up from needy men, often for a small sum, the knowledge and skill necessary for them to hook a competition with.—I am, &c.,

J. C. N.

SITTINGBOURNE HOSPITAL COMPETITION.

SIR,—I have seen the accepted plans for the above, the work of the surveyor to the Local Board. Twenty-two sets of drawings were exhibited in a public room communicating with the surveyor's office. The successful competitor submitted two sets of plans, neither of which were approved, and also a sketch plan to meet subsequent requirements of the committee. Having now derived abundant information from the twenty-one designs sent in, the Local Board have instructed their surveyor to prepare another set for the necessary approval of the Local Government Board.

I am of opinion that not one of the schemes yet submitted by the successful competitor will pass, as this is, I believe, the first rural hospital proposed to be erected under the 131st section of the Public Health Act, 1875; the facts relating to this competition should be brought before the notice of the Government Board.—I am, &c.

HOSPITALLER.

THE QUEEN ANNE STYLE.

SIR,—The "Queen Anne" style, says Mr. Calvert, "has decidedly a very homely, comfortable, English appearance, and blends well with the landscape of a suburban locality."

It seems useless to dispute as to taste. If style be rhythm, common-sense, and appropriateness, as Viollet-le-Duc strove hard in his lifetime to show, there is no such thing as style belonging to the age of Queen Anne; but merely a stuffing of a few parodied false features of Classic upon all that was left, but fast dying out, of the true homely and comfortable structures left to us from the Middle Ages.—I am, &c.,

JOHN P. SEDDON.

Queen Anne's Gate, S.W., 18th Feb.

THE OXFORD HIGH SCHOOL FOR BOYS.

SIR,—The Oxford High School for boys itself forms a very practical illustration of the evils of competition, adverted to in your last number.

It is the old tale, with little variation. The original design of the accepted architect is cast aside altogether, or only followed in regard to style.

Then, in this case, the ground-plan and general arrangements of one of the unsuccessful competitors is adopted, that is to say, of all that which is at present decided on; not, mind, a mere adaptation of it, but the actual plan itself, with no greater alteration than an enlargement and carrying up of the porch.

The elevation is also treated to a central gable, a high-pitched roof, and bell-turret, as was the case with the unsuccessful design alluded to, but not an idea of which existed in the selected architect's previous plans.

The whole is then stript, and very cleverly redressed in Queen Anne's clothes, and, I suppose, all concerned now ought to be considered happy—the governing body, because they have gained the advantages of the thought I had bestowed on the plans; the architect, because he has obtained the work and its profits; and your humble servant, because of the honour done him by the adoption, although unacknowledged, of his plans.

Comment is superfluous; but, Sir, you may reasonably think I must have overstated the case. I therefore enclose tracings of both designs, which will, I think, convince you that I have by no means erred in that direction.

I do not, however, submit these tracings for publication, because those showing Mr. Jackson's original design are from memory only, and although correct enough for this purpose, he would, no doubt, prefer lending the originals, if you deemed the matter of sufficient interest, and I should, of course, be happy to do the same with mine.—I am, &c.,

Oxford, Feb. 18th. FREDK. CODD.

Intercommunication.

QUESTIONS.

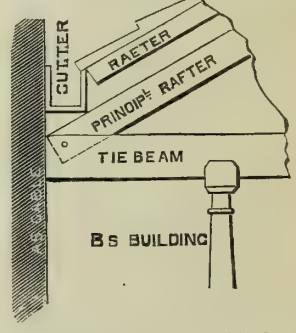
[6044.]—**King Ina's Palace, Chester.**—This building was restored a few years ago, and the manner in which the work was carried out was remarked upon in the professional journals at the time. Can any of your readers inform me of the date when the so-called restoration was effected, and the name of the architect who superintended the work?—J. H.

[6045.]—**Felting Roofs.**—I should be glad if some reader would kindly inform me whether it is really a good plan to nail board and felt on to the rafters of the roof to exclude cold and wet. Is not this process likely to cause dry-rot among the timbers, and if so, are there any reliable means of preventing it?—T. E. T.

[6046.]—**Artists' Directory.**—In the early part of last December I received a printed circular headed "Artists' Directory" for 1880, enclosing a cutting with my name and address, and a printed form requesting me to correct the address, &c., if needed, and to return with the printed form and postage-stamps for a copy of the book. The circular was dated from somewhere in Regent-street. I should be glad if any of your readers can tell me if the "Artists' Directory for 1880" has been published—at any rate, I have not received a copy in return for stamps sent.—QUID PRO QUO.

[6047.]—**Heating Conservatory.**—I shall be glad if any of your readers will tell me of any known method of heating a small conservatory with hot water from the kitchen-boiler, distance 20ft. from the nearest point of conservatory, the floor of the latter being 5ft. below level of boiler. Can it be done? I have consulted several hot-water engineers, and they are unanimously of opinion that as it is opposed to all natural laws it is impossible to make the water circulate below boiler.—MANCHESTER.

[6048.]—**Wall and Gable.**—A. is the owner of a range of buildings in a main street. The gable wall belongs to A. and adjoins a plot of ground belonging to B., upon which B. is now erecting a permanent one-story brick building. A.'s roof runs parallel with the street, but B. intends his to be at right angles with it. B. is



erecting no side wall against A.'s gable, but carries his roof on columns about 3ft. from the gable wall and from the end of the tie-beams. B.'s gutter is against A.'s gable. Had A.'s gable not existed, B. must necessarily have erected a side wall. Can he be compelled to erect such a side wall, and by what authority?—BEARDMORES.

[6049.]—**Breaking Weight of Fir Beam.**—I shall be obliged if one of your correspondents will inform me in the simplest manner how to find the breaking weight of a fir beam 9in. × 12in., and 15ft. long, supported at each end and the load distributed. Also of a cast-iron story-post, H shape, 10ft. long, 9in. × 6in. of ⅜in. metal. —PERPLEXED.

[6050.]—**Baywood.**—I have recently specified baywood handrail and balusters to a staircase. I am told that baywood is not mahogany. Would someone oblige me with reply, and also say if baywood is cut into veneers? —MAHOGANY.

[6051.]—**Ventilating Tubes.**—Can chimney ventilating tubes be recommended as a means for ventilating private dwelling-houses? Robert Scott Burn, in his work entitled "Modern Building and Architecture," illustrates Walker's ventilating tube, the combined smoke and air-flue being in one piece of pottery. Is there any danger of the heat from the fire effecting a breakage? I have never had experience with such tubes, and will be obliged for a reply from some one who has.—P. C.

[6052.]—**Strength of Beam.**—Can any of your readers oblige me by giving a formula for calculating the strength of a beam trussed in its own depth with one or two iron rods. The only formula of the kind which I have found applies only to beams in which the rods are carried down over cast-iron struts to some distance below the underside of beam. In this case the beam is to be in three thicknesses bolted together with packing pieces between, and trussed with two iron rods placed between the thicknesses and passing from the upper corners of beam at each end down under one or two iron bars or saddles placed across the underside of beam, the total dip of the rods being thus about 16in.—D. B. D.

[6053.]—**Examination for District Surveyorship.**—Will any reader inform me what class of subjects are necessary to work up for the above examination, and when the next is to come off?—C. Y. S.

[6054.]—**Substitute for Oil in Mixing Paint.**—A foreign correspondent requests some information as to a premium which he says has recently been offered in this country for the best substitute for oil in mixing the paints or colours used by house-painters and decorators. Can any of your numerous readers afford any particulars? —JOHN G. WILSON.

REPLIES.

[6017.]—**Banister Fletcher's Book on "Quantities."**—In reply to "Constant," he is quite correct. All digging and excavating work generally is done by the cubic yard, and the constant, therefore, is for the cubic yard, not foot.—BANISTER FLETCHER.

[6030.]—**Timber-Measuring.**—I am not surprised at the question raised by your correspondent, William Phelps, as to the correctness of Hoppus' tables for measuring round timber. "Liverpool" and "Kyle" both seem to lose sight of the fact that William Phelps is referring to round, and not square, timber. Hoppus's mistake appears to consist in a misconception of area of a circle. I presume engineers, in estimating the contents of a cylinder for H.P., would not use so loosely-constructed a method. The Custon House measurers in London, and the principal brokers adopt a system of measuring which might startle persons who had never heard Old Hoppus called in question. I have found in practice that ¼ girth does not represent the actual truth; but should your correspondents ever have to handle foreign round timber it would be well for them to ascertain, before completing a transaction, how much wood they would get for their money, or they may find to their cost that William Phelps is much nearer accuracy than Hoppus.—W. J. HENDERSON.

[6034.]—**School Accommodation.**—I understand the 9ft. super given in the requirements to be the minimum space for each child. If so, it follows that the large schoolroom must have an area sufficient to afford this. If not so, the Educational Department's instructions are misleading, for the space allowed in the main room would be considerably less, as the area of the class-rooms would be all taken out of it.—G. H.

[6035.]—**Perception of Beauty.**—Since Mr. Perry has kindly offered to discuss the "Perception of Beauty" in these columns, I should be much obliged if he would give the standpoint of the two schools—the "Idealists" and "Realists." Some remarks on each, showing in what points they differ, will, I am sure, be interesting to many readers. Can Mr. Perry inform me whether Goethe's "Letters on Art" have been translated into English?—ART STUDENT.

[6042.]—**Drainage.**—I believe that William Jackson will find that the local board of health has power, under 5 and 6 Wm. IV. cap. 50, sec. 67, "to make, scour, cleanse, and keep open all ditches, &c., paying the owner for the damages." It is a nuisance to suffer the highway to be incommoded by reason of the foulness of adjoining ditches. See Glen on the "Law of Highways," p. 402. The squire should first have had notice to open, cleanse, and scour the ditch, which he is bound to do by common law, but can only be compelled by indictment. See also "Nuisance Removal Act, 1855," also 18 and 19 Vic. cap. 121, sec. 22, and 3 Geo. IV. cap. 126, sec. 118.—COUNTY SURVEYOR.

[6036.]—**Preventing Sound.**—I would suggest to "S." a plan that I adopted some years ago in a shop similarly circumstanced, and which was successful. Lay a sheet of felt over the whole area of boarded ceiling. Batten under this with battens 2½ by ¾, then lath and plaster so as to form a new ceiling. "S." will find the passage of sound considerably obstructed and the sound of people talking prevented. This plan will of course entail a small loss of height to the shop of about 2½in. at most, but the remedy will be effectual. If a lower ceiling, quite independent of the boarded one, be formed, so as to allow a good air space, the arrest of sound would be more effectual, but it would cost a loss of height in shop.—G. H. G.

[6043.]—**Settling-Tanks.**—There is a brick manufactured by the Marland Brick and Clay Works, Torrington, Devon, which I think is the most suitable brick manufactured for settling-tanks. It possesses all the qualities of glazed fire-bricks, and is of a very close grain, and non-absorbent. It scarcely requires glazing, but can be glazed on one or more sides if preferred.—E. H.

The local board of Street, Somersetshire, have elected Mr. J. B. Gifford as inspector of nuisances, vice, Mr. S. King, retired.

Our Office Table.

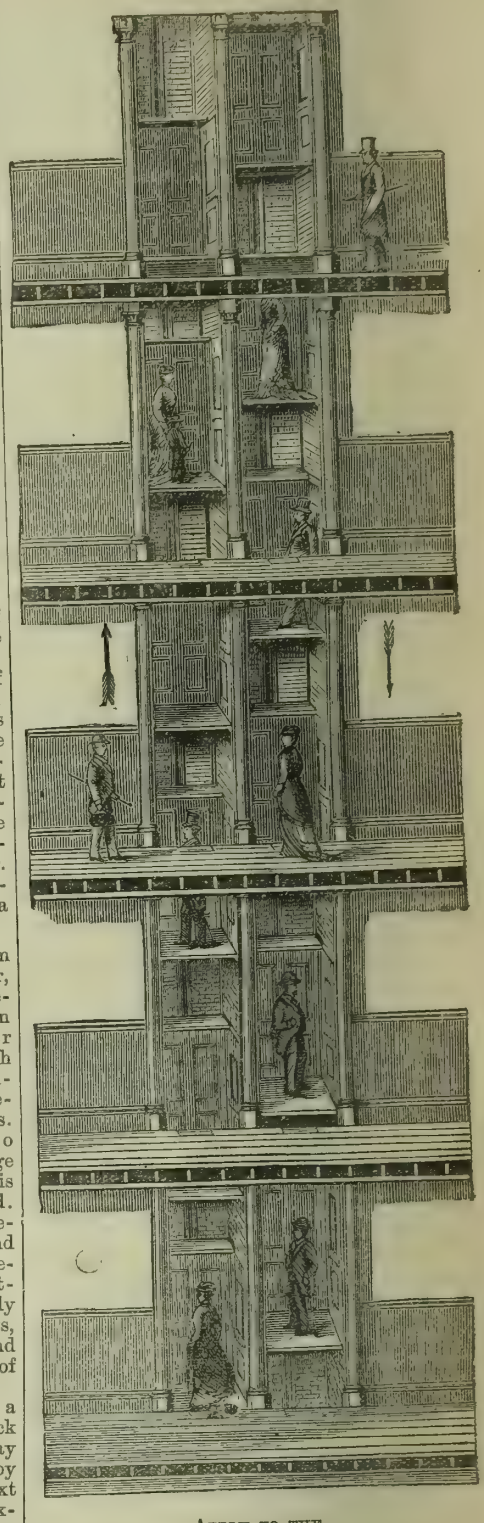
THE City and Guilds of London Institute for the Advancement of Technical Education, have just issued a revised edition of the Programme for their Technological Examinations, which are to be held in May next, at different local centres throughout the country. Under this system, any artisan can be examined, and, if he passes, obtain a Certificate in any of the thirty-two subjects in which an examination is held. These subjects include nearly all the principal industries of the country, and the examinations are designed to test the knowledge possessed by workmen, of the scientific principles of their business. The additions, which appear for the first time in the second edition, are:—"Mechanical Engineering," "Treatment of Ores," "Mine Surveying," "Oils," "Fuel," and "Flax." Of these, the most important is the first-named, including, as it does, so many different branches, each furnishing employment to such large number of workers. Classes for instruction in the various subjects have been formed at most of the principal seats of industry in the kingdom; but candidates are not obliged to study in one of these classes before entering for examination. The only test required is that the candidate should pass in one of certain selected subjects of the Science and Art Department Examination. He can do this either before or after passing the Technological Examination. Copies of the Programme can be had, gratis, and free by post, on application at the Halls of the Mercers', Clothworkers', or Drapers' Companies. Liberal prizes are offered in all the subjects of examination, as well as Certificates in three grades.

THE Rev. Matthew Woodward, vicar of Folkestone, recently applied to his Diocesan Court for a faculty for certain decorations in his church. The application was opposed by the people's warden, because one of the proposed ornaments is a painted window representing a priest wearing a chasuble as he administers the Communion. Mr. Woodward contended that the vestment was necessary for the correct representation of a fourteenth-century incident. Dr. Tristram refused to grant a faculty for the window unless the priest is represented wearing a surplice instead of a chasuble.

THE death is announced of Mr. William Sendell, well-known as a wood-carver in Exeter, where he resided, and in the West Country generally. Mr. Sendell was an artist of no mean ability, and, under the Earl of Devon, and other noble patrons—who watched his career with much kindly interest—he executed many important works, some of which have been recorded, from time to time, in these columns. Mr. Sendell's abilities were devoted entirely to architectural work, and the churches and large mansions are numerous in which samples of his clever manipulation in wood are to be found. Symptoms of a distressing malady recently became apparent, in a strangeness of action, and these, unaccountable at the time, quickly developed into confirmed disease, ere he had attained his 43rd year, and he passed quietly away upon the 12th inst. Outside business, Mr. Sendell was a well-known Freemason, and took an active share in the political affairs of Exeter.

DR. STEELE, of Guy's Hospital, gave a demonstration on "The Hospital and Sick Room," at the Parkes Museum, on Saturday last. Dr. Steele introduced the subject by referring to the apparent antagonism betwixt the terms hygiene and the sick-room, but explained that while it was the object of the medical art to cure disease, it was equally the aim of hygiene to maintain health, and in their dual capacity of warding off death the one may be said to be the handmaid of the other. In the sick-room the lessons we had learnt in health had a double significance; first, in teaching us how we might best assist Nature in her attempts at recovery from an unnatural condition, and secondly, by limiting or entirely preventing the extension of this abnormal condition to others. He instanced especially the necessity for pure air and an abundant supply of it for the sick-room, and illustrated this part of the subject by the various models in the Museum of the windows of the chief London hospitals, which are so constructed as to admit the largest amount of air with the smallest perceptible draught.

HART'S PATENT CYCLIC ELEVATOR.



APPLY TO THE
PATENTEE, 37, WALBROOK, E.C.
OR TO THE
SOLE MAKERS
J. & E. HALL,
Engineers, Millwrights, Founders, and Boiler Makers,
DARTFORD, KENT,
OR
21, ST. SWITHIN LANE LONDON.

THE BUILDING NEWS.

LONDON, FRIDAY, FEBRUARY 27, 1880.

THE UNKNOWN CITIES OF SYRIA.

EIGHTEEN years ago, two Frenchmen of science, M. Henri Waddington and the Count de Vogué, conceived the design of an archæological exploration in Syria. They proposed to penetrate far beyond the customary lines of travel, and to ascertain whether, among the sandy wildernesses rarely, if ever, visited by Europeans, they could not discover some long-hidden antiquarian treasures of interest to the modern world. The attempt was made, and resulted in success. It has brought to light, indeed, all that remains of the ancient civil and religious architecture of Central Syria. Nor were the discoveries, continued up to a very recent date, and only made public, as it were, yesterday, confined to fragmentary ruins. They included entire cities, with their churches, dwellings, streets, and tombs. The Syria thus explored was not that of Antioch, Tyre, or Jerusalem, nor was it that of "the great desert," inhabited only by wandering tribes; it lay between them; was once enriched by a magnificent civilisation, supported a prosperous population, and has for ages been concealed from the sight of mankind as by an impenetrable veil. It is walled in by ranges of hills; its people are wild; and, with the exception of Damascus and Palmyra, the relics of its olden life have hitherto been left in almost total darkness, even by the nineteenth-century spirit of research. But the cloud has at length been dissipated, and among the first objects presented to view are the ruins of a temple, dedicated to the great divinity of the desert, under his Syrian name, Baalsamin. There is nothing in the slightest degree Greek about it; it points altogether to a different history, being distinctly Oriental, prodigal in ornament, somewhat of the Scriptural Jewish type, having been erected, it is supposed, at about the same period as the historical shrine of Jerusalem. Yet, on the pedestals in front of the portico are to be traced inscriptions, hitherto undecipherable, which some have claimed as being written in a dialect of primæval Greek, while others insist upon their Nabatian origin. At all events, it was here that the explorers hoped to unearth an authentic bust, or portrait in stone, of Herod the Great, but were disappointed. The image had been hurled from its pedestal, to which, however, a foot, incapable of identification, still adhered. But it is certain that a number of Christian monuments did grow up among, or mingle with, the remnants of Pagan art in this region. It is not even here, nevertheless, that the latest discoveries in their true sense began. These commenced, indeed, with the cities which existed in Central Syria from the first to the seventh centuries of the Christian era, which have long been obscured from sight, and which are doubly interesting on that account, because they offer a genuine picture, untampered with until now, of the early Christian ages. The Count de Vogué affirms that no European had ever preceded him along this path of exploration, and the literature of travel sustains his claim. It is a matter of extreme curiosity, therefore, to follow the new light he throws upon the history of a land whose every tradition is endeared to the modern mind. At Boswa, far in what is now the wilderness, are the remains of a theatre of Roman magnitude, tier upon tier of seats scarcely disturbed or mutilated in any way; monumental and decorated gates for the performers to pass through; and even, which is unique, several columns left of the upper gallery, reserved for women. All this is distinctly Roman, and around it are the ruins of baths, basilicas, and a palace, such as the explorers discovered, also, at Chaqqa, and of which several halls remain almost entirely intact. At Phena, to which, as to the other Central Syrian cities, Arab appellatives have long been given, there stands to this day, though so long lost to view, a magnificent prætorium, or Court of Judgment, with bold arches springing from wall to wall and resting upon the capitals of elegant pillars, belonging to the reign of Marcus Aurelius. The tribune is still to be identified, and along the walls are arranged marble brackets, destined to receive the portraits of the officers of the Third Legion, one of whose centurions was the architect of the whole structure. But, as M. de Vogué thinks, a deeper interest attaches to the private than to the public life of those early centuries, thus revealed. It was not only, as has already been indicated, solitary edifices that were lighted upon, but towns in their entirety, affording a complete view, almost, of Syrian Christian manners in those times, and not of Christian manners alone. As was common in that epoch, the abodes of the dead preceded those of the living, along the public way. To reach the inhabited outskirts, it was necessary to pass through range after range of tombs, elaborately constructed, and finished with the utmost care, whether they were structures above ground, or excavations hollowed in the living rock, the latter being reached by broad paved stairs, leading to doors of basalt, ornamented with mouldings and festoons. The wealthy enriched these entrances to the chambers of death with porticoes, or columns placed in pairs; others, when their family tombs rose above the ground, surmounted them with pyramids, scooping out niches for the perpetual burning of lamps, in the immemorial Eastern fashion. Occasionally, towers were met with, of which the lower stories were dedicated to sarcophagi, while the upper, honeycombed to the apex, served as dove-cots.

Beyond this necropolis, the long, "unknown" city of Central Syria commences. The explorers exhibit in their illustrations a practical restoration of one, which, as they vouch, owes nothing whatever to the imagination. The streets, scarcely ruinous in the ordinary sense of the term, are—in Harouan, for example, one of the best preserved among these marvellous monuments of the past, over which the influences of time have passed so harmlessly—are straight and wide, and bordered on both sides by handsome houses. What injuries they have suffered—generally, a falling in of the roofs—have been due, for the most part, to the effects of earthquakes rather than to those of decay, for the walls, as a rule, remain solid, and not a few of them still attain a height of three stories. Taking Harouan, therefore, as typical of these recent French discoveries, it is clearly there alone that we have anything approaching to a parallel with Pompeii, as an exemplification of antique life, Greek more than Roman, in this instance. From Greece itself, as from Assyria and from Egypt, the private dwelling has disappeared; it is only the imperial monuments that remain. Here, however, at Harouan, we have illustrations of the kind from every grade of the social scale. But nowhere is to be traced there the gaiety and grace that were characteristics of the Vesuvian City; at Harouan, on the contrary, sternness and severity prevail. The former had a beautiful Bay and an exquisite landscape as its foreground and its frame; the latter was built on the very edge of a waterless, verdureless, shadowless desert. Its builders, moreover, had little or no timber at their command. Everything in their city, even the leaf of a door, or the shutter to a window, was of stone. Before beginning to construct a house, they hollowed out cellars and cisterns in the solid rock, and, with the materials thus excavated, reared the walls. Little wonder, then, that their works have proved durable. Neither wood nor brick entered into the composition of the edifice, whatever its purpose might be. Hence, a solid, monotonous, perhaps forbidding aspect was conferred upon these hitherto "unknown cities of Syria," as their French discoverers designate them. If not Egyptian in design, they were not far from Egyptian in solidity. Occasionally, however, where the desolate central region bordered on a softer zone, the explorers met with double porticoes, superimposed, one upon another, monolithic columns, galleries connecting different ranges of apartments, and arrangements for regutating, at different hours of the day, the falls of light and shadow. Generally, however, the aspect was one of broad and lofty walls, without a single window; high-perched galleries looked down upon the street; narrow doorways, like the entrances of tombs, gave access to and from it. Instead of the pillared and fountained *atrium*, or central house-court of Pompeii, the travellers found themselves in huge saloons, occupying nearly the whole of the ground-floor, destined to all appearance for family-gatherings and the reception of strangers. Thence, a stone staircase, sometimes rising out of the hall, sometimes concealed, led up to the more private apartments and to the sleeping-chambers. Niches in the wall appeared to indicate where chests and cabinets were placed, while deep alcoves as clearly showed where the beds were provided for. Not a few of these ancient dwellings, indeed, remain to this hour in such a state of preservation that they are still, more than a thousand years from the date of their construction, inhabited. In the district—as distinguished from the City—of Harouan, M. de Vogué found a considerable family living, as though in a house of their own building—their kitchen, an excavation in the rock; their kitchen-range, a hollow block of stone; their chimney, a funnel pierced through a hill; their stables, a range of artificial caves, that might have existed at the time of the Nativity. All this is exceedingly curious, and appeals to the sympathies of others besides the archæologist and the antiquarian. Stone mangers, stone water-troughs, stone oil and wine presses, a second Petra, in fact, which it was left for the second half of the nineteenth century to reintroduce to the knowledge of the world. Of course, amid these more perfect specimens, are many ruins, walls thrown down, and arches fractured out of shape; but they all constitute, more or less, details of history, and of a history which, beyond a certain point, has yet to be written. And a singular circumstance is that, on the walls of these stone-built abodes were often tqaced inscriptions, such as were common alike, except in phraseology, to the Pagan temples and the Christian tombs, suggesting that the builders were not always at the pains to quarry for themselves. Thus, "Oh! Invincible Jupiter, bless this house," not far from "This is the Gate of the Lord, through which the just shall enter." There is distinctly illustrated here, however, the gradual development of a Christian Art, with a character and records of its own, as many of the inscriptions, if few of the constructions, testify. In point of fact, however, the transmutation of heathen temples into Christian shrines was a process which never went very far in a region so near to the very birthplace of Christianity itself as Central Syria. The former were, to begin with, too small; they were not adapted for large and enthusiastic congregations, inspired by a new piety. Nevertheless the ancient

structure, to which the appellation "Basilica" was given, evidently found favour, more or less, in this home of the early Faith. That of Chaqqa, of an age anterior to that of Constantine, for example, which the French explorers discovered, needed only an apis and a tower to become a complete Christian church, according to the ideas of that place and period. Little architecture, from the point of view of art, was possible, the sole material at hand being a hard basaltic rock, exceedingly difficult to work. Nevertheless, in the religious edifices of Central Syria, within the dates defined, cupolas, arcades of columns, and even Byzantine suggestions, were not wanting, though it is impossible to say how much of the genius of Islam, the Saracenic genius, that is to say, may have been grafted upon the work of these original Christian stone-workers in Central Syria. Singularly enough, however, according to the Count de Vogué and his colleague, the most elaborate remains, so far as experiments in decoration are concerned, belong to the earlier than to the later centuries, ranging, as these do, from the first to the seventh. But, however this may be explained, the central interest of these recent discoveries will continue to consist in the bringing once more into the view of the world of those which might perhaps be described as the forgotten, instead of the unknown, cities of the Harouan, and other districts of the region thus learnedly investigated, one of which, we are told, in its internal arrangements, in the inscriptions above its portals, in all that it hints at of public and family life and manners, seems like an ideal reconstruction of the Scriptural Ezra, and when, as modernly so designated, the cupolas of Boswa, for ages not less invisible to Europe than the cities of a mirage, the strange church architecture of more than a thousand years ago had its parallel. Such are among the results of the most recent explorations in that part of the world whose traditions are the most hallowed in the Christian annals.

WATER-COLOUR DRAWINGS AT THE DUDLEY GALLERY.

THERE are few very bold or striking pictures in this gallery, but the general visitor will find a variety of pleasing and brightly-coloured studies on the walls. In original effort and genuine water-colour, the present exhibition falls short of previous years, and some of the contributors seem to have yielded to the influence of the more sensational and superficial of their school. It will be only possible for us to glance at a few of the leading works. There is still a strong tendency with some artists to resort to opaque pigments for giving solidity of effect. We may mention, for instance, Mr. W. G. Addison's "Keeper's Beat," a masterly sketch, and M. Jules Lessore's view of "The Beach, Southwick" (24), vigorous and broad in the shadows, in both which works body-pigments, have been employed. Mr. Barrett's "At Home" is in a more delicate handling of transparent colour, and represents a quietly-papered room in modest Georgian taste, in a harmony of "blue-green," with a neat-pattern frieze of the same tint. Over the mantelpiece is a low mirror with blue china, while the figure of a lady seated by the fire and the half-covered table and vase produce a trim and homely effect, unmarred by any striking eccentricities of detail. Mr. Robert Dudley in his "Fete Day, Brittany" (33), has given a pretty sketch of an oak spiral stair, with two little girls, clad in white and blue, descending, in which the contrast of colour is made a telling element in the picture. Among the landscapes that first strike us we must place Mr. W. T. Richards' massively and boldly-painted scene "Tintagel Castle, Cornwall" (43), in which the dark rocks are powerfully rendered. "Annie and Puck" (45), by Miss Edith Martineau, is a pretty sketch of a girl and kitten. In the midst of a great many brightly-tinted drawings, whose chief merit is their artificial and garish colouring, our eyes alight on a pleasingly-finished sketch by Mr. H. Moore, "Early Morning with heavy Dew" (60). It is a fine study of mist and trees, in which the heavy morning dew lies on the ground obscuring the lower part of the line of trees which form the background, while the foliage grows clear against the sky at the summit. "Preparing for Market" (70), by J. Clark, is also happy, while near it a little architectural sketch, "Court of Palazzo Vecchio, Florence" (72), by A. Rotch, draws attention chiefly for its bright colouring and decorated columns. Mr. F. Hamilton Jackson's poetic conception, "The Fairy Boat" (73), is clever, but the handling too realistic. Mr. R. Phené Spiers, as usual, sends two or three charming water-colour sketches of architectural subjects. The first we come to, "Mount St. Michel, Normandy" (83), is a crisp, transparent sketch of the Mount, with the pinnacled buttresses of its abbey rising out of the motley group of houses; the same artist's "College Tower, Winchester" (330), is quite equal to it, and a thoroughly faithful drawing of the fine old tower of Late Pointed which graces the college of William of Wykeham. The companion drawing of Mr. Spiers, "Cathedral of St. Pol de Leon, Brittany," is also a skilful rendering of the towers of this fine church, and the two are executed in simple washes of sepia or bistre. Mr. John White's "Sweets" (98), is a heavy-coloured study of a little girl seated on a chair, with a box in her hand, the dark solid background and chiaroscuro are almost equal to a Rembrandt. In contrast to this, in colour and manner, is Constance Phillott's "Kathleen" (124), a pensive face, sweet in expression; she is seated at a door listening to the wind. The colouring is as delicate as the features. Close by, one of Mr. Arthur Severn's nocturnal-looking scenes, "Misty Morning from Vauxhall," is hung, which hardly bears comparison with other works of the artist.

Amongst the studies of still-life, a word of praise is due to Mr. A. C. H. Luxmoore's quaint and solidly-painted bits of furniture and blue china, from the Van de Hoope Museum, Amsterdam (140 and 250); nor can we overlook a sharp and spirited sketch from the pencil of Mr. A. H. Haig, of the "Tower of St. Pierre, Caen." This drawing is a gem of clear colouring, and the artist has added to the charm of the beautiful spire by sketching it within the field of view of an archway from a house-top. Very different in style and manner of colouring is Mr. A. B. Donaldson's "Busy Vrous, Dordrecht" (151), a picturesque street of houses spoilt by the usual mannered crudity of treatment and bright tinting of this artist. "Old House in Ludlow Churchyard," is an interesting bit by G. H. Jackson (169), and a truthfully-drawn and coloured sketch of "Kensington from the Gardens," by Evelyn Redgrave, is worth a passing glance among the quieter and more conscientious works. In this category we must award praise to Mr. E. M. Reid's drawing of "Handforth Hall, Cheshire" (199), an old gabled half-timbered building, with some exquisite lozenge-shaped panels made by the timbering, and some interesting Late Gothic detail. The hall was built in 1500, and is extremely valuable as an example of Transition. A fine seascape, "Gleam of Sunlight after Rain, Seascall" (205), is by Mr. Arthur Severn, who has here produced a scenic effect with his usual skill. The place of honour in the gallery is awarded to Mr. Joseph Knight's large picture of oil-like solidity and finish, called, "A Bye Path o'er the Moor." Mr. Knight has, without doubt, produced a fine effect in the broadly-treated masses of purple upland; the effects of light and shadow are skilfully handled, though the peculiar sheen over the sunlit grass is hardly true to nature. The views of Venice by Vincenzo Cabianca (217, 227) are worth noticing, and so is 242, "A Quiet Bend," by Mr. F. E. Bodkin, and also a sketch in the New Forest, by Mary C. Jevons, 241. We come to another of Mr. A. H. Haig's cool and crystallised bits of architectural colouring in the "Chateau Chinon, Touraine" (251), a work of Late Gothic character in detail, while the view of "Ponte del Paradiso, Venice" (254), by Alexandre Roussoffe, is feelingly painted in the details and figures, and the colour rich and pearly. Another architectural piece strikes us in 267, "Last Leaves, Lichfield," in which the artist, Mr. Harry Goodwin, has given a pretty glimpse of the cathedral between the trees of the Close, a purple tone pervading the picture. In works of an imaginary kind, the Dudley Gallery cannot be said to excel its former exhibitions, though few will be found not to admire Miss Kate Carr Hastings' very pleasing study, "Hawthorn"—a fair-haired maiden, in hat, suffused with light, surrounded by a rich background of May-blossom. The subject, of course, is poetically conceived, both in design and colour, and the artist has been happy in expressing the starry flower with opaline brilliancy. A clever bit of stone painting is seen in Mr. W. Paris's sketch in the "Abbey Mont St. Michel, Normandy" (282); and the visitor will not fail to appreciate the pathos expressed in Mr. Kempe's "Ballet Girl's Home" (299); a poor girl, half-undressed, who has fallen asleep upon the bed she has thrown herself upon. Under the sensational title of "Nihilists" (311), Mr. J. W. Bottomley gives us, with his accustomed fidelity, a troupe of mischievous pups, engaged in pulling off a table-cloth. The smashed crockery on the floor is the result of their freak. Miss Kate Greenaway has a frame of five tableaux, representing "Springtime" (333); the figures are decoratively treated and exhibit different occupations. The work has promise. Mrs. Sparke's "Orpheus and Eurydice" can hardly be said to take its place among the more ambitious works of the imaginative school; it is, nevertheless, forcible and dramatically conceived. We have already noticed two works by Mr. Arthur Severn; his "Moonlight on the Sea" (385), and Mr. W. Severn's view of "Sark Needles" (425), well maintain these artists' power as painters of sea-effects. The rolling waves lit up by the moon are, in the first piece, handled with masterly skill, and the bluish-green tone of the picture is true to nature, while the rocks of syenite in the latter are equally good. We pass a pretty drawing of Sunflowers, by L. Colvile (384), and a highly-finished drawing by Cesare Maccari (413), entitled, "A Flower on the Tomb of Raphael—Pantheon, Rome." The last is simply a view in the Pantheon, showing a richly-attired lady taking a little boy to the tomb of the great master. The drawing shows care and elaboration. "The Phantom Ship," by W. H. Overend (441), a blue mystic effect, in which the artist, to judge from the granulated appearance of the colouring, has freely used the sponge to attain the indistinctness of his images. A few other works of merit are Nos. 322, a finely-treated subject, by E. Roesler Franz; Mr. Wray's "Le Clocher du Village" (359), "A Street in Malmesbury," by F. A. Eastwood.

The sketches of children's portraits, by J. C. Moore, are clever; the faces are bright and expressive, and the colouring cheerful.

The screens are, as usual, filled with pictures and sketches, some of them of cabinet beauty and detail. Mr. Walter Crane exhibits two decorative subjects. His drawing, "With Pipe and Flute" (555), two

maidens seated in a pastoral landscape, is too naturalistic in treatment, though the idea is metaphorical. The other piece, in allusion to the line,

"I saw young Love make trial of his bow,"

is surely out of drawing in the arm of Cupid. We must bestow a word of commendation on Miss Fowler's view of the "High Street, Southampton." It is accurate in drawing and colour. No. 630 is a pleasing sketch of "Friday-street, Henley-on-Thames," by Walter Field. As a study of still life, Mr. B. W. Spiers gives us one of his clever heterogeneous groups of old books and manuscripts in 643; Miss Kate Greenaway, with undoubted humour, draws a little girl, dressed in red pelisse trimmed with fur, peering with a knowing look from beneath an old-fashioned bonnet, of the style of our grandmothers. Suspended at her side is a large school-bag, and in her hand a quaint gingham of the old style. Nos. 657, 548, 570, and 578 are all studies of interest, especially Miss Mary Eley's (607) nicely-drawn, expressive face in a mob-cap.

WOODWORKING MACHINERY.*

THERE are few branches of engineering that have made such rapid progress in this country, no less than in America, as wood-working machinery. It constitutes, in itself, a large and increasing industry, and its history furnishes us with one of the best records of national progress. As artists, we may affect to underrate the importance of mechanical over manual labour in the production of artistic joinery; but, taking the wider view of the political economist, we cannot lose sight of the advantages the economical conversion of timber affords. Mr. M. Powis Bale, C.E., M.I.M.E., has just written an interesting account of the rise, progress, and construction, of wood-working machinery, illustrated with examples of recent designs by English, French, and American engineers. The book forms a bulky octavo volume, well-printed and got-up, and will be found an historically interesting, as well as practically-suggestive, work to the engineer, manufacturer, and student. In the earlier chapters of the volume, Mr. Bale enters at some length into an account of the beginnings of inventors in this field; the names of leading pioneers are recorded, while, in the subsequent chapters, the reader's attention is confined to technical details. It is instructive to notice that a large number of recent patents for machinery differ very little in principle from those taken out nearly a century ago by Sir Samuel Bentham, who was a remarkable genius in his day, and foremost among the pioneers of this branch of engineering. We are told that, in his specifications dated 1791 and 1793, "the principles involved in many of the most important machines at present in use are claimed, and set forth in the clearest manner." Among the inventions were planing-machines, with rotary cutters, veneer-cutting, moulding, bevel-sawing, tenon-cutting machines, and many kinds of rotary and boring tools. The first saw-mill in England is said to be one erected by a Dutchman, near London, about 1663, but was the occasion of so much riot that it was abandoned. Another, erected by one James Stansfield, in 1768, was torn to pieces by the mob—incidents that are sufficient to show us that the simplest attempts to economise labour were regarded with prejudice. It appears that one of the earliest records of the use of the circular saw is a specification of Samuel Miller, of Southampton, granted in 1777, in which he claims "an entirely new machine for more expeditiously sawing all kinds of wood, stone, and ivory." The motive power was a horizontal windmill. Miller also claimed an arrangement for bringing the timber up to the saws when in motion—the germ of the rack saw-bench. Brunel, the engineer, Sayner and Greenwood, and others, early in this century, took out patents for improvements in sawing machines. The author transcribes a description of Brunel's patent, to show how he proposed to cut logs, which is interesting in many particulars; but we pass on to later inventions, in which American ideas largely prevail. In the International Exhibition of 1851, a Cincinnati firm, Fay and Co., were the chief exhibitors. Furness, of Liverpool, and Worssam, of London, are names intimately connected with improvements in wood-cutting machinery. In 1865, Mr. Samuel Worssam patented an improved self-acting saw-bench, consisting chiefly in the use of movable feed-rollers, for moving the timber, and returning it when a plank had been sawn through. The author insists upon the importance of care in designing wood-working machines, that the members of the machine and its weight of iron should be duly proportioned to the work it has to do. He says—"If this were more generally borne in mind, we should not, I think, see so many abortions, turned out by so-called engineers, which has taken from English machinery, more or less, the high character it once held, and has in several classes of industry proved a boon to our American rivals." Sir Joseph Whitworth's machine tools are specially commended for excellence of design and proportion. Several illustrations of circular-saw benches are furnished, among which are Messrs. Powis, Western and Co.'s plain circular-saw bench, a good example of "box framing"; Mr. J. Casson's "continuous-feed saw-bench," made by J. M. McDowall and Sons, Glasgow, by which the wood is fed to the saw continuously, without reversing the machinery, which is well spoken of by the author. Mr. Worssam introduced a patent feed for deals and battens, and the author describes a similar plan applied by himself to benches driven by hand, consisting of a grooved roller, whose periphery works partly in an opening in the table, to insure a rest for the timber. Some useful suggestions are made by Mr. Bale on the adaptation of saw-benches to different kinds of work, but which it would be impossible for us to advert to here. The improvements introduced by Messrs. Ransome and Co. are noticed; also the rack-feed saw bench of Messrs. C. Powis and Co., well adapted for the heavier kinds of circular sawing. The timber in the latter case is placed and made to travel on an iron travelling-bed, divided longitudinally by the saw. An engraving is given of Messrs. Powis's machine. The table can be made to travel at from 12ft. to 40ft. per minute. The author recommends those about to purchase a saw-bench to have the saw-spindle made of Bessemer or other steel, of not too hard a texture; or if iron, the best; to have the bearings of best gun-metal, or, better still, of phosphor-bronze, a metal well spoken of for bearings; and not to be tempted by a low price. For saw-benches cutting 12in. deep, self-acting feed gear is recommended, as the labour of pushing the timber is great. Timber and deal frames are treated of in two or three chapters, and the patented improvements of Mr. S. Worssam, Messrs. Powis, James and Co., W. B. Haigh, Robinson and Smith, A. Ransome and Co., &c., are referred to. Most of these improvements relate to builders' work, feeds, the motion of the saws, arrangements for carrying the tree, and adjusting it to the saw. A good engraving is given of Messrs. S. Worssam and Co.'s "combined timber and deal frames" for timber of moderate size. The timber in this case is brought up and advanced to the saws by serrated rollers. Over the timber or tree are rollers, acted on by weighted levers, which keep the timber in place on the feed-rollers, and the timber is supported on travelling carriages at each end. The frame carries several vertical saws, which have a reciprocating motion given to to it by a crank-shaft. It would be impossible in our limited space to refer to the various modifications of saw-frames of this description used for different kinds of work; for general log-sawing the vertical saw-frame, with a roller-feed motion, is desirable; for crooked timber the "rack-feed" is necessary; for cutting thin boards out of valuable woods a single-bladed frame, either vertical or horizontal, is recommended. An improved horizontal single-blade timber-frame, by Messrs. Worssam and Co., is engraved, which is specially adapted for the latter purpose, and where thin boards are required. In all high-speed frames it is necessary to have strong standards well framed and supported, so as to diminish vibration. Planing and moulding are the next operations is order of time; and the author devotes several chapters to machines for this purpose; they are the most important for architectural reasons. Both these operations are sometimes combined in one machine. Bentham was one of the earliest inventors in this field, after which numerous improvements were introduced by Burnett, Paxton, Muir, Bevans, and others. As in other directions, the United States have been foremost in improvements, the Woodworth and Daniels' machines being the models chiefly followed. Proceeding to describe later inventions, the modifications of Mr. H. Wilson and Mr. Whitney are pointed out. In 1868 Mr. S. Worssam patented improvements in "trying up" and "squaring up" machines, by which they could be applied to work three sides of the timber in one operation. It would be useless to attempt to describe without diagrams some of these modifications, which are detailed at considerable length in Mr. Bale's treatise. One "combined hand and power feed surface planing machine" is illustrated in this section. It is the invention of J. A. Fay and Co., of Cincinnati, U.S.A., and consists of three separate tables, with an adjustment to suit different thicknesses of timber. This machine will plane long or short stuff up to 24in. wide from ⅛in. in thickness; it will make glue joints, bevel, chamfer, &c. A useful little surface-planing machine is made by Robinson and Sons, of Rochdale. The author next discusses the features of these machines; he says truly one very necessary element is a reliable arrangement for feeding the timber through the machine steadily and at a proper speed, as the quality of the work turned out depends mainly on this. For large machines the table should be a fixture and the cutter-block rise or fall to suit varying thicknesses of stuff, and the spindles of the latter should be of steel. A planing-machine (of Messrs. Ransome's) is shown, designed for heavy work. One feature is that the framing is cast in one piece, which affords stability; while the wood is prevented slipping by top-rollers and by lever and weights, which act on the entire-beam under operation. The machine can plane, groove, tongue and edge at the rate of 70ft. per minute. The moulding and planing machine of Mr. H. Wilson is another very ingenious contrivance, and exceedingly complete in its details and appliances. Another wood-cut is given, representing Mr. Leonard Chapman's patent thin-stuff planing machine (made by Johnstone, Hewetson, Wilson and Co., London); it can plane and edge the thinnest wood for boxes, blind-laths, &c., or wood from 1-16th to 1½in. thick up to 3¼in. broad at the rate of 100ft. per minute, and it planes at the great speed of 250ft. per minute. It is a small machine, and its work is said to surpass handwork.

* Woodworking Machinery: its Rise, Progress, and Construction; Hints on Management of Saw-Mills, &c. By M. Powis Bale, C.E., M. Inst. M.E. London: Crosby Lockwood and Co.

The planing-machine of Johnston, Hewetson, and Co. (Walworth-road) is useful for many purposes of builders' work. It is one of the "trying-up" kind, so necessary to take the timber out of "winding" for joiners' work. In this class of machine, instead of the timber being forced through on rollers it is cramped on to a long cast-iron travelling-table, which travels backwards and forwards under the cutters. In ornamental joinery and church work, in which it is necessary to mould and shape circular or irregular forms, or for circular cornice mouldings, chair and sofa frames, a different class of machine is employed, of particularly ingenious construction, and we find an illustration of one patented by Western and Co., of Lambeth; it is called a "single-spindle irregular moulding machine," and its chief advantage is that it allows the workman, by reversing the cutter-spindle, to cut with the grain of the wood, whilst using one spindle only. It is impossible to give the reader an idea of the many clever inventions known as "Band and Fret-Saw Machines." These, as our readers know, who have ever visited the workshops of Messrs. Cubitt, Mr. Lascelles, or other large employers of mechanical aids, are saws made of thin bands of metal, which work over pulleys, and can be employed for furniture, cutting fret and ornamental patterns in metal, wood, ivory, paper, leather, and other materials. William Newberry, who took out a patent in 1808, for a saw made as an endless band or ribbon of steel, strung over two wheels, is said to have been its inventor. Various improvements followed, many of which are detailed. The tempering of the saws, to enable them to stand tension and sudden strains, their mounting and feeding arrangements, have been been subjects of numerous patents. Zimmermann and others introduced methods for swivelling the saw, and for canting them at different angles; and Knowling made several improvements in canting the saw for cutting at an angle in his patent machine, which is illustrated. In the older appliances only the table carrying the wood could be canted; but this led to difficulty in keeping the timber in its place. Messrs. Fay and Co., Messrs. Western, Messrs. Périn and Co., of Paris, have also done much towards the perfecting the band-saw, and the author furnishes many useful hints as regards their construction. Steam morticing and boring-machines are described. These are constructed either with the reciprocating chisel or a rotary motion; the former are chiefly used in England. Its invention is ascribed to Bentham. An engraving of Richard's patent steam mortising-machine is given, which contains many novelties; and many recent machines are of this type. In making oblique mortises the table can be set to any angle, and the chisel is speeded to make 600 strokes per minute.

Our limited space will not allow us to enter into the chapters on tenoning-machines and "general joiners," of which latter class of combination machines a few good examples, manufactured by Worssam and Co., are illustrated. Another chapter is devoted to dove-tailing machines, and Armstrong's, one of the most complete, is engraved. It is manufactured by Messrs. Robinson and Sons, of Rochdale. The operation of dovetailing has been made the subject of considerable ingenuity. The chapters on veneer-cutting machines, wheel and carriage machinery, and machinery for miscellaneous purposes, machine foundations, shafting and gearing, and the details, rules, and tables given at the end of the volume, will be found of much value to those engaged in the conversion of timber, and to builders and others; and the full index at the end renders the work of Mr. Bale the most comprehensive compendium of woodworking machinery we have seen. The author is a thorough master of his subject.

INSTITUTE OF BRITISH ARCHITECTS.

THE ordinary meeting was held at the rooms of the Institute, Conduit-street, on Monday evening; Mr. John Whichcord, F.S.A., the president, in the chair. The Secretary (Mr. White) read the minutes of the previous meeting, which were confirmed.

A second donation to the Premises Improvement Fund from Mr. Edward Gruning was announced by the Secretary.

The notice given by Mr. Porter at the last meeting, in reference to the appointment of a committee to consider the question of architectural competitions, was read by the Secretary in the terms already published. The question will be discussed at the next business meeting, on the 8th March.

On a ballot being taken the following gentlemen were elected members:—As Fellows: Edward William Stephens, Week-street, Maidstone. As Associates: Arthur Cawston, 11, Clement's-lane, E.C.; William George Cooke, 1, Coverdale-road, Shepherd's Bush, W.; John Edward Knight Cutts, Bedford Chambers, 28, Southampton-street, Strand, W.C.; Percivall Currey, 37, Norfolk-street, Strand, W.C. As Honorary Associate: William Simpson, F.R.G.S., 64, Lincoln's Inn-fields, W.C.

PORTLAND CEMENT.

A paper on this subject was read by Mr. Henry Faija, Assoc. M. Inst. C.E., which will be found on the next page. On the conclusion of the paper, Mr. Faija said he had made one assertion in it, but had not proved it, to the effect that the amount of water used in gauging the cement materially affected the results. Since writing the paper he had proved by experiment that the less water used the greater the strength attained.

DISCUSSION.

Professor KENNEDY, in response to the call of the President, said Mr. Faija had read a paper interesting as much to himself, as an engineer, as to the Institute of Architects. Mr. Faija had brought forward many points of considerable importance which were often neglected. The results which Mr. Faija had arrived at as to the non-cementing material which passed through small meshes had taken him by surprise, for he (Mr. Kennedy) had experimented with a couple of pounds of fairly quick-setting cement, and the residuum left behind the meshes did not set in twenty-four hours. Bauschinger, of Munich, had made experiments in the same direction, and found that of the cement left behind the sieve some of it would not stand at all, whilst some of it stood 80lb. to the square inch, or 1-5th only of the strength of the cement originally experimented on. He (Mr. Kennedy) could not see any reason for making a briquette so small as Mr. Faija had used, and thought that large briquettes were preferable, because the smaller the briquette the more its resistance depended on the skill of the man or machine which gauged it, and the less correct was the result in practice. He knew of some remarkable discrepancies—as much as 50 per cent.—between the results obtained from the same cement by the gauging of two persons, each using a different size of briquette. Therefore that showed that the larger a briquette the less the result depended on the skill of the gauger. He preferred a briquette of 2¼in. square, so that the axis of the briquette was in the line of the pull. The results in that way were very satisfactory. He was rather disappointed that Mr. Faija had not translated into English the results of the experiments completed some twelve months ago by Bauschinger, who had obtained about 15,000 determinations on all the matters mentioned by Mr. Faija, and many more relating to the shearing, and crushing strength, the bending resistance, tensile strength, specific gravity, chemical constitution, absorption of water, increase of volume in drying, and numerous other matters. Bauschinger's work was extremely complete, but unfortunately, the results were not given in English units. It was customary to test cement in tension, but he did not know why; seeing that in practice the greatest care was taken not to submit cement to that test. The compressive resistance of cement was assumed to be ten times that of the tensile strength; but experiments had shown it to be more, from 7 to 13 times greater than the tenacity. Bauschinger had proved that the crushing resistance increased in the same time more quickly than the tenacity. The shear resistance of new cement he (Mr. Kennedy) had proved to be 25 per cent. greater than the tenacity, and that it increased, as the tenacity increased, with time. The bending resistance had been proved by more recent experiments of Mr. Willis, and it was shown that cement would bear a deflection of 1-100th part of an inch on a prism 6¼in. long by 1¼in. square, before it would break. On the Continent the method of drying was with air; but it had been proved that samples which had been under water for a long time had a greater tenacity than those which had been the same time submitted to air; but when the cement was mixed with sand, the drying in air or under water made but little difference. It might be interesting to know the effect of moulding cement under pressure. It was mostly used in that way; and he had found by experiment that the resistance under pressure increased 1·85. The question whether cement was injured by keeping it in bulk—in a shop, for instance—had been tested by Bauschinger, with results somewhat contrary to the received opinion. Bauschinger had tested 1,500 briquettes kept in a dry place for three months and a-half, when the average strength appeared to be only 4 or 5 per cent. less than it was originally. With regard to the specification which Mr. Faija had suggested, it was very desirable, no doubt, to have an accurate specification; but he thought it would be impossible to get people to use such intricate clauses as Mr. Faija had recommended; but he thought the difficulty might be overcome in another way, and he would suggest that if the Institute of Civil Engineers, together with the Institute of British Architects, could agree upon some standard method of testing, then that method might be simply referred to in all contracts as "the Institute standard," so that the method of testing would become well understood and generally known. In case the suggestion should be acted upon, he would advise further that the size of the briquettes should be increased rather than diminished, and secondly, that the compressive resistance should be made the chief test, if, indeed, it did not supersede all others.

Professor KERR had listened with great interest to what had been said by Mr. Kennedy, and thought that the simple test proposed by him would be very serviceable. He thought it was very difficult to determine the tensile strength of cement, but the compressive and crushing tests were simple, and would answer all the purposes of the architect. Bauschinger's results, no doubt, were very interesting, but the test required by architects was a simple one. He was glad to find that Mr. Faija had referred to the subject of the quantity of water required to make a good cement, and that he had come to the conclusion that, the less water used the greater would be the strength of the cement. The reason was plain, because, in course of time, the water evaporated and left a vacuum behind. Therefore it was clear that the more water that was used the more porous would be the cement. That principle, he thought, was very well known. The inventor of artificial stone used an extremely small quantity of water—so much so, that it was almost impossible to discover any water when the *powder* was ready to be converted, under pressure, into artificial stone. One use to which cement was being put was that of making so-called fireproof floors. He thought it would be well if cement was very carefully used in this particular. It was very important that architects should know the exact behaviour of it under those circumstances; for if used thus, and the cement should come to grief, everybody would regret it; but that was only one of the many points of interest connected with the subject.

Mr. HENRY SHARP, of Poole (in a paper read by the secretary), stated that he had used Portland cement for a very long time, and had paid great attention to the subject of testing it, chiefly as to its tensile strength when 28 days old. He described his method of gauging it, in the proportion of one of cement to three of clean, sharp sand. He noticed that the German manufacturers of cement guaranteed a strain of 284lb. to the square inch in 28 days, the gauging being about the same as his own; and he added that at his works he obtained better results, and was not satisfied with the less strain than 350lb. at

28 days old. The only objection he could see to adopting the tensile strain as a standard was that the manufacturers might object to it; nevertheless, he thought such a recognised system of testing would be found beneficial.

Mr. GRAWITZ (Germany), remarking on the point mentioned by Mr. Faija in regard to the testing required by the Metropolitan Board of Works, said that the test with neat cement was hardly ever used in Germany. The briquettes in that country were made in the proportion of one of cement to three of sand, and there were official rules laid down, and generally acknowledged. At the Royal Academy in Berlin a department had been established for testing building materials, that department being used extensively by cement-makers and cement users, a system which worked very well. He went on to make some comparisons between the English and German tests, and expressed his surprise that Mr. Faija had not mentioned that the Metropolitan Board of Works had introduced the German system since October or November last. The test of the Metropolitan Board required a briquette to be made with one of cement and three of sand, mixed with 10 per cent. of water by weight, using the standard sand produce by sifting quartz sand through sieves of 900 meshes and 400 meshes. The academy in Berlin used a dry sand sifted through sieves equal to 744 English meshes and 287 English meshes. The Metropolitan Board of Works dried their briquettes for two days in air and then placed them 26 days in water; whilst at the Berlin Academy the practice was to let them remain one day in air and 27 days in water, so that there was no material difference between the two systems. Mr. Faija had referred to seasoning or cooling the cement, but the best cement made in Germany was the slow-setting cement which did not require any seasoning or cooling at all, but, on the contrary, might be used direct from the mill when it was quite hot; and, in fact, a slow-setting cement requiring cooling and seasoning, would not be considered in Germany a good cement at all; whilst a quick-setting cement could not be expected to have great strength. As to the residuum which Mr. Faija provided for in his specification of 15 per cent., he observed that good German cement would not leave more than two per cent. when sifted through a similar sieve to that which Mr. Faija had proposed, of 2,500 meshes to the square inch. Mr. Faija's proposed tensile test was practically too high a standard for the manufacturers to comply with it, unless they were paid for the over-strength; and if a maker supplied a cement stronger than was required the users would be able to mix much more sand with it. He thought it was a pity that an official test-department did not exist in this country, as it would be of use both to the makers and users of cement.

Professor LEWIS moved a vote of thanks to Mr. Faija for his paper, and to Professor Kennedy and to Mr. Grawitz for their observations. It had occurred to him that the tensile strain was of comparatively little use to architects, who required, generally, to know the crushing-force and resistance which cement would give in the case of settlement. With regard to the crushing-force in the case of settlement, one of two things must occur:—Either the cement must give way owing to the shearing force, or else it must have a slight degree of elasticity to allow of the settlement without breaking the cement. Professor Kennedy's experiments were satisfactory, and supplied a want much felt. Mr. Kennedy had investigated the difference of strength between the briquettes when the cement was poured into them, and when they were subject to the crushing-force in ordinary cases. To take the strength of a cement without pressure was to take it in a way in which it was never used in building; and, so far, Professor Kennedy was entitled to the thanks of the Institute. Professor Lewis then went on to say that he had for the past nine years been making microscopical observations on the way in which cement, and limes of all kinds, set; because the old theory about the setting of lime and water in cement was being gradually exploded, and had, as yet, not been fairly investigated. He hoped, at a future time, to throw his results into the form of a paper. He had made some experiments on cement supplied for a building in North Wales, and had used a microscope with a power of about 110 diameters. The grey cement resolved itself under the microscope into very minute brownish-white spots, lying upon a sort of substratum or black vitrified mass. He was puzzled to know what the vitrified mass was, and, though he sifted it through a sieve of 14,400 to the square inch, the appearance was the same as before. He was at last enabled to separate the black substratum from the white specs by washing the cement and pouring off the upper part of the liquid several times, which at last gave him the residuum nearly black. He had not, however, had time to get these black specimens analysed, but he hoped to do so, and to give the results hereafter.

The PRESIDENT thanked Professor Kennedy for the practical suggestions he had made, believing that they would be of very great utility, as a standard test was very desirable, and he quite agreed that the elaborate specification drawn up by Mr. Faija would be impracticable in most of the works which architects were engaged to superintend.

Mr. FAIJA briefly replied to some of the points which had been mentioned, and was glad to hear that Professor Kennedy agreed with him as to the non-setting power of the core. He did not think the particular test to be applied to cement was of the slightest consequence, as long as the one test was known to bear some comparison with the other; for the matter resolved itself into the question which was the easiest test, and it was on that ground that he had proposed the tensile test as being the easiest to comply with, without recourse to the very delicate instruments required for the other tests. He quite agreed with the suggestion made by Professor Kennedy, that there should be a recognised body for carrying out these tests, to whom all disputes in reference to building materials should be referred. He had made some microscopical observations on cement, but had only been able to discover from them the one fact that he had mentioned as to the non-setting power of the core.

The meeting was then adjourned to the 8th March, when a special general meeting of the members will be held.

PORTLAND CEMENT.*

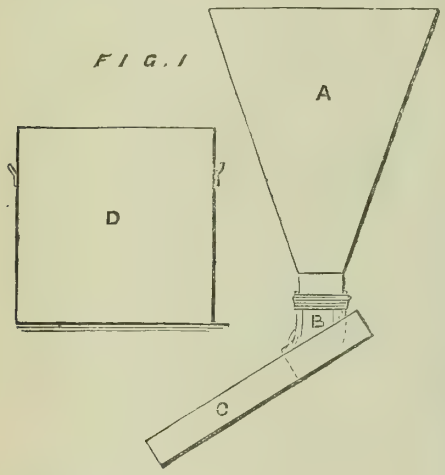
By HENRY FAIJA, Assoc. M. Inst. C.E.

I BELIEVE it is some forty years since Professor Donaldson made some very interesting and exhaustive experiments with Roman cement and with the septaria from which that cement is made. Roman cement was then employed in almost every building of importance, while what is now known as Portland cement had scarcely emerged from the laboratory and was practically unknown. The introduction of this then new cement, it is needless to say, was met on all sides with great opposition, but its eminently hydraulic properties and great strength eventually asserted themselves, until at the present time Portland cement is synonymous with strength. But, like all manufactures which assume large proportions, there are unfortunately both good and inferior cements to be met with; and as the strength of a concrete or mortar must depend not only on the quality and properties, size and shape of its aggregates, and the means employed for their amalgamation, but also on the strength and quality of the cement, I propose in this paper to speak solely of the primary source of strength, viz., the cement. The recognised tests for Portland cement, are its weight per striked bushel; the fineness to which it is ground; its colour, and its tensile strength. With the exception of the tensile strength, which is an absolute test, these tests are really only problematical, for it is evidently possible to obtain a material that, in weight, colour, and fineness, may approximate to the standard required in Portland cement, and yet not be cement. Hence a bad or a damaged cement may possess all these requisite qualities and yet fail in the crucial test of strength. It is also possible, but in a minor degree, to have a cement that is of the required strength, but would yet fail to give the results expected of it, when made into concrete or mortar. From experiments extending over a considerable period, the results of which are given in the accompanying tables, I hope to be able by (1) determining the work which a cement has to do, and (2) by considering separately the properties which it should possess, to attain that object, to arrive at such results as will be of value to both users and manufacturers. Concrete or mortar, being a combination of aggregates which are united into a compact mass by means of the cement, it follows:—that the cement should possess strength; that it should be so finely ground as to thoroughly intermingle with and separate all the aggregates used, thus cementitiously uniting each particle; that it should set fairly quickly, and that it should neither expand nor contract during setting. Without describing the manufacture of cement, which is carried out in various ways according to the nature of the raw materials used, it may be considered, for the purposes of this paper, a combination of carbonate of lime, silica, and alumina in certain proportions. These ingredients are obtained in different localities in various forms. Thus, on the Thames, the white chalk, which is nearly a pure carbonate of lime, is used in combination with Medway mud, which contains the silica and alumina. In many works on the Medway the grey chalk is substituted for the white, and Gault clay is used instead of the Medway mud. At Folkstone and other places on the South coast, similar materials are used. At Harwich, Newcastle-on-Tyne and Stockton-on-Tees, a local blue clay which contains the requisite proportions of silica and alumina is used in combination with chalk, which is imported generally from the Thames. In the North of France—in the neighbourhood of Neufchatel and Devres—a natural cement earth is found, generally at the foot of the chalk hills. This material, which much resembles grey chalk in appearance, contains, in many instances, the exact proportions of lime, silica, and alumina for the production of a high-class cement. At Rugby, in Somersetshire, and other parts of England, the blue lias formation supplies the requisite ingredients, the stone and clay being found in layers of from a few inches to as many feet in thickness, one above the other. At Madras, a cement is made from lime produced from sea-shells, used in combination with a river mud, and I have lately been consulted respecting the manufacture of cement from somewhat similar materials, viz., coral lime and a river mud, found on the opposite side of India. At Rio de Janeiro also similar raw materials are used. In Derbyshire, the immense limestone hills may be made available for conversion into cement, in combination with a tufa which is also found in the locality. In Buckinghamshire, on an estate on which I am at present engaged, there has been found a deposit of a natural cement-earth, which lies immediately under the surface and averages about 10ft. in thickness, lying directly on the Oxford clay; with it is intermingled a considerable quantity of a nodular limestone. It would be needless to enter more fully into the geology of Portland cement manufacture, but it may be taken that wherever carbonate of lime, silica, and alumina, are met with, in a fairly-easy convertible form, there Portland cement can be made. But with each variety of material different means must be employed for attaining the desired end; and to describe the process of manufacture in each case would take up more time than is at our disposal. The process may, however, briefly be divided into three stages, viz.:—the thorough mechanical combination of the raw materials, their calcination, and the reduction of the clinker by grinding to the Portland cement of commerce. From this very cursory glance at the materials from which Portland cement can be made and the mode of manufacture, it will readily be seen that there are many causes which may materially affect the result of the cement produced, viz., the quality of the raw materials themselves, their amalgamation in correct proportions, their perfect mechanical combination, the proper calcination of the combination, the perfect reduction of the clinker to a fine powder, and lastly the careful storage and cooling of the cement before it is used. Of the causes of many of the results which may be met with, it is impossible to more than allude to, but assuming that the raw materials have been well chosen, an imperfect amalgamation of them will probably produce a blowing cement. The use of an undue quantity of lime will produce the same result, combined with slow-setting powers, while the use of too much clay will produce a quick-setting cement, that will contract. Having secured the perfect amalgamation of the raw materials in the proper proportions, similar results may be obtained from imperfect calcination, thus a lightly burned cement will be quick-setting, and an overburned

* Read Feb. 23, before the R.I.B.A.

cement slow. Having regard, therefore, to the number and combination of circumstances which present themselves for consideration, when it is required to divine the causes which produce certain results, I propose to treat solely with the peculiarities and properties which developed themselves during the experiments made with certain samples of cement, and to deduce from these results certain data which may be of service in judging of the quality of a cement for the purposes for which it is required. The quality usually required of cement is in accordance with the standard set out by the Metropolitan Board of Works in the regulations relating to concrete buildings, viz. : That "the Portland cement shall be of the very best quality, ground extremely fine, and weighing not less than 112lb. to the striked bushel, and capable of maintaining a breaking weight of 350lb. per square inch, after being made in a mould and immersed in water during the interval of seven days." It must be admitted that, taken as a specification for cement, this regulation is rather vague, and as in all matters appertaining to the testing of cement great exactness is required, and that a uniform and standard apparatus should if possible be adopte d, I think that the Metropolitan Board of Works have it in their power by somewhat enlarging on this regulation to lead to the abolition of many abuses, and thus tend to the elucidation of many seeming contradietory results.

As the weight per striked bushel of a cement must evidently vary according to the means employed to fill the measure, it is essential that it should always be filled in the same manner. The apparatus which I use, and which I think meets all requirements, is in accordance with the diagram No. 1. A is a circular iron hopper or



funnel perfectly smooth on the inside, into which the cement to be weighed is placed ; at the small end it has a canvas stocking, B, which leads the cement into the zinc shoot C, placed at an angle of 55°, the lower end of the shoot being five inches above the top of the measure. The measure D, placed on a perfectly firm floor, on which there is no vibration, is never in any way touched during the process of filling, nor until after it has been carefully struck with a straight-edge. When filling the measure the stocking may be held in the hand so as to regulate the run of the cement from the funnel. In a paper I read before the Institution of Mechanical Engineers, in Jan. 1875, when referring to the weight of cement, I said : "A light cement is generally a weak one, though it may be of the requisite fineness ; at the same time, a heavy cement if coarsely ground is also weak, and will have no carrying capacity for sand. As the more the clinker is burned the harder and heavier it becomes, and therefore more difficult to grind in the millstones, the heavy cements to be met with are almost invariably coarse ones ; and as an under-burned cement, from its softness, will be ground fine enough, but will be found deficient in weight, so it will be seen that the weight, unless taken in conjunction with the fineness, is no test as to the quality of the cement." This opinion I have found confirmed by subsequent experiments, the results of some of which are given in Table No. I. In each case the cement was weighed, tested as delivered, and also when ground ; so that all would pass through a No. 50 sieve. The tensile strengths given being in each case an average of ten briquettes.

Table No. I.

	Residue per cent. after sifting through sieve having 2,500 meshes per square inch.	Weight per striked bushel.	Tensile strength on section 1in. square.	
			7 days.	28 days.
No 1—			lb.	lb.
Cement as delivered from manufactory	25	114	535	661
Cement ground to all pass sieve 2,500 meshes ..	Nil	104	572	not taken
No. 2—				
Cement as delivered	16	116	509	650
,, ground..	Nil	109	542	675
No. 3.				
Cement as delivered	14	116½	476	662
,, ground..	Nil	112	505	710
No. 4—				
Cement as delivered	33	118½	693	728
,, ground..	Nil	105	666	810

By examining these results, we find, firstly, that by fine grinding the weight per striked bushel is reduced, and secondly, that the tensile strength is increased, both at the expiration of seven and twenty-eight days from the time of gauging. That the weight per bushel should be less, is what would naturally be expected, as it is evident that the finer particles are less dense than the coarse, and also that they fall lighter into the measure. That the fineness to which a cement is ground should affect the tensile strength in so marked a degree, may be accounted for by the fact that the coarse particles in a cement have practically no cementitious property, being little better than so much sand. To prove this the following experiments were made with the core or coarse particles in a cement :— 1. The residue that would not pass through a 625 mesh sieve was gauged with water, and, at the expiration of seven days, was found to be merely held together in a mass similar to so much sand, having a slight admixture of loam. 2. That which passed through the 625 mesh sieve, but would not pass through the 2,500 mesh sieve, was gauged in a similar manner, and at the expiration of the same time was found to be in a similar condition. 3. That which passed through the 2,500 mesh sieve, but would not pass through a 4,900 mesh sieve, being gauged in the same manner, was at the expiration of the same time found to be in a similar condition. These experiments were made with a cement that was perfectly set in 30 minutes after gauging. In each of these cases the pats could be crumbled to pieces between the finger and thumb, and the granulations were the same in size and shape as before the water was put to them, thereby proving that the granulations themselves had no power of setting, but were simply held together by the infinitesimal particles of finely-ground cement from which it was impossible to separate them. It, therefore, seems that the granular portion, or the core of a cement, has really a deleterious effect on its strength, and for all practical purposes may be considered only as so much sand.

Table No. II.

	Sample No. 1.		Sample No. 2.		Sample No. 3.	
	7 Days.	28 Days.	7 Days.	28 Days.	7 Days.	28 Days.
	lb.	lb.	lb.	lb.	lb.	lb.
Cement as delivered from Works.. ..	535	661	509	650	481	650
Ditto all ground to pass No. 50 Sieve ..	572	—	542	675	505	710
Siftings only passed through No. 50 sieve.	547	697	573	668	152	629

Table No. II. gives the results of further experiments made with the same object. It will be seen that in samples Nos. 1 and 2 the cement was actually improved by extracting the core that would not pass the No. 50 sieve ; but sample No. 3, which was a very finely-ground cement, slightly deteriorated ; and it will be further noticed that all three samples were improved by fine grinding. Though in this paper I am not going into the strength of mortars, it would be well to say that the fine grinding would give a more decided advantage in the case of mortars than in neat cement. Many people, even some manufacturers, consider the core to be the backbone of the cement, and to a certain extent they are in the right, but the result of these experiments proves that to be of value it must be ground. It is naturally the hardest burned particles which form the core, those which the mill stones have been unable to grind through their being of a harder nature than the rest of clinker. The core—therefore, as core, is really only so much sand in the cement—when ground acts in most instances beneficially and improves the quality of the cement.

(To be continued.)

SHEARING STRENGTHS OF SOME AMERICAN WOODS.

By John C. Trautwine, C.E.*

NOTWITHSTANDING the common use of wood for pins or treenails, no experiments that I know of, except one or two isolated ones, and they imperfect, have been tried for determing the extent of its reliability for this purpose. With a view to supplying this deficiency in some measure, I have recently tested several of our American woods, in the shape of cylindrical pins ·64 of an inch (or full ⅝ inch) in diameter. I used one of Richlé's well-known and accurate testing machines, in connection with an iron holder, and through a cylindrical hole in which the closely-fitting wooden pin to be tested was placed.

Two specimens of each were tried. Where their difference did not exceed 10 per cent., the mean is given. Greater differences must, of course, be of frequent occurrence, even in good sound specimens. All the specimens were fairly seasoned and without defects. The central pieces sheared off were ⅝ inch long. The single circular area of each pin was ·322 of a square inch, and that of the two areas that were sheared at once ·644 of a square inch ; and since ·644 by 1·55 equals 1 square inch, it follows that if the results in the table be divided by 1·55, the quotient will be the actual double-shearing strength found for each pin of full ⅝ inch diameter.

The following table gives the results in pounds per square inch of total sheared area :—

	Pounds Per Sq. Inch.
Ash	6,280
Beech	5,223
Birch	5,595
Cedar, white	1,372 to 1,519
Cedar, Central American	3,410
Cherry	2,945
Chestnut	1,535
Dogwood	6,510
Ebony	7,750
Gum	5,890
Hemlock	2,750
Hickory	6,045 to 7,285
Locust	7,176
Maple	6,355
Oak, white	4,425
Oak, live	8,480
Pine, white	2,480
Pine, yellow, northern	4,340
Pine, yellow, southern	5,735
Pine, yellow, very resinous	5,053
Poplar	4,418
Spruce	3,255
Walnut, black	4,728
Walnut, common	2,830

NEW BUILDINGS AT KENSINGTON.

TWO buildings at Kensington were visited by the Architectural Association last Saturday : the new Vestry Hall in the High-street, nearly completed, from the designs, and under the superintendence of, Mr. Robert Walker, who won the work in competition, and the other was the fine church of St. Mary Abbott, which also has been lately completed, from the designs of Sir Gilbert Scott, by the addition of the spire.

* From the *Journal* of the Franklin Institute.

Both these buildings have been illustrated and described in the BUILDING NEWS. We shall therefore confine ourselves here to the architectural effect of the buildings since their completion. The Vestry Hall, which has a considerable frontage towards the High-street, is now sufficiently finished externally to enable us to say that its façade quite equals, if not exceeds, the expectation we formed of it from the drawing. The projecting centre, and the engaged three-quarter columns, are something bolder than the ordinary features of this sort we are accustomed to see in buildings executed from competition designs, and the general proportions of pediment and wings are satisfactory. The façade and return side is of Portland stone, of two main stories. The first floor, occupied by the vestry-hall in front, is a lofty story, with a range of wide windows with semicircular heads. These heads are separated from the main opening by a deep transom of masonry, forming an intermediate entablature, while the windows are divided below by small pillars of polished grey granite. The piers form panelled pilasters between the large openings, and short fluted pilasters above, and these carry the main entablature. The pediment over the centre Corinthian columns is enriched by emblematic sculpture, while a clock forms the crowning composition. The general effect of the rusticated basement and the large windows expresses the character and purpose of the building. The front doorway is made a prominent feature, and leads direct to a wide vestibule and hall, which is continued through the building, forming a back entrance. The surveyor's offices are located on the left side of entrance, lighted by front and return windows of large size, while those of the vestry clerk form a similar arrangement on the right-hand side. The private offices and waiting-rooms are conveniently placed in the rear. Lighted from Church-court, is a large committee-room, the ceiling of which is ornamented by panels and enrichments. A well-lighted and ventilated lavatory is placed near the back entrance. We find the main staircase of stone forms a central hall, which can be approached from the two entrances we have named, and a third side-entrance in Church-passage. The staircase is oblong in plan, and is lighted by a lantern and surrounded by pilasters, the doorways opening upon it having pedimented heads. The doors of the principal apartments are all of oak, and the workmanship excellent. From the main landing, we enter the great hall, a well-proportioned room, 92ft. by 45ft. 6in. by 32ft. high, well-lighted from the front and side by the large circular-headed windows we have described, while at the back, a series of lunettes over the rear offices are obtained. It has coupled pilasters between the piers; a bold cove, with ornamental trusses, and a flat ceiling, relieved by panels, and with borders of carton-pierre. Over the committee-room below is a board-room, finished with an ornamental panelled ceiling, and columns at the ends, and between by room and the vestry-hall is an ante-room. There is a large basement, with kitchen and offices, and the whole building is heated by hot-water pipes. Messrs. Braid and Co. are the contractors, and the contract sum, was, we believe, £30,000.

The new spire of the church of St. Mary Abbott is an imposing addition to the old structure, and groups pleasingly with the chancel end of the church. The design is one of the late Sir Gilbert Scott's, and has been carried out by Mr. John O. Scott. It is, in general composition, like the spire of Salisbury Cathedral, which, apparently, furnished the model. The clustered base, with its upper and inner tier of pinnacles, admirably breaks the transition from tower to spire, and the outline is massive and bold. The upper pinnacles die against the sides of the spire, and bands of carved lozenge-work are introduced. We notice a perceptible curvature or entasis has been given to the spire, which we believe, Sir Gilbert Scott always adopted in his later churches. Comparing this spire with one of his earliest, that of St. Giles, Camberwell, we observe a decided superiority in this respect in the later work; the pinnacles are set closer to the spire, and the outline is more satisfactory. The church has been described before in this journal. Its lofty arcaded nave, covered with a wooden vault, relieved by ribs, is a fine example of Scott's later work in the Decorated style; the chancel has a well-designed reredos, enriched with mosaic, a fine marble altar upon pillars, and there is a large fresco painting on the north side of sacrarium, by Clayton and Bell. A fine brass lectern stands in the chancel. Externally, the most striking feature of the buildings is the fine western front, with its lofty triplet of Geometrical windows, over a richly-carved western doorway. The bold carving to the arch and jambs of this entrance, and to the flowers in the hollows of the jamb-mouldings in the windows above, still look sharp. We are informed by the clerk of works that the stone used was Bath stone, the Box-ground variety, which has weathered remarkably well in this instance, due, no doubt, to careful selection and laying.

THE ACOUSTICS OF PUBLIC BUILDINGS.*

By T. L. WATSON.

(*Concluded from p.* 235.)

ANOTHER point is the treatment of the platform, or pulpit, end of the building. Everything is gained by reducing both height and width. Where the body of air round a speaker is restricted, it is found that the waves of sound have a proportionately greater force. The principle is well illustrated by the speaking-trumpet, where the sound, generated in a very confined space, is carried to a great distance in the open air. In Episcopal churches with chancels, it is commonly found that the clergyman is better heard from the altar than from the pulpit, although he is then further from the congregation. One word may be said about galleries. They should not be very deep if the space below them is to be part of the area, as the sound penetrates with difficulty a confined portion of a building, such as we have under a deep gallery. An end gallery has the advantage of making echo unlikely. To produce an echo, we require a plain surface, on which raps of sound strike simultaneously. If we cause them to strike obliquely, instead of perpendicularly, the echo is rendered impossible, and it is frequently found that if we remove the speaking point in a room from one of the sides to a corner, an echo is destroyed.

In the case of halls that are used for several purposes, we have no choice but to make our floor level, or nearly so. Wherever it can be done, however, the seats should rise as they recede from the platform, and they should rise not in a straight line, but following the curve first illustrated by Mr. Scott Russell, and called by him the isacoustic, or equally-hearing curve. The seats are here set out on the simple principle that each member of the audience is entitled to a direct line of sight and sound from the speaker. The principle is briefly this:—A line is drawn from the speaker to a point which represents the top of the head of one of the audience. From this point is set up a certain height to be fixed by circumstrnces, and called the face-room. Another line is now drawn from the speaker through the second point and produced to the next row of seats, where the process is repeated. Mr. Russell recommends a height of 18in. for face-room, but this seems to be unnecessary. 6 or 7in. is quite enough in most cases, and even less than this may be sufficient. In churches, I have commonly given about 6in., and, with the floor of pulpit about 3ft. 6in. or 4ft. high, this will raise the floor at the back of the church only about 18in. In a very long church I found that it raised it rather less than 2ft. Regarding the amount of face-room, it may be pointed out that a person in an audience is usually able to avoid the head of the person immediately in front of him, so that if we give a height sufficient to enable a person to see over the head of one who sits two seats in front of him, we shall do very well. In spite of the value of reflected sound, we must remember that the most important thing is to give unobstructed direct sound, and the merit of the isacoustic curve is that this is distributed equally over the audience. It has also the great advantage of allowing us to make the platform very much lower than would be otherwise possible.

I have now sketched out a few of the considerations that must chiefly regulate the form of the building. I cannot altogether pass over the question of the material with which we have to finish the internal walls, but I shall dismiss it in as few words as possible. The three principles on which we may proceed are well indicated in a letter by Lieut.-Col. Scott, in a letter to the *Times*, at the time of the opening of the Albert Hall. He says: "In considering the mode in which the interior walls of the Hall should be finished, three courses were open to me, each one of which has advocates whose opinions on such a subject merited attention. The first course was to discard resonant materials as much as possible. Those who think that this is the right course argue that, after the sound has reached the ear, the sooner it is absorbed the better, and that any degree of resonance from the walls of the building is detrimental to musical effects. A second course was to finish the walls with hard well-polished plaster, and to lay the floors with tiles. This is the opinion of one of the most distinguished organ-builders of the day. A third course was to line the walls with a resonant material, and I decided on the plan of using wood, for the following reasons: 1. The buildings most remarkable for their acoustic properties have been all so finished. The celebrated theatre of Parma, Her Majesty's theatre in the Haymarket, which was destroyed by fire, the Surrey Music-hall, which shared a similar fate, and the theatre of the Royal Institution, were all lined with wood. 2. It is a generally received opinion that a room sufficiently non-resonant for speaking, is too dead for musical purposes, and that the resonance derived from wood is more beautiful than that obtained from other materials. 3. The correction of undue sonority by draping is a simple matter, but it would have been costly to have imparted resonance to a building deficient in this respect."

It cannot be doubted that, on the whole, the best of the three courses was the one adopted. There is a very great support yielded to a speaker or to music by the sympathetic vibration of the woodwork of a room. Where sonorous waves are very small, we hear the total of the vibration as one sound. The effect of wood lining in reducing echo has not, I believe, been pointed out, but there can be no doubt that it has such an effect, and it will not be difficult to understand why it is so. Only a portion of the sound is produced at the speaking point. The reinforcement takes place all over the room, and therefore there can be no sudden contact of waves at any of the plain surfaces of a room. It is significant that of the four buildings referred to, two had been destroyed by fire. It will be interesting to see further on whether we can produce the desired result by other means.

I desire now to glance for a few moments at the remedies that may be applied to defective buildings. These may be divided into three classes. (1) Those which dull or deaden the reflecting surfaces; (2) Those which break up and dissipate the condensed waves of sound on walls, floor, or ceiling, and (3) Those which act by reinforcing the original sound. A number of diagrams were exhibited here of buildings that had proved defective in point of acoustics, and the remedies proposed for them. These were taken from the Intercommunication column of the BUILDING NEWS for the last twelve years, and Mr. Watson read the questions and answers elicited. He then pointed out the resemblances and differences in the cases, reviewed the remedies that had been suggested, and described the means he would have recommended. He then proceeded to say:—I have not yet referred to the third class of remedies for acoustic defects, those which act by reinforcing the original sound, and I shall close by a few words about them. If we introduce a quantity of woodwork into a building, it would fall within this class, but this can seldom be done to any great extent after the building has been completed.

Acoustic vases were regularly employed by the Greeks and Romans in certain of their large buildings which were not constructed of resonant material. Vitruvius states in the clearest way, that because the theatres in Rome were usually constructed of wood, vessels to reinforce the sound were not needed in them. In the stone buildings resonant vases were introduced, and put in niches provided for them. They were usually, but not always, of bronze, and were placed in cavities or niches under the seats of the theatre, their forms and sizes being graduated, so that they would respond to a series of notes. Vitruvius states that, in a theatre of moderate size, 13 cavities should run

* Read by the author before the Architectural section of the Philosophical Society of Glasgow.

round at half the height, but he adds "If the theatre be on a larger scale, the height is to be divided into four parts, a zone of three ranges of cavities may be provided, one for harmonic, the second for chromatic, and the third for diatonic cases." The peculiarity of such resonators is that each responds to a particular note, or to its harmonics. When, therefore, there was a sufficient number of them in the building, every note that was uttered would be responded to by one or more of the vases, and thus strongly reinforced. By this means the actors were able to make themselves heard by an immense audience, and that in a stone building.

It is not, perhaps, so generally known, that acoustic jars were occasionally, perhaps frequently, employed in the buildings of the Middle Ages, and have been discovered sometimes under the choir stalls, and sometimes built into the masonry of the chancel walls. They have been found at Fountains Abbey, at the Church of St. Peter's, Norwich, at St. Mary's Church, Youghal, Ireland, and at several places on the Continent. At the Church of St. Clements, Sandwich, three such earthenware pots were discovered high up under the plaster of chancel roof.

I am not aware that acoustic vases have ever been used in recent times. We have, however, what I believe to be a modern substitute for them. I hope that I shall not be thought rash if I offer for your consideration a very simple explanation of a well-known phenomena, for which, I believe, no plausible, or even possible, reason has yet been advanced. I refer to the employment of strained wires in buildings to prevent echo. Mr. Gilbert R. Redgrave gives the usual explanation in the following note in one of the building papers. "The reason why tightly-stretched wires tend to prevent echo and reverberation, is very obscure; the best authorities attribute their action to the breaking-up of the waves of sound." How the waves of sound in the middle of a hall are broken up, is not stated by any writer, but I account for the origin of the explanation in this way. It is well known that projections and recesses on a wall or ceiling do prevent echo, by breaking up the waves of sound, which would otherwise run along a smooth surface, somewhat as the wave from a boat runs along the shore. This is intelligible in the case of walls and ceilings, but, for want of a better explanation, it has been applied to wires crossing a building, with the very necsssary qualification, that the subject is obscure.

We know that a wire in a state of tension will produce, if struck, a musical note. The harp and piano are composed of such wires. The pitch of a note produced by a wire depends on the number of vibrations which it is capable of producing, and this again depends on the length and tightness. Now, if, in the neighbourhood of a wire, we sound the particular note that it is capable of giving, the wire is thrown into sympathetic vibration. If we sound a different note, and one which is not a harmony of the note of the wire, no effect is produced upon it. If, then, we have eight or ten wires stretched across a building, and each wire capable of responding to its own note, or to a harmony of it, we shall be very unlikely, in speaking, to produce a note that will not rouse one or several of these wires to its assistance, and the voice will thus be supported, as the voice of the singer is supported by a harp or piano, when the accompanist plays in harmony with it. It is true that we do not hear the wire in a hall separately, the vibrations are not great enough, but we recognise their effect in the stronger and more harmonious tone of the building. Their action corresponds to that of the vibration of wooden lining in a room, and it not only reinforces the voice, but it destroys echo, in the same manner as we have seen that wooden lining will do. The sharp reflection of a single sound is no longer audible.

The varying effect of wires at different parts of the same room is another interesting point. If it be true that the vibrating air in a building may be divided by nodes, in the same manner as that in an organ-pipe, it admits of simple explanation. The air at a node does not vibrate, it is alternately compressed and dilated, but is not moved either way. If we suppose a wire placed exactly at one of these nodes, it will not vibrate, unless we suppose the vibration to be communicated to it by the building itself. If it is placed near a nodal point, it will vibrate only very slightly, but if placed at a loop, or the point midway between two nodes, it will resound with the greatest vigour.

Some extracts were read here giving particulars of cases where wires and cords had produced a great effect in defective buildings.

At the beginning of this paper, I quoted the opinion of an authority on acoustics, to the effect that no possible building could equal the open air for addressing a large audience. The effect of resonators in large buildings has yet to be tested, however, and till that has been done, it will be doubtful whether the limit of size in such buildings has yet been reached.

ORIENTAL CASKETS.*

In the "Historical Chart of Architectural Ornament," which I gave in my last lecture, you will find that Oriental art is set down at the outset as having been the original source, or treasury, whence all subsequent and Western art has been derived. It is spoken of as "Miscellaneous Architecture and Art," and so it is,—full of fancy, originality, and beauty, and yet so heterogeneous and confused in its elements as almost to defy classification or reduction to consistent rules. It is noted as "Hieratical," and such has been its general characteristic, though much of it has been built at the dictation of conquering monarchs. It has never attained individual, intellectual, artistic freedom. It seems always to have been executed under compulsion, according to tradition, or under some instinct handed down from generation to generation, which is inexplicable to artists of individuality of character.

The sumptuous Assyrian and Persepolitan remains now being discovered seem to have belonged to palaces reared by conquerors in commemoration of their conquests, rather than simply temples, as in Egypt. Still, we know that enormous edifices dedicated to religion were co-existent with them. Tyranny and priestcraft seem to have ever gone hand in hand in the case of Early Oriental art: the artist was but an instrument. All personality was crushed out of him under the traditional and conventional work imposed upon him and his countless fellows. Early Oriental architecture, by its scale, mass, magnificence, elaboration, and profusion, astonishes and bewilders us: it seems like the work of the sons of the giants, if not a mere fanciful creation of the imagination, or a dream of the romancer of the "Arabian Nights." But we become wearied, rather than edified, by the description of buildings so extensive, so colossal, and elaborate, which were built in the lust of pride to commemorate conquests and slaughter, or to awe the minds of the priest-ridden multitudes.

The palaces of Nineveh, to judge by the gross human-headed bulls which guarded their portals, did not approach much nearer to civilised refinement than the Pyramids of Egypt, or stone circles of Stonehenge and Avebury.

It may surprise us to read of a city like Babylon, eight times the size of London, inclosing within its vast walls, with their 100 gates of brass, a palace 1½ mile in area, sculptured and painted thoughout, and a temple still more gigantic in extent.

But we cannot grieve over these ruins, or those of the monstrous temples of Egypt, as we do over those of the Parthenon at Athens, or even of an abbey in a Yorkshire valley; nor can we feel that their destruction has been aught but a boon to humanity and civilisation.

The art of the Oriental world, from first to last, seems to have been simply barbaric, and material in its aim, without infusion either of the intellectual or the spiritual. It is not without high excellence as to the material qualities which were its aim. It did attain grandeur, sublimity, and a considerable amount of beauty, but never the sobriety and simplicity necessary to true art. We must not, however, overlook the fact that it had an ideal, though not the highest, and that the Oriental races have been and are the better for their art, such as it was; and we cannot but recognise the devotion with which they burnt the lamp of sacrifice at the altars of idols which were their only emblems of the divine and superhuman.

I have specified in the Chart, as in some degree distinct phases of Oriental art, the following:—Egyptian, Assyrian, Persepolitan, Indian, and Chinese. Of these the first three are dead and past styles, the buildings mostly existing but in ruins, or being exhumed by the patient explorers of the present age. And yet they were the most dignified and important, and have had the greatest effect, and supplied the most elements to Western Art. The remaining two, though less ancient, are still living, though stagnant as regards progress; and their productions are found in a condition of completeness almost unique among monuments of like antiquity in any part of the world. As fair examples of what, in general characteristics, early as well as late Oriental Art was, and as being accessible by means of photography for our present purpose, our attention will be mainly concentrated upon them on the present occasion. Still, so far as the materials at my command will allow, I shall endeavour to commence at the beginning, and to follow Oriental art in its historical sequence, making brief notes on its styles in the order of their succession.

Of Babylon, we read in Herodotus that it formed a perfect square within walls, and by the dimensions he gives, it must, as I have said, have been eight times the size of London, and it was entered by 100 gates of brass. No doubt large spaces within the walls must have been of the nature of parks, unoccupied by houses. Nothing but vast shapeless mounds and scattered fragments of materials remain of the monstrous palace and temple already referred to. Too little has as yet been ascertained with regard to their details, that they should longer occupy our attention. The architecture of Persepolis, in scale and character, resembled Egyptian; but it possessed many distinctive features, such as the portals of its palaces, as at Nimroud, being flanked by sculptures of colossal-winged bulls, with human diademed heads, some of which have been rescued from the ruins by Layard and are now in the British Museum. They convey to us a grander idea of this Early Oriental art than the mere calculations as to immensity which is all that, as yet, we have gleaned from Babylon. Their impassive features and attitudes do not render them impressive as works of art, nor do they attain the conventional and calm grandeur of the Egyptian sphinxes and similar monuments.

In Assyrian details we also constantly find the well-known honeysuckle ornament, which became so distinctive a feature in Ionic Greek, and the capitals of ancient Persepolitan columns present us with cushioned volutes, which, though placed vertically, must have been the prototype of the Ionic capital. And in other Persepolitan pillars we find elegant bulbous-shaped vases and capitals, with which we seem to become familiar in the later and more elaborate decorations in India.

Doubtless, as investigation proceeds, we shall be able to trace backward to the earliest styles, and to find the reason, as well as precedent, for many of the details, resembling Classic, which continually surprise us in out-of-the-way districts of India and elsewhere. For the present we may be content to credit Early Oriental art with having originated much that the Greeks adopted and developed, and to have been generally the cradle whence the arts of the civilised world have been derived at the outset. Egyptian architecture was, as far as we know, the noblest and most dignified development of Early Oriental art, and its influence is to be traced in the Doric Greek architecture, of which the Parthenon is the masterpiece.

Egyptian architecture was evidently the outcome of the excavated cave, and its characteristics are what would naturally be derived thence—simplicity, solidity, and monotony.

Despotic government and a vast dependent population favoured the construction of stupendous monuments, which were doubtless under the influence and direction of a powerful priesthood; consequently the works partook more of the nature of temples and tombs, and their adjuncts, than splendid palaces, which seem to have been the prominent objects in Assyria and Persepolis.

Mystery was affected throughout, and tradition rigidly exacted iron rules; all spoke of, and seemed designed to endure for, eternity.

The Great Pyramid may, as it has been alleged, have embodied wonderful problems of science, but as a work of art it had nothing but

* Second lecture, delivered at the Architectural Museum, on February 24, by J. P. Seddon, Esq., F.R.I.B.A.

mass as an element of sublimity to render it imposing.

If the ruins which stretch from the Pyramids of Gizeh to Saccara be but the remains of others, amazing multitude would have been another of their characteristics. But neither of these crude methods of inspiring awe, nor the exaggerated scale of the Great Sphinx, could ever have deeply impressed the cultivated minds of free and artistic men.

Yet the Egyptian temple must have been, as it was intended, awe-inspiring to the enslaved masses who, perforce, thronged its courts. A paved passage, sometimes more than a mile in length, bordered the whole of its length; by a row on each side of colossal, calm, impassive sphinxes, with stony stare, led up to the stupendous propylon which gave access to the first courtyard. The doorway in the centre of this was flanked on both sides by lofty slender obelisks, one of which has recently been brought and set up in our metropolis as a curiosity.

The propylon consisted of two enormous pyramidal blocks of masonry, crowned with a bold hollow-moulded cornice, and they were connected by a doorway between them, surmounted by a similar cornice at a lower level, ornamented with the emblem of eternity—a winged globe.

The frowning aspect of this majestic pile seemed to bid those who passed beneath it to leave all hope, or at least, will, of their own, behind them.

It ushered them into a spacious court colonnaded all round; and other propylons gave access to further courts of like character beyond, until at last the temple itself appeared; gloomy as a great cave, with massive roof of stone upborne by multitudes of colossal columns; and beyond, came the insignificant cell to which all this architectural splendour was but the prelude, and which contained some sacred bull, or other brute animal, which the besotted worshippers came to reverence and to gaze at.

We, who can roam over the ruins of these temples, free from all such debasing influences, note with interest the character of these columns and their decorations. They are immense circular or polygonal shafts, made to resemble vertical bundles of bamboos or reeds, bound together by bands of withes horizontally at intervals, and their capitals exhibit great variety of forms imitated from nature; some compressed, like unopened buds, others expanding, vase-shaped, as flowers; with the leaves and petals of the lotus intermingled, and the whole of the buildings inside and out are covered all over with incised and painted hieroglyphics, which enrich, without interfering with or detracting from, the simple outlines and majestic proportions of the architecture; as we shall find to be too often the case with the more pretentious and over-elaborate subordinate decoration of the buildings in India.

The natural types adapted in Egypt are treated with rigid conventionality; and are wholly devoid of life and animation, as if dictated by routine. Even the scenes depicted in the paintings are like the dryest historical records, without artistic inspiration. One sees the principal warriors represented on a gigantic scale, as compared with that of the pigmy hosts who assist or oppose them; and this alike suffices to show that the work is far removed from the nature of living and true art.

Chinese architecture, in the sense of imposing or substantial structures, may be said to be conspicuous for its absence. And yet the work connected with building by so ancient and ingenious a people as the Chinese cannot fail to present much that is interesting and unique. Few of their religious edifices have any claim to high antiquity; but, among so conservative a nation, those that exist no doubt followed the type of those that preceded them. The prevalence, or fear, of earthquakes may have led to the adoption of the mode of construction usually adopted. This is of a tent-like construction, consisting merely of the erection of lofty poles, carrying umbrella-like roof-coverings of fantastic form and outline, apparently imitated from the pendent boughs of the fir-trees common to the country. All other wall veilwork is simply of the character of open-lattice screen-work, not undevoid of picturesqueness in effect. The many-storied pagoda, which seems to be a special national invention of the Chinese, is simply a polygonal erection of the character described above, having a tier of this quaint roofing as a cornice to each story, as well as the roof which crowns the whole structure.

The Temple of Heaven, at Pekin, is a circular building of the same class, with three tiers of hollow outlined roofing.

The characteristic effect of Chinese architecture is gaiety, and thus differs from Early Oriental architecture, the aim of which was wholly opposite. It is light, aërial, brightly-coloured, and gilt; it shines with lacquer and varnish, or is constructed of porcelain and garnished with bells. It seems to have been developed from the type of the tent, which, doubtless, formed the normal dwelling of their nomad ancestors.

The domestic architecture of the Chinese is worthy of notice, as having a curious resemblance to those residences that have been disinterred at Pompeii, and it is, doubtless, to a great extent representative of the character of the domestic architecture, at least as regards general arrangement, of the ancient world.

Within a plain and unornamental exterior, composed of rectangular walling, with a moderately enriched portal as entrance, a space of ground, large or small, according to the means of the occupants, is crowded with low one-storied buildings, connected with colonnades, and separated by court-yards, and miniature gardens tastefully arranged.

Their monuments, even though they be of marble or granite, are constructed to resemble wooden constructions with upright posts, and transverse beams with miniature roofings. With two upright posts only these are called *Pai Fongs*, and are erected in memory of celebrated women. Those with four posts are termed *Pai Loos*, and are in honour of public men—others dedicated to the memory of Buddhist priests, are like Indian dagobas.

Whether or not China attributed any architectural feature of importance to the general miscellaneous stock or Oriental ornamentation, it would be difficult to assert positively. Its porcelains, carvings, embroideries, and fancy manufactures did undoubtedly find their way to Western Europe at very early periods, and throughout the Middle Ages as they do now, and they may have supplied new ideas to the Gothic carvers and sculptors who were able to make good use of them.

Still we can dismiss, as insignificant, the influence of China upon the architecture and higher arts of the civilised world. The unarchitectonic nature and pettiness of Oriental ornament generally is specially characteristic of Chinese work, which seems more suited for masquerade than the simple requirements of practical life, while it seems unable to attain to any noble aspiration after the higher life in the art of man.

(*To be continued.*)

COMPRESSED AIR IN TUBULAR FOUNDATIONS.

In using this valuable method of sinking cylinders for tubular foundations, care is necessary in properly arranging the joints. In many instances the cylinders are fixed by means of interior flanges, between which packing is laid. The object of the packing is to prevent the cylinders from touching each other, and to insure an equal pressure. In a recent discussion upon this question at the American Society of Civil Engineers, a member (Mr. F. Collingwood) believed that if some portions of these cylinders, such as the exterior parts of them, are brought into contact, a bending or tearing strain is set up in the angles of the flanges, which will be so much addition to the strain caused by the upward pressure of the air, and may become dangerous. He cited a case where some cylinders were sunk for a bridge near Fall river; the flanges of air-lock were about 2in. thick, and the joints leaked air. Men were sent down to tighten up the bolts, and the result was the air-lock was blown off, and several men lost their lives. The writer further suggests a few precautions in reference to the doors of air-locks that ought to be borne in mind in the construction of these chambers. The first is, that the "holes in the hinges be elongated vertically, so that as the pressure comes on it can compress the rubber at the hinge as well as elsewhere; second, that a thoroughly efficient and easily-worked arrangement be provided for hoisting up the doors to the locks." The object of these suggestions is to insure a perfect contact of all fitting surfaces. Rubber rings are often used for packing and seating, but it gets hard and brittle in course of time, the consequence of which is, that the rubber on the doors or valves does not exclude air without a considerable pressure. As the use of air-locks involves considerale risk to the men employed, not only from failure of air-tight arrangements, but from the rapid changes of pressure they have to undergo in passing through the lock, the recommendations of Mr. Collingwood deserve the best consideration of engineers engaged in sinking foundations under water.

We must also draw attention to the fact that straight pipes, without the water-jet, have been very successfully used in removing sand. The same writer, who has had experience in large caisson-work, observes that all material can be removed more cheaply by compressed air than by any other method, and he states "that he has removed sand by a 3½in. pipe as fast as all the men that could work round it conveniently could shovel it to the pipe,—say, 20 yards per hour." In many instances, the sand and material have to be raised by bags through the cylinder and air-lock,—a laborious and troublesome operation. In the removal of material like stiff clay, mud, boulders, &c., a pipe, of course, cannot be used for the purpose, but the same principle can be applied. In some of the coal and other mines on the Continent the material is raised by a cage working in a cylindrical shaft of air-tight construction. The cage performs the part of a piston, and is made to ascend and descend by the same means. An arrangement of this kind appears admirably adapted for the lifting of solid materials in the excavation of submarine foundations, and its efficiency and economy cannot be doubted.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Birmingham Architectural Association.—An ordinary meeting of this Association was held on Tuesday evening at the rooms, Queen's College. Mr. R. B. Morgan (the chairman) presided, and among those present were Messrs. W. Henman, J. P. Osborne, A. Reading, W. H. Kendrick, F. G. Hughes (hon. sec.). After the business had been disposed of, a paper on "Architectural Metal Work" was read by Mr. J. W. Tonks, which we shall probably give next week. At the conclusion of the paper a discussion on it took place, in which the chairman, Mr. Henman, and other gentlemen took part. A hearty vote of thanks was accorded to Mr. Tonks on the motion of the chairman, seconded by Mr. Kendrick.

PARLIAMENTARY NOTES.

London Water Supply.—Mr. Fawcett asked the Secretary of State for the Home Department, on Monday, whether he could inform the House when the Bill relating to the water supply of London would be introduced.—Mr. Cross was understood to say that he expected all the details of the Bill would be arranged this week, and it would be introduced as soon as the Chancellor of the Exchequer could give him a day for the purpose.

Water Supply.—Mr. Monk, in the absence of Mr. R. Hill, asked whether, in view of applications from various districts to take water for their own purposes from watersheds with which they have no natural connection, the Government were prepared, in anticipation of legislation upon the subject, to initiate an inquiry into the whole question of water supply.—Mr. Sclater-Booth said the question whether there should be a preliminary inquiry had been several times under the attention of the Government. At the present time he thought there was no occasion to institute any special inquiry upon the subject, seeing that ample information was at their disposal should they think fit to deal with it.

Ancient Monuments Bill.—This Bill was read a third time in the House of Commons on Tuesday.

Liverpool Water Supply.—In the House of Commons the Liverpool Corporation Water Bill, was read a second time on Tuesday, and at the suggestion of Mr. Sclater Booth referred to a hybrid Committee, consisting of nine members, five to be nominated by the House and four by the Committee of Selection.

The tender of Mr. F. White, of £1,690 for building the new Dunstable Town Hall, on the site of the building destroyed by fire, has been accepted. The work has to be finished by the 1st of September.

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ILLUSTRATIONS.

WEST LONDON SCHOOL OF ART.—DESIGN FOR A VILLAGE CHURCH.—LINCOLN MINSTER.—HOUSE AT OATLANDS.

OUR LITHOGRAPHIC ILLUSTRATIONS.

WEST LONDON SCHOOL OF ART.

THIS School is now the largest of the ten Metropolitan District Schools of Art, and one of the six largest in the kingdom, while the number of students who have been successful in the Examinations and in obtaining prizes, has considerably exceeded the average of most of the other large schools: during the Session of 1878-1879, nearly six hundred students attended the School, and this number would have been considerably increased but for the badness of the accommodation in the old school; in the beginning of last year the Committee determined to take steps for building a new School, and fixed upon a site in Great Titchfield-street, which was obtained on advantageous terms from the Trustees of the late Duke of Portland; and through the public-spiritedness and munificence of two of the members of the Committee, Mr. J. H. Donaldson and Mr. Walter Graham, the new building has been erected and leased to the School. The building, which throughout is thoroughly well lighted, heated, and ventilated, contains on the half-basement large rooms for architectural, modelling, and designing classes, with ample store-space, rooms for housekeeper, &c. On the ground-floor are large entrance-hall and corridor, with elementary and life-class rooms, each 30ft. by 23ft., and Masters' and Committee rooms. The first floor is devoted to a large lecture and female elementary class-room, 67ft. by 23ft., with a second life class-room, and on the second or top floor the whole space is occupied by a large sculpture-gallery, 76ft. long by 23ft. wide, amply lighted from the top and by means of large sun-burners for night use. In connection with the school on each of the principal floors a large additional class-room or studio, 30ft. by 22ft., lighted in all cases from the north, with ante-room attached, is arranged with separate entrance from the street and separate staircase; and on every floor good lavatory and other accommodation has been provided. The staircases are all of stone, resting on solid brick walls, and are ample in width and thoroughly well-lighted. The main elevation is of simple character, with a frontage to Great Titchfield-street of nearly 80ft., the windows being large and lofty, and the whole of appropriate but not too ornate design, the facing being of Yellow Malm bricks with Red brick and Stone dressings. The works have been carried out by Messrs. Watson Brothers, builders, of Charlotte-street, Portland-place, from the designs and under the supervision of Mr. Robert W. Edis, F.S.A., architect, of Fitzroy-square. The school forms a most important addition to the District Schools of Art, associated with and working under the Government School of Art at South Kensington; and under the hands of the influential managing committee of artists and gentlemen, with the head-master, Mr. Stewart, and an able staff of assistant-masters, is likely to be of infinite service in the cause of art-teaching in the important commercial neighbourhood in which it is situated, many of the principal firms of upholsterers, decorators, &c., being represented on the committee and subscribing to the working funds of the school.

A VILLAGE CHURCH—"BUILDING NEWS" DESIGNING CLUB.

THE selected design for a village church which we publish to-day is by "Sub Rosa," whose plan, notwithstanding the rather cramped entrance and crowded effect of the baptistery, was, in our opinion, the best design submitted by our Designing Club competitors.

LINCOLN MINSTER.

OUR first double-page plate to-day presents a valuable detail of one bay of the beautiful choir of Lincoln Cathedral. The drawing is by Mr. Sydney Vacher, whose measurements were worked out on the spot to half-inch scale, so that our illustration should in every respect be reliable, which cannot be said of all the measured drawings of old work which have been published. We understand that Mr. Vacher proposes to present the original large drawing either to South Kensington Museum or to the Royal Architectural Museum. A collection of details like this one of similar buildings could not fail to be of value.

HOUSE AT OATLANDS.

THIS house was recently erected for Mr. Short. The lower portion is faced with red Fareham bricks, the upper portion rough-cast and the roofs tiled. The architect was Mr. W. H. Powell, of Mecklenburg-square W.C., and the builder Mr. Spencer, of Bedford. The chimney-piece, or rather a portion of it, bears an historic interest. The upper part is old, and was in an interesting XVIth century, half-timbered house at Walton-on-Thames, formerly belonging to "President" Bradshawe. John Bradshawe lived here, probably 1644-50, and in the room from which it was removed, tradition says, the death-warrant of Charles I. was signed. The house is now in a dilapidated condition, let out in tenements, still preserving, however, its panelled room, from which the upper portion of this chimney-piece was taken. With a view to the preservation of this interesting relic, it was purby Mr. Geo. Short, and removed to the residence recently erected for him in the same parish by Mr. W. H. Powell, by whom the portion below the shelf was designed. Illustrations of the old room and its fireplace may be seen in Hall's "Books of the Thames," &c.

COMPETITIONS.

PROPOSED RAILWAY HOTEL AT PRESTON.—About forty designs have been submitted for the proposed new hotel at Preston, which is to be built at East Cliff; but up to the present moment we find no arrangements have been made for their exhibition, and the drawings have only just been unpacked. The new hotel will be built to connect by a covered way with the new station, while the principal windows will have a commanding view over the public gardens and country. The situation is an elevated one, and we hear that many of the designs are in picturesque styles. We understand several local firms have competed, and that the claims of one of them have been put forward rather unfairly.

ST. HELIER'S MARKET, JERSEY.—The Markets' Committee, after a careful comparison of the competitive plans, have awarded the first premium of £30 to Mr. T. W. Helliwell, of Brighouse, Yorks, and Messrs. Bellamy and Hardy, of Brighouse and Lincoln, and the second, of £20, Messrs. Bromilow and Cheers, of 409, Strand, London, and 21, Harrington-street, Liverpool. The Legislative Assembly will meet some time next month, when the premiated plans will be again laid before them.

THE NEW EXETER GIRLS' HIGH SCHOOL.—Fourteen architects have sent in drawings in competition for these schools, and the designs and plans have been open for public inspection, by presentation of card, at the Castle of Exeter for a fortnight. All drawings are exhibited under motto. "Choose well; your choice is brief yet endless" sends seven drawings in the Queen Anne style: "Justitia," six drawings of Elizabethan type, and a comprehensive perspective of the proposed school and surroundings: "Je suis en mesure de la faire," sends four drawings and a perspective. The design is Geometrical: "Place aux Demoiselles" sends six drawings of Tudor character: "Desideratum" also sends six of freely treated design: "Economy" sends eleven pen-and-ink drawings, and a perspective—the style is pronounced Queen Anne; "Compliance" is another pen-and-ink design, shown in eight drawings and a perspective. It is of a Domestic Gothic character: "D.V." sends seven drawings and a perspective. They are of Geometrical Gothic; "Finire quærentem labores" sends six drawings, Tudor; and "Fiat Justitia" five drawings, Geometrical. The nine drawings signed "Cultus" are of Queen Anne feeling: whilst seven ink productions, of a Geometrical character, bear the motto "That our daughters may be as corner-stones polished." Lastly, five designs of a Tudor feeling are marked by a circle within a triangle, inside a circle. The competitors are principally local: no decision has yet been arrived at.

SCHOOLS OF ART.

HALIFAX.—The annual distribution of medals, prizes, and certificates to the students of the Halifax School of Art, took place on Thursday week, and Mr. H. C. McCrea, J.P., presided. Mr. Stopford, the master, read a short report of the work done. The evening classes, he remarked, were very successful, the total number of students being 70, with an average attendance of 50. In the National Art competition the school obtained one silver medal, two bronze medals, one Queen's prize of books, and six students obtained third-grade prizes. Five students obtained prizes at the local examinations, five obtained full certificates, and 23 ordinary certificates. In the high or advanced examinations, three were successful in designing, one paper being marked "good," and four passed in building construction. Out of 142 schools in the kingdom, Halifax stood 10th as regards results, which, considering the insufficient accommodation and other defects of the school premises, Mr. Stopford considered to be very satisfactory. A sketching class and sketching club had been established in connection with the school, and Mr. Stopford announced his intention of forming a class for the practice of porcelain painting. Mr. H. C. McCrea has promised to give £500 towards providing a new art school, which is much needed.

CHIPS.

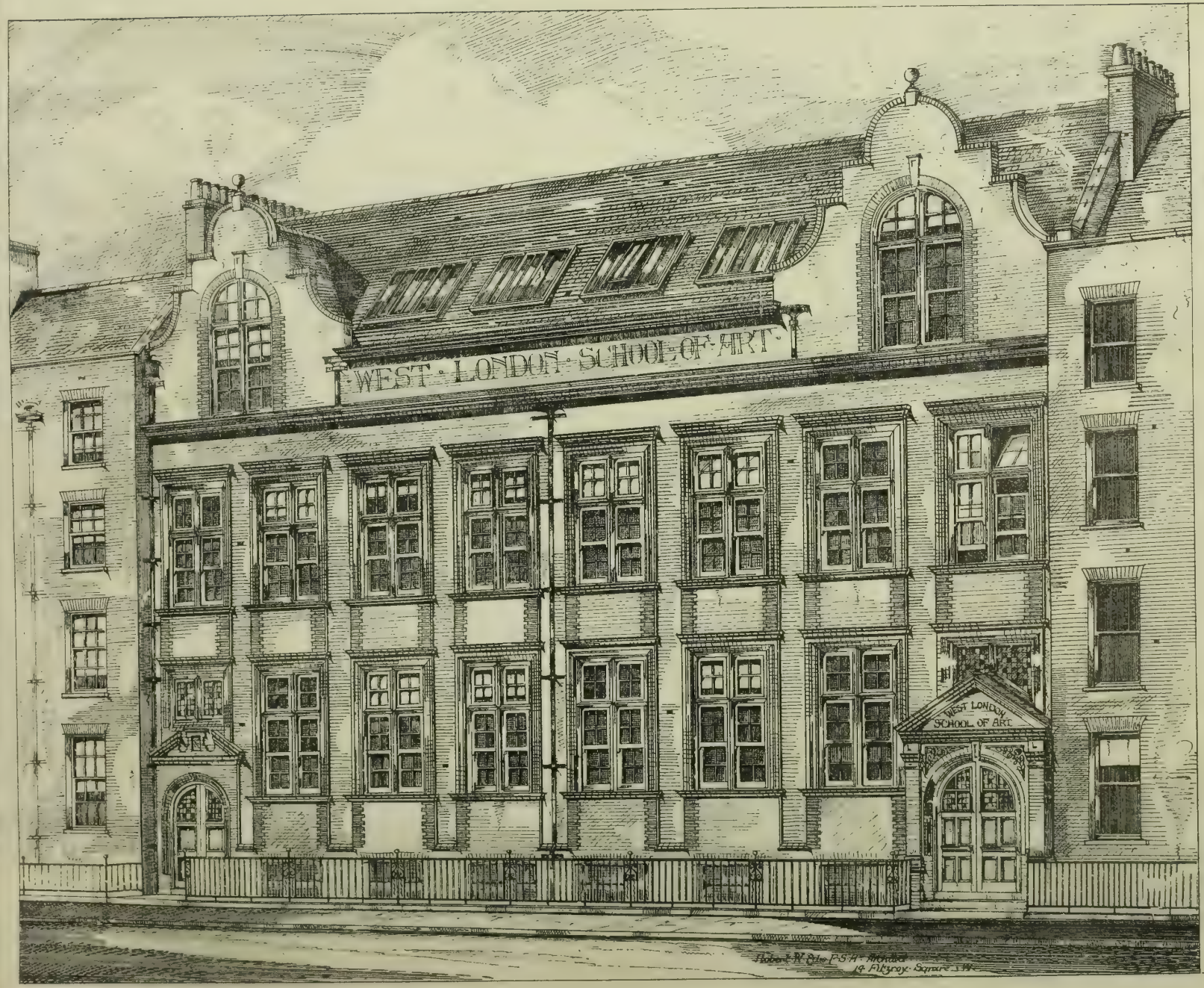
At a new church now building in South London, all hands were knocked off in the forenoon last Thursday, and expected to attend morning prayers at the adjacent temporary church. This will continue throughout Lent. The men are paid as if working, whether at the expense of the contractor, or from the funds collected for building the edifice, has not transpired. Somebody once wrote, "There is a time for all things"!

The foundation-stone of a new Baptist church at Dumfries was laid on Monday last. The building, when completed, will accommodate 600 persons. The style is an adaptation of the Greek. The total cost will be about £1,800. The plans are by Mr. Francis Armstrong, architect, Dumfries.

A new addition to St. Patrick's Training Schools at Druncondra, Co. Dublin, has been built, from designs by Mr. J. Leslie O'Hanlon, jun., architect, for the Roman Catholic Bishops of Ireland. It has been erected on a waste piece of ground which stood in front of the old school. It is three stories in height, and is of Gothic design. The works were executed by Mr. Fagan, builder, of Rathgar, for less than £1,000.

A meeting of the trustees of Sir John Soane's Museum was held on the 19th inst., at which were present Prof. Donaldson, Mr. Frederic Ouvry, F.S.A., Mr. David Mocatta, F.S.A., Mr. Alderman Thomas Q. Finnis, and Mr. Alan Cole. It was decided that during the forthcoming months of April, May, June, and July, the museum should be open to the public on four days, instead of three days, a week, such days being Tuesday, Wednesday, Thursday, and Saturday.

New schools which have been erected in Salford, in connection with the church of St. Stephen, were opened on Wednesday week. The works, which have cost nearly £3,300, have been carried out by Mr. William Brown, builder, Salford, from the designs of Mr. Henry Lord, architect.

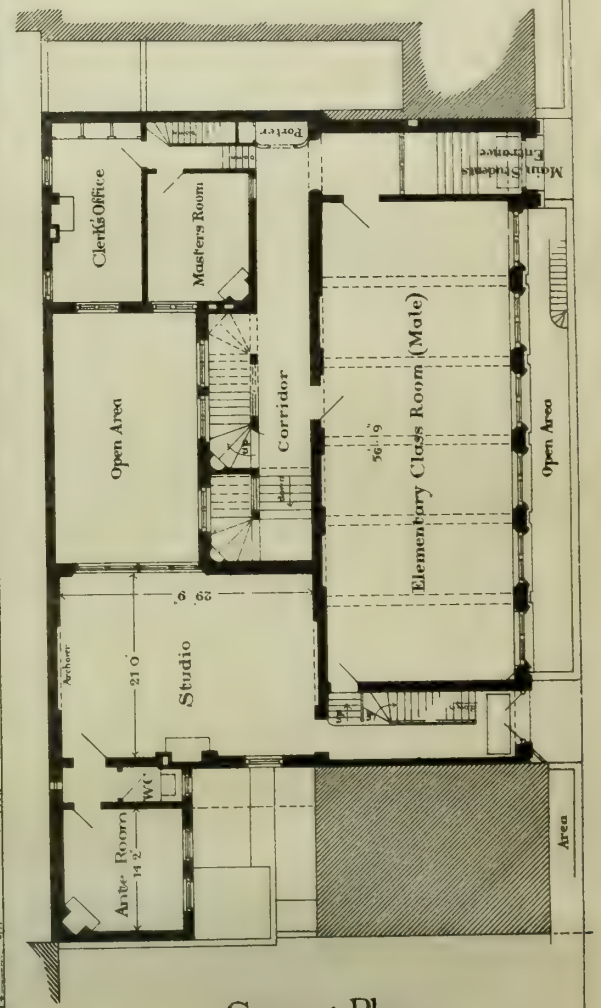


WEST·LONDON·SCHOOL·OF·ART·

G^t TITCHFIELD STREET W.

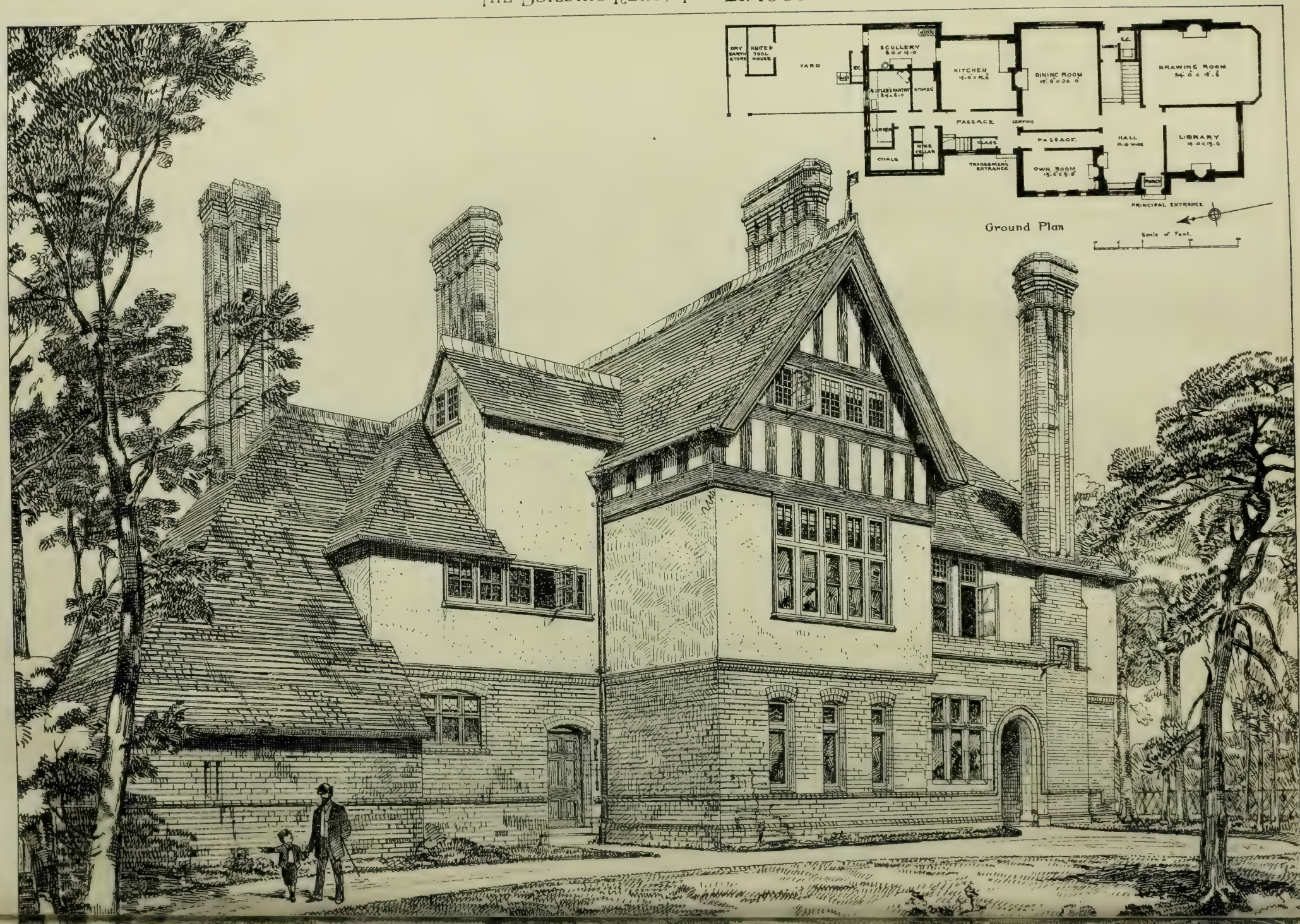
ROBERT W. EDIS F.S.A.

ARCHITECT

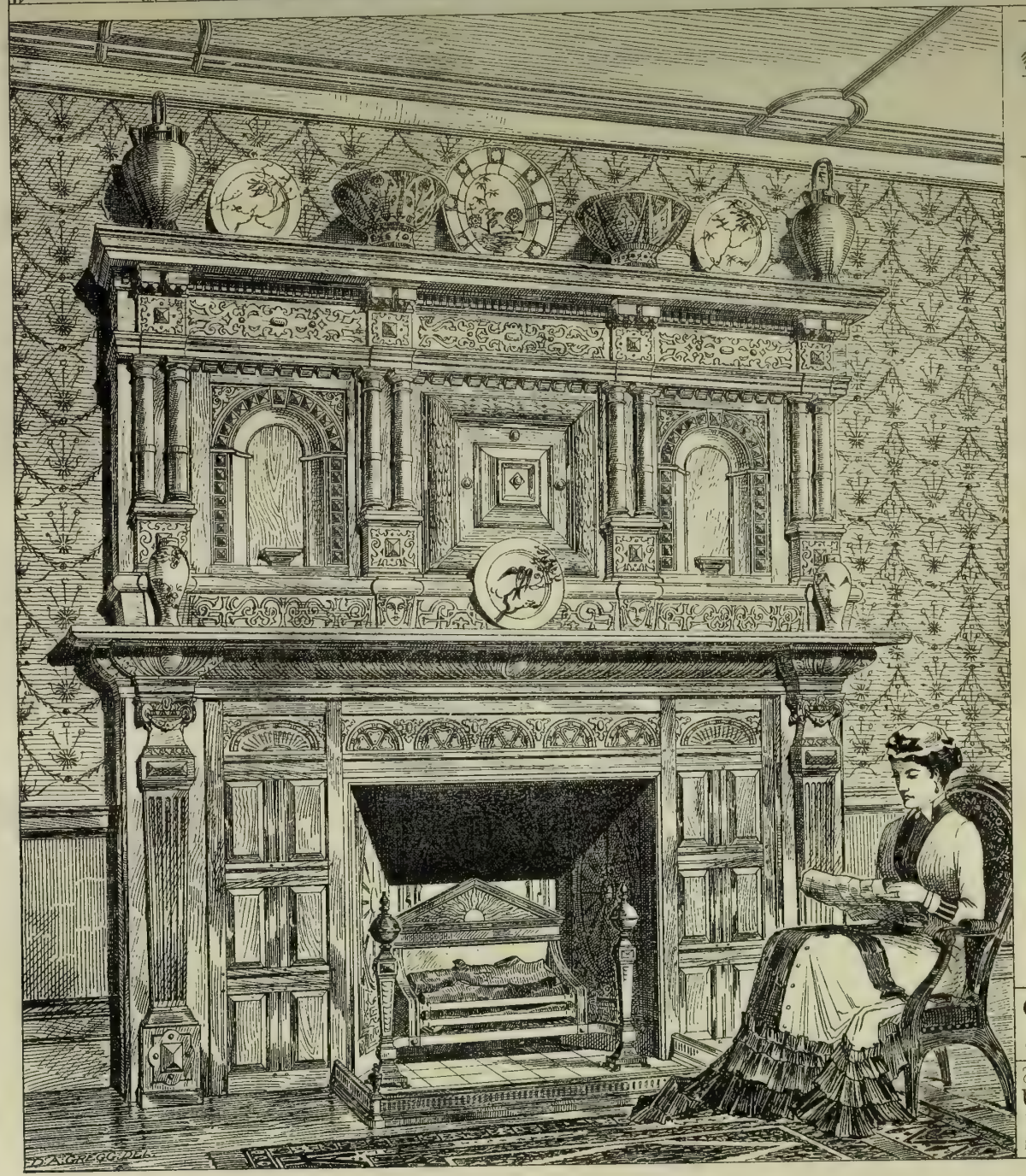


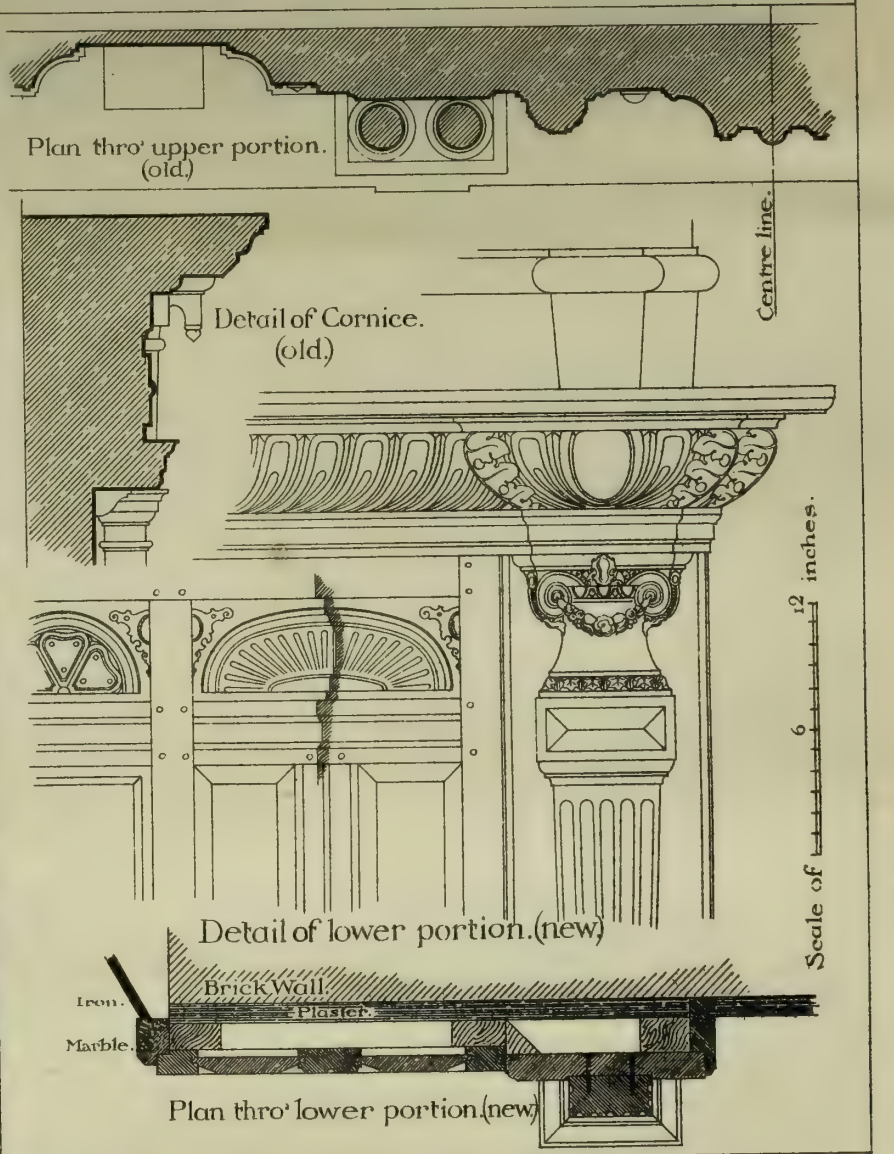
Ground Plan:

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.


DRY EARTH STORE
KNIFE & TOOL HOUSE
YARD
SCULLERY 8.0 × 9.0
KITCHEN 14.0 × 15.6
DINING ROOM 17.6 × 20.0
DRAWING ROOM 24.0 × 18.6
BUTLER'S PANTRY 8.0 × 8.0
STORES
PASSAGE
LARDER
COALS
WINE CELLAR
GLASS
PASSAGE
HALL 6.0 WIDE
LIBRARY 14.0 × 13.0
TRADESMEN'S ENTRANCE
OWN ROOM 13.6 × 9.6
PRINCIPAL ENTRANCE
Ground Plan
Scale of Feet.

House at OATLANDS for Geo: Short; Esq:~ *W H Powell, Archt:*

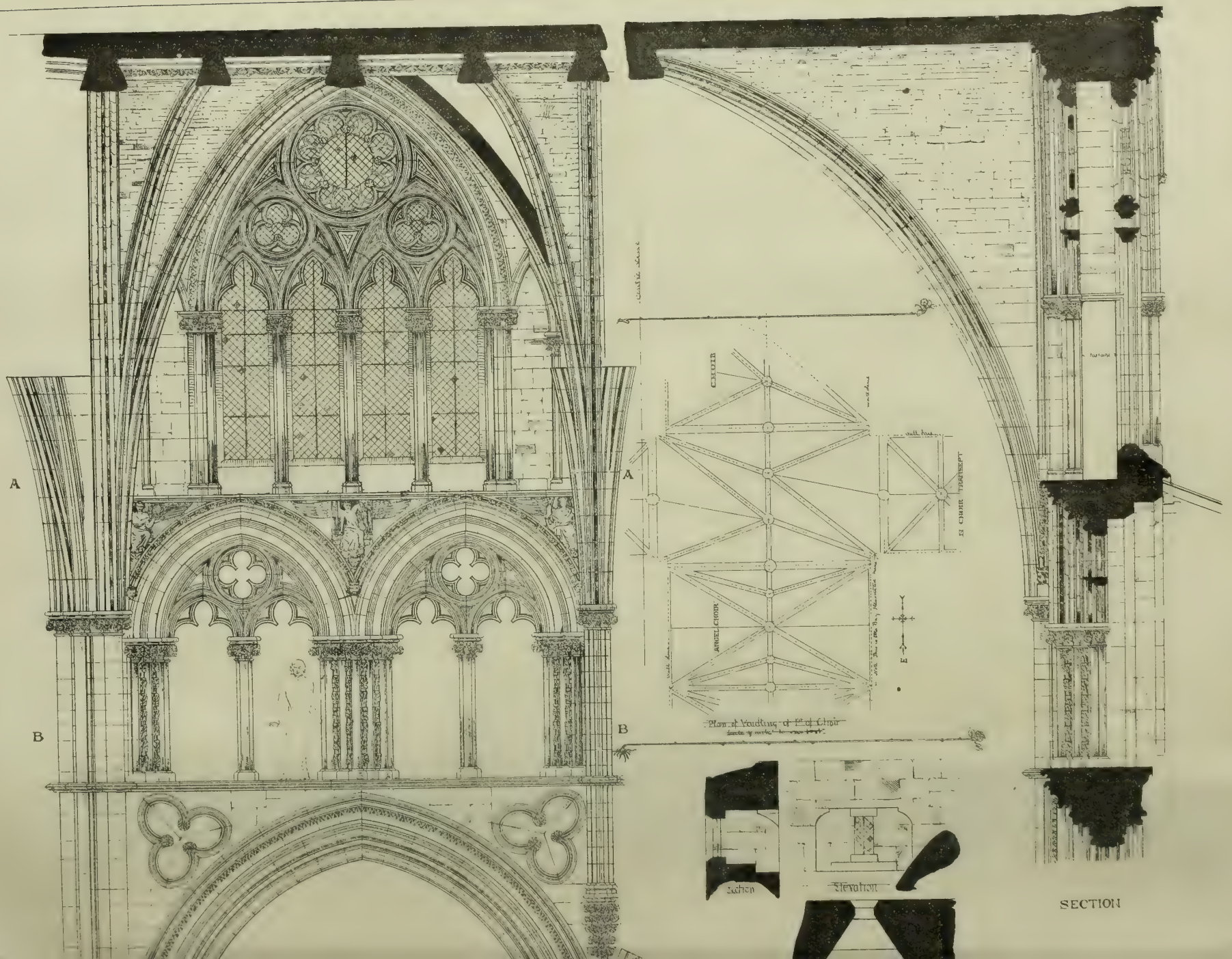




Chimney Piece in a House at OATLANDS recently erected for GEO: SHORT ESQ^RE

The portion above the Shelf is old, and was formerly in the House of "President" BRADSHAWE at Walton on Thames:
The lower portion has been designed to adapt it to its modern use: 1879: *W. H. Powell* ARIBA *Archt:*

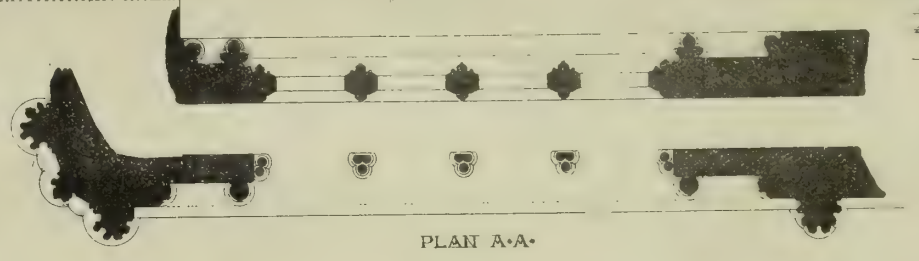
Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W C


A
B
A
B
CHOIR
ANGEL CHOIR
S CHOIR TRANSEPT
Plan of Vaulting of E^t of Choir
Section
Elevation
SECTION

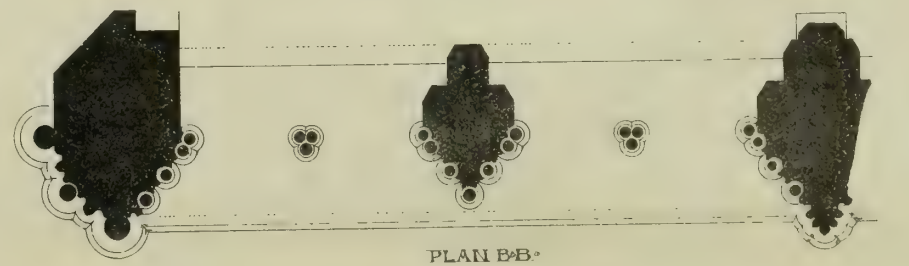
Window in Pocket of Aisle Vault



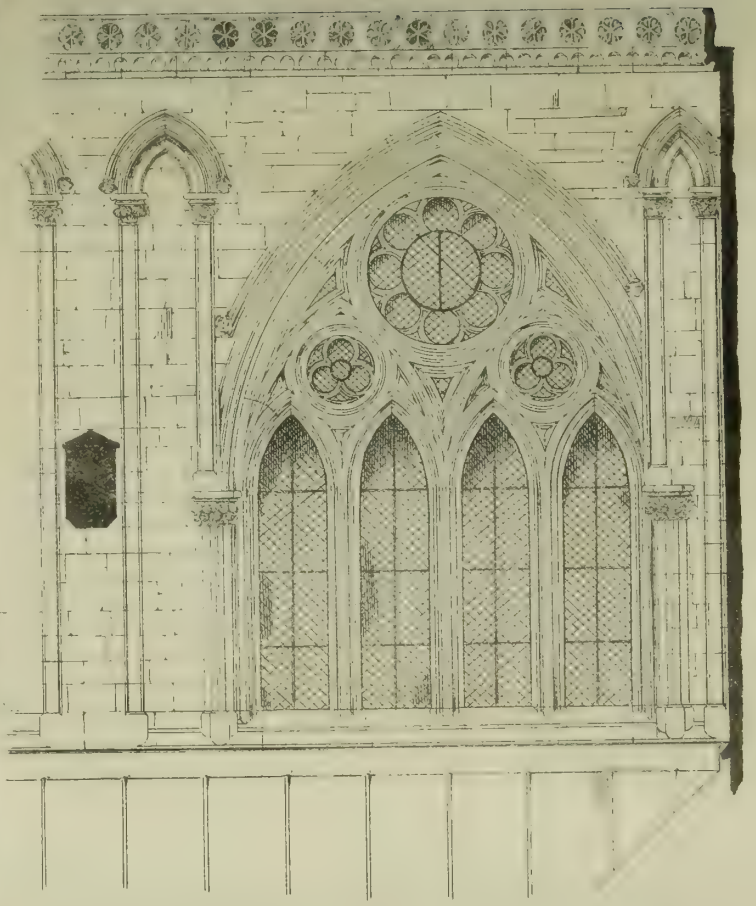
ELEVATION



PLAN A·A·



PLAN B·B·



Outside Elevation of Clearstory Window.

LINCOLN MINSTER.

ONE BAY OF THE ANGEL CHOIR.

Measured and Drawn June 1875.

SYDNEY·VACHER·

SCALE OF FEET

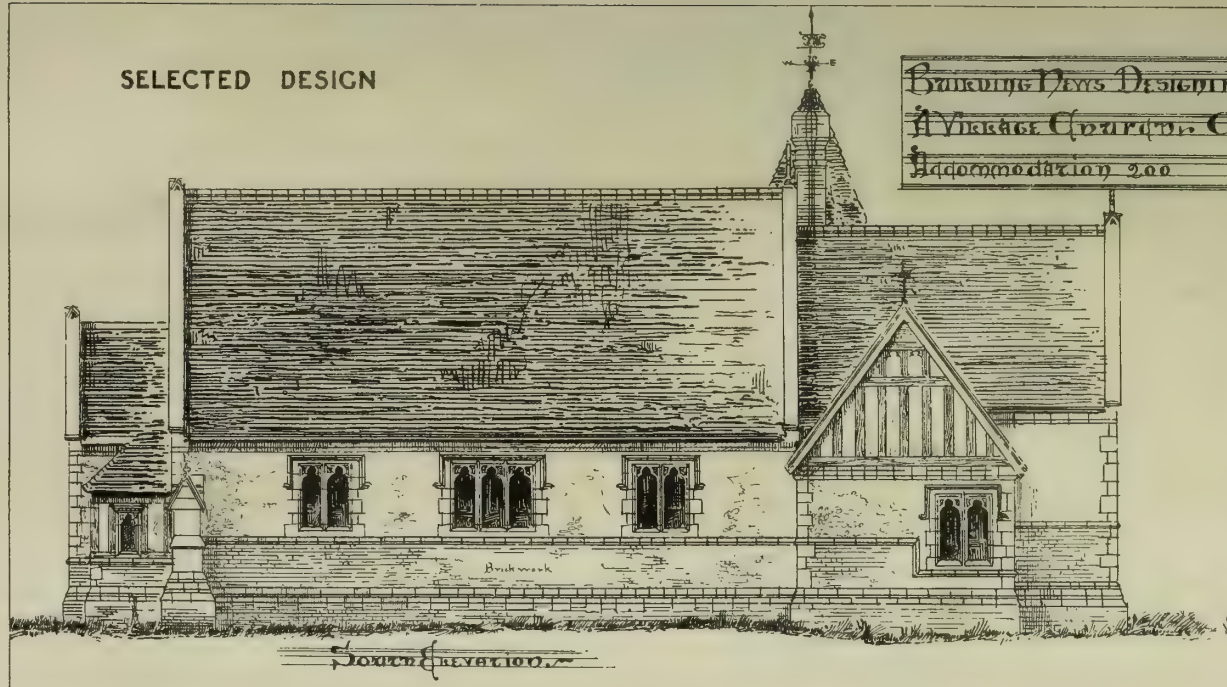
Photo Lithographed & Printed by James Akerman 6, Queen Square W.

SELECTED DESIGN

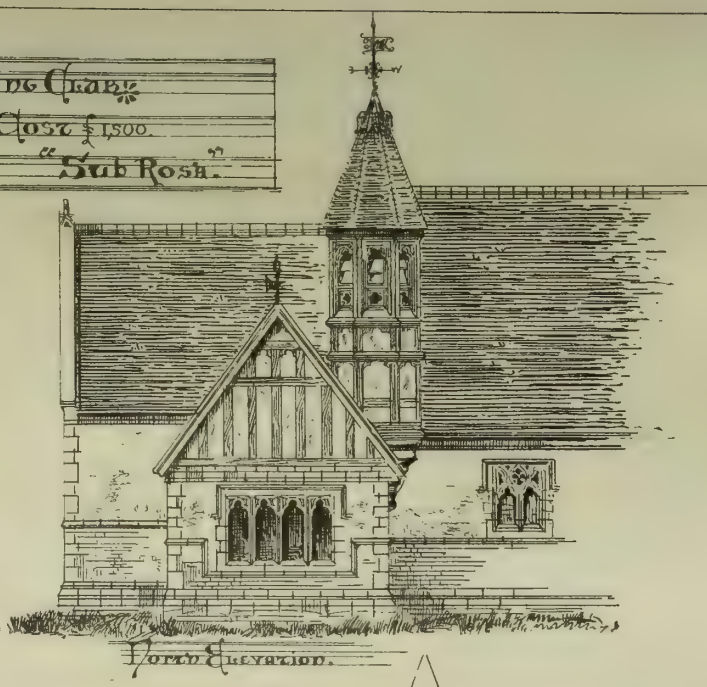
BUILDING NEWS DESIGNING CLUB.

A VILLAGE CHURCH. COST £1500.

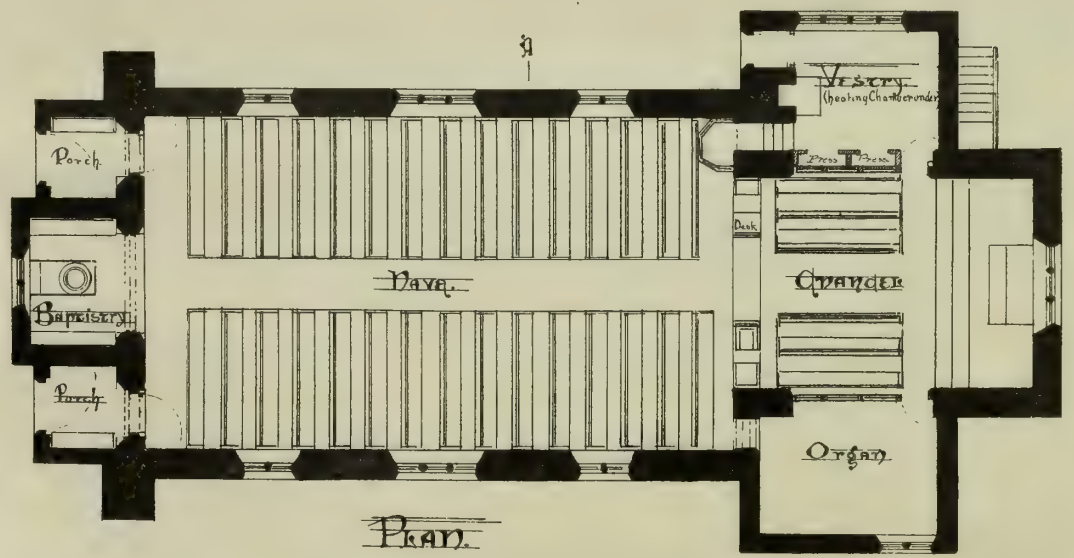
ACCOMMODATION 200 "SUB ROSA."



SOUTH ELEVATION.



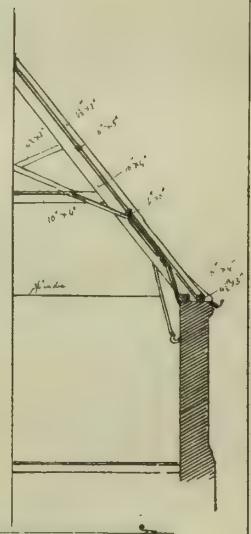
NORTH ELEVATION.



PLAN.



EAST ELEVATION.



SECTION ON A.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

ASPHALT AND MINERAL BITUMEN IN ENGINEERING WORKS.

AT the meeting of the Institution of Civil Engineers on Tuesday, the 24th of February, Mr. Brunlees, Vice-President, in the chair, the paper read was "On the use of Asphalt and Mineral Bitumen in Engineering Works," by Mr. W. H. Delano, Assoc. Inst. C.E.

Adopting the nomenclature of M. Léon Malo, which had received general sanction, the author considered asphalt as a combination of carbonate of lime and mineral bitumen produced by natural agency. Asphaltic mastic was the rock ground to powder, and mixed with a certain proportion of bitumen. Gritted asphalt mastic was asphalt mastic to which clean sharp sand had been added. Asphaltic or bituminous concrete was gritted asphalt mastic mixed when hot with dry flint or other stone. Boussingault's analysis of bitumen gave C 85, H 12, O 3. It was, therefore, an oxygenated hydro-carburet, and quite distinct from the preparations of gas-tar and pitch, which were sometimes erroneously styled bitumens and asphalts. It was important that these distinctions should be borne in mind when specifying asphalt, as their disregard might lead to the employment of a material having few of the properties of the natural rock, although bearing, to the uninitiated, a strong resemblance thereto. Messrs. Hervé-Mangon and Durand-Claye, of the Ecole des Ponts et Chaussées, Paris, had supplied the author with detailed analyses of different kinds of natural asphalts, which were given in the paper, and specimens were exhibited. But beyond knowing the numerical value of the proportionate constituents, it was highly necessary that the engineer should be acquainted with their quality. Asphalts which gave almost identical analyses might, in practice, yield widely different results, if the nature of the individual components was dissimilar. Powdered limestone should be white, and soft to the touch; if rough, it probably contained iron pyrites, silicates, crystals, &c. The presence of these substances was prejudicial, and if suspected, the limestone should be subjected to a secondary analysis, directions for which were given. The proportion of bitumen to limestone in the natural asphalt should not exceed 10 per cent. for carriage-ways, indeed less than that was preferable. For this latter purpose no asphalt should be specified which had not stood the test of, at least, three hot summers and three cold winters. These precautions being taken, the author was of opinion that a well-laid surface of compressed asphalt, 2 to 2½in. thick, on a foundation of Portland cement concrete, 6 to 9in. thick, was superior to all other carriage-ways. It was noiseless; hygienic, being impervious to urine and the liquids from dung; absorbed vibration; produced neither dust nor mud; was cheap, durable, and easily repaired, and the old materials could be used again. The charge of slipperiness, which had been made against asphalt roadways in London, was not due to the material, but to the absence of provisions for proper scavenging. In Paris, where the asphalt was regularly scraped, washed, and swept, the complaint did not arise. In support of the assertion that climate did not affect the asphalt in London, a table of humidity was given, showing the means of six years' (1873-8) observations to be—for Paris, 80·2; for London, 81·5. The cost of washing the roadways, when done systematically and on a large scale, was much less than was generally supposed, and the advantages far more than counterbalanced the expense. The author submitted a design for a portable washing and sweeping-machine for use in London. Reference was made to the cost of compressed asphalt carriage-ways. In Paris this amounted, on the average, to about 13s. per square yard on lime concrete 4in. thick, but a thickness of 6in. to 9in. of Portland cement concrete was much preferable. The cost of transport of the material also exercised an important influence on the ultimate expense. Details were given of various works of asphalt paving carried out by the author, with particulars of the cost of maintenance.

The quality of absorbing vibration, which was a marked characteristic of asphalt roadways, had been taken advantage of in the application of the material for the foundations of machinery running at high speeds. This was instanced in the case of a Carr's disintegrator, which, being mounted in a pit lined with bituminous concrete, was worked at 500 revolutions per minute, without sensible tremor, whereas, with the former wooden mountings on an ordinary concrete base, the vibration was excessive, and extended over a radius of 25 yards. In the Paris Exhibition of 1878, there was shown a block of bituminous concrete, weighing 45 tons, forming the foundation of a Carr's disintegrator as a flour-mill, and making 1,400 revolutions a minute, a speed which would have been impracticable on an ordinary foundation. Extensive applications of the material for this purpose obtained in France, especially in connection with steam-engines and steam-hammers.

Another use of asphalt was for the flooring of powder-magazines, where its non-spark-emitting character made it particularly valuable. It was also largely applied in France, in the form of gritted mastic, for the flooring of casements in fortifications, and in its pure liquid form, for the coating of vaults and arches, where it protected the masonry from damp, and the subsequent disintegration caused by infiltration and by frost.

In conclusion, the author referred to the imitation asphalts occasionally brought forward, and by some regarded with favour on the score of cheapness. The best of these, if properly made, was as dear as the natural material, without in any degree possessing its special qualities of appearance and durability; and in no case were any of them suited as paving materials to resist heavy traffic. In Paris, the tricks of irresponsible paving contractors were many, and necessitated constant vigilance. Inferior cement was put into casks bearing established brands, and the concrete made with such cement was put down in thinner layers than were paid for. The author had even known cases where the concrete was omitted altogether, a layer of common mortar taking its place. Such foundations would insure the failure of the best asphalt, which ought to be considered only as a wearing surface or armour to the concrete. But the mode most difficult of detection was the ostentatious display, at the site of the works, of cakes of the particular asphalt specified, while an inferior material was in the boilers. Once laid, wear alone would reveal what had taken place. From these malpractices asphalt had occasionally suffered unmerited condemnation, but the author claimed that with *bonâ fide* materials and workmanship, satisfactory results could always be obtained.

ROAD-CONSTRUCTION.

AMERICAN authorities on road-making are as much at variance upon the subject of construction and maintenance of roads as our own surveyors and engineers; and it is, perhaps, one of those questions upon which unanimity of opinion is impossible. We lately gave our readers an abstract of a paper read by Mr. Edward P. North, at a meeting of the American Society of Civil Engineers. In the discussion on the paper reported in the Society's journal, some useful facts have been elicited. Messrs. Spielman and Brush, who have had large experience in the construction of Telford roads in Hudson County, New Jersey, divide this class of road into two parts: 1. The foundation, which should be uniformly secure, and should be a perfect blind drain; and 2, The superstructure, which should be a durable water-tight roof. Sub-drainage is urged as important. An 8in. foundation of rubble and a superstructure of broken stone 4in. thick formed the roads in question, and great care was taken in laying and sub-drainage. Cesspools filled with broken stone were excavated about 200ft. apart on both sides of the road, which collect all the water that accumulates in the foundation of the pavement. The writers say that wherever the foundation of the road gets clogged with water the upper surface shows wet spots. On the foundation 2in. stone was put on, sprinkled and rolled with a horse-roller of 150lb. per inch run. One-inch stone and screenings were then put on and similarly treated, but with a roller of 400lb. per inch run. After every rain the roller was applied and the loose stones which came to the surface after the traffic had commenced were raked off and re-crushed for screenings. Wind and water are great enemies of Macadam roads; the first by blowing off the dust which protects the metalling, and the last by loosening the stones. These authorities say that 8in. is the best thickness for a foundation; it should be laid closely by hand, and the interstices filled and wedged, so that the stones of the upper coating cannot work down. The stones are preferred large and well compacted. The upper coating used in these roads was crushed trap 4in. thick, and the authors prefer machine to hand-broken stones for this purpose, because the edges of the stones are sharp and bind better, and because the screening and detritus so obtained are useful for a top dressing. Mr. George O. Ansley's experience was strongly in favour of steam-rolled Macadam roads over those formed by the horse-roller. He calls the horse-rolling system inhuman towards horses and extravagant in the waste of material. The one advantage gained by horse-rolling is that the horses' feet tread the surface, and discover soft places. In the opinion that the rammer is often an improvement upon the steam-roller, we certainly agree with Mr. Ansley. Steam-rolling is very necessary to produce the general form and compactness of the foundation of a road, but a roller bridges over small soft places which are left unnoticed till the heavy traffic produces unevenness and dips. These defects are avoided by the regular stroke of a rammer, and its use in forming the earthy foundation is strongly recommended. The speaker thought, as regards foundation, the Macadam method was as good as the Telford, and, contrary to the former opinion, prefers hand-broken stone for the surface coating, as less liable to become disintegrated. Another speaker in the discussion advocates the use of trap rock-screenings alone, spread in thin layers, sprinkled, and rolled. From the gist of the remarks made, it is evident there is a general dissatisfaction with regard to the results of rolling Macadam. Even steam-rollers leave, as we have noticed, certain places of soft material, which only the rammer can consolidate. Mr. Charles D. Fox, of London, is of opinion a good steam-rammer or stamper would be better; and he instances the unsatisfactory state of the roadway of the Victoria Embankment, upon which no expense was spared in steam-rolling, and which is in constant need of repair. Turning to the able remarks made by M. E. Lavoinne, Ingénieur des Ponts et Chaussées, France, we find Mr. North's paper criticised in some particulars. The writer remarks:—"They generally consider that in a perfect macadam all stones should bear directly against one another by faces as large as possible, not by edges; and that the interstices, previously reduced to a minimum by rolling, should be filled afterwards with a binding which cannot be affected by atmospheric influence nor give access to moisture." The writer, speaking of binding, says in Paris the authorities prefer to use sand, with a small quantity of chalky dust, instead of screenings or small stones. The sand is injected into the interstices of the compacted road by thorough watering, and the pressures between the stones are thereby equalised. The chalky dust introduced further consolidates by filling the spaces between the grains with a sort of mortar. The best results are said to have followed this method. Another speaker, Mr. E. R. Andrews, made some sensible remarks about Macadam; its liability to become ground into powder under heavy traffic which rises in dust in summer and becomes mud in winter. The stone block pavements are said to be the cheapest, and the wooden pavements of London are spoken of as giving entire satisfaction; the "Henson pavement" is particularly recommended. In America the wooden blocks are too often laid with green wood, imperfectly dipped in tar, on a bed of sand, without the intervention of any solid foundation or boards, whereas it has now become a recognised principle of construction that the foundation should be of some hard resisting and impervious material, to be considered, in short, the true pavement over which the wooden blocks rest as the wearing surface. We have only touched upon the leading points of the discussion mainly to show that the vexed question in road-making and maintenance are as unsettled in America as they are at home.

The Overseers of the parish of Lambeth have brought an action against the Metropolitan Board of Works to enforce the rating of the Suspension Bridge. The Court decided that the bridge was no more rateable than are the various county bridges throughout the kingdom. They will next be trying to rate the Marble Arch, or the fountains in Trafalgar-square.

Building Intelligence.

HANWELL.—The new church in this village (which has been popularly, but quite erroneously, supposed to be the parish in which the great Middlesex County Hospital is located) has been consecrated by the Bishop of London. It is dedicated to St. Mark, by way of association with St. Mark's, Chelsea, the sphere of the former labours of the aged Rector, the Rev. Derwent Coleridge. It is built of stock bricks, with red-brick quoins, and specially-moulded arches and jambs. The shafts of columns are of Bristol Pennant stone, with Bath stone for caps, bases, and window tracery. The floor of chancel is paved with tiles, but the whole of nave, aisles, vestry, &c., with wood-block, laid herring-bone, in one unbroken surface. The pulpit is of pitch-pine, and a handsome stone reredos is in preparation, as a memorial to the late Sir A. Spearman, and is presented by members of the family. There is a sedilia and credence, both of stone, in the thickness of walls. The altar, stalls, &c., are of plain character, in deal and pitch-pine. The design for the church was prepared by Mr. W. White, F.S.A., and the works have been carried out by Mr. Gregory, of Clapham-junction.

POLTIMORE.—The parish-church, dedicated to St. Mary, has just had its chancel restored, from the designs and under the superintendence of Mr. R. Medley Fulford, F.R.I.B.A., architect, of the Close, Exeter. The work has been executed, in its entirety, by Mr. Harry Hems, of Exeter. The chancel-arch, hitherto blocked by plaster and stucco, has been opened out. Beneath it is the rood-screen, which has had the paint of generations removed; has had new oak sills put in to support it, the delicate carved detail being generally cared for, where altogether rotted away new carving has been substituted, and where in somewhat better condition, the course of decay has been stopped. To support the exterior walls of the general structure, four new buttresses of red stone have been built, coped by Ham-hill stone; and Ham-hill has been used generally in nearly all the internal dressings. During the progress of the restoration, two interesting little one-light ancient windows have been opened out. These have been filled with ornamental geometrical glazing by Mr. F. Drake, of the Cathedral-yard, Exeter. The central avenue and the approaches to the sanctuary have been laid with encaustic tiles, supplied by Messrs. Maw and Co., of Brosely; and the altar, which is new and of carved oak, is gained by a step of polished Ipplepen marble. The chancel being formerly very narrow, and hence the space for the stalls of a particularly limited character, the north and south walls have been underpinned, and an arcaded recess formed at each side.

RIPON.—The reopening of Jepson's Hospital, Ripon, took place on Wednesday week. The building as now completed is a vast improvement on the old premises, being spacious and lofty. The dormitory is large enough for 25 boys. The style is that which was prevalent at the time of endowment (1672). The outside is of Surrey brick. The hospital consists of master's house, school-room, refectory, dormitory, &c. The total cost of the building is £1,250.

SHEFFIELD.—St Matthias' Church, Ecclesall-road, was opened on Tuesday. The church is constructed to hold 700 worshippers. The style is Early English, the material stone. The nave is 33ft. 6in. wide and 65ft. long, terminated by a chancel 33ft. wide and 30ft. long, with an octagonal apse. There are also north and south aisles, organ-chamber, and vestries. The total cost is about £5,000. The chancel windows have been executed by Messrs. Powell Brothers, Leeds, and the decoration in the chancel is by the same artists. The choir-stalls and pulpits have been executed by Messrs. Jones and Willis, of London and Birmingham. Mr. J. D. Webster is the architect.

ST. IVE.—The old parish-church of St. Ivo, at St. Ive, stands close by the wayside upon the direct road between Liskeard and Tavistock, and some five miles from the first-mentioned town. The building has many points of especial architectural interest about it, and is a fine specimen of a West Country Perpendicular Church. Its chief glory, however, is in its Decorated triple sedilia, and the rich niches that stand one on each side of the eastern window. These niches, as well as the sedilia in question, are earlier in character than the rest of the building, and date, probably, from about the beginning or middle of the 14th century. The detail, both as regards carving and mouldings, is so singularly like that of much in the cathedral Church of St. Peter, at Exeter, that little doubt can exist but that the same hands that wrought at Exon manipulated, as well as designed, the particular portions of St. Ive, to which present attention is directed. Some time ago, Mr. Richard Coad, architect of Duke-street, Adelphi, London, prepared the necessary drawings, and the task of restoring the sedilia was then entrusted into the hands of Mr. Harry Hems, of Exeter. The work is now complete. Very tenderly has the old masonry been handled. In former days the labels and weatherings of the sedilia had been ruthlessly hacked away. These have been made good, and stone from the Beer Quarries, the same material as was originally used at St. Ive, has been worked, the old moulds and old type of carving being carefully followed in the new.

CHIPS.

In our reference to the new metallic compound known as Spence's Metal (see p. xv. last week), we, by a slip of the pen, said it *contracted* on cooling. The context, referring to its power of taking sharp impressions, shows that what we intended to say was: it *expands*, on cooling.

The death is announced, at Innsbruck, of the German painter Franz Hellweger, of acute pneumonia, at the age of 67 years. He was associated with Cornelius in some of his most important tasks, working with him during three summers at the frescoes in the Ludwigskirche at Munich. He had also a large share in the decorative works in the cathedrals of Cologne and Spires.

Perhaps no street in London shows greater eccentricity in the way of numbering than Oxford-street. There are, it seems, eight houses numbered 315, eight numbered 314, three numbered 343, and two numbered 256; while 140 of the houses have only 55 numbers among them.

Percentage of carbonic acid in various samples of air, as computed by Dr. Angus Smith, F.R.S.:—On the hills in Scotland, ·0322; in the London parks, ·0301; in the London streets (average), ·0341; theatre (gallery), ten p.m., ·1010; theatre (boxes), twelve p.m., ·2180; theatre (pit), eleven p.m., ·3200; over middens in Manchesser, ·0774; Metropolitan Railway, ·1174; in mines (largest amount), 2·5.

The City Commissioners of Sewers determined at their meeting on Tuesday to try the system of a series of electric alarm posts or boxes in the City to give warning in case of fire. A list was given of the points at which the experiments would be tried.

Two bridges on the Great Northern Railway, at Ilkeston, have recently given way at the foundations, owing, it is said, to mining operations beneath the surface.

A well-attended meeting of solicitors, representing building societies and others, was held on Monday, at the Inns of Court Hotel, London, to consider the Bill before Parliament, introduced by Mr. Marten, Q.C., to amend the law relating to leases. It was resolved to support the Bill, and a petition was adopted for presentation to the House in its favour.

In their annual report, just issued, the Birmingham Gas Committee announce that they have made a net profit of £51,165 in the year's working.

The foundation-stone of a new mission-room for the parish of Sculcoates was laid on Monday week. It will be in connection with the Church of All Saints, a very fine Early brick church, by Mr. Street. The new building will be over 80ft. long and 30ft. wide, and will be connected with the east end of the church by a corridor. Messrs. George Jackson and Sons are the builders, and the work is being carried out from the designs and under the superintendence of Mr. Robert Clamp, A.R.I.B.A., of Hull.

On Monday morning the first instalment of antiquities from the Indian Museum, presented to the Trustees of the British Museum, was exhibited to the public. This consists of five large cases containing Buddhist sculptures, and come principally from the neighbourhood of Peshawur. At present no description of these wonderful sculptures has been given, but the Museum authorities have engaged some of the most learned professors to enlighten the public upon the subjects represented.

The Birmingham Society of Arts has agreed to ask Mr. G. E. Street, R.A., to accept the office of president of the society.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Front Page Advertisements and Paragraph Advertisements 1s. per line. No front page or paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

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RECEIVED.—B. and J.—C. T. W.—B. and B.—C. F. P.—B. of S.—S. V.—C. F.—J. P. S.—B. V. B. Co.—R. N. and Co.—W. M. H.—H. M. W. C.—J. M.

QUESIVI. (We cannot say. An advertisement in our pages would probably procure you the information.)—ROBERTS, THOMPSON, AND ROBERTS. (Your letter, if published, would expose us to an action for libel.)—A COUNTRY ARCHITECT. (The house we illustrated was commented on at the time by several correspondents, and as no reply was forthcoming it must be supposed that the defects pointed out exist. But we had nothing to do with this in reviewing the book, and hardly see the necessity of returning to the subject.)—R. D. R. (Names and addresses must be advertised for.)—T. BUTLER-WILSON. ("Orsmond" was a misprint for "Ormond.")

"BUILDING NEWS" DESIGNING CLUB.

LIST OF SUBJECTS.—1. A boat-house suitable for a river in the suburbs of a town, with dressing and pic-nic rooms over. Brick and timber to be employed. Plans, elevation, and perspective. Scale, 8ft. to the inch. 2. A wardrobe in pitch-pine, with a large looking-glass panelled. Necessary drawings at inch scale and details with sketch.

DRAWINGS RECEIVED.—Alphonso the Brave, Honey Dew, Burswell, Castello, Our Praises are Our Wages, Pupil J., Vanity Fair, Edwin, Ora et Labora, B in 3 circles, Quod, Ogmore, Alfred, Fleur-de-Lis, Clansman, Morning Prayer, Hornet, Heart and Arrow, A. Fish, A. U. C.

Correspondence.

THE RESTORATION OF ST. MARK'S, VENICE.

To the Editor of the BUILDING NEWS.

SIR,—I thank you for having published my letter of the 2nd Feb. In confirmation of what I then wrote to you, I may tell you that we are just about to begin the partial restorations that are indispensable on the main façade of the Church of St. Mark; by which it is rendered certain that no demolition will take place, except a trifle in the narrow space comprised within the first arch to the right, where certain works which bear upon the solidity and stability

of the edifice are needed, and where it has already been strutted, and even for these works we await Government approbation. In any case, the present configuration will remain unaltered, and all the marble pieces which actually compose this short tract of the façade will be replaced as they at present exist.—I am, &c.,

Venice, Feb. 19. GIO. BATT. MEDUNA.

CARLISLE FRATRY.

Feb. 21, 1880.

DEAR SIR,—I am directed by Mr. Street to forward to you with his compliments, the enclosed copies of correspondence, in reference to the above.—I am, &c.,

(pro. G. E. STREET),
THOS. J. B. HOLLAND.

[Copy].

CARLISLE REFECTORY.

The Society for the Protection of Antient Buildings,
9, Buckingham-street, Strand, W.C.
16 Feb., 1880.

G. E. Street, Esq., R.A.

SIR,—We beg to acknowledge the receipt of your letter of the 9th inst., in which you inform us that you propose to restore the Fratry at Carlisle in the manner against which (if we understand you rightly) this Society has always felt bound to protest. We understand that the building will be remodelled and restored to what it may be conjectured to have been before the Reformation. We trust that it is not true, as stated, with apparent authority, in the local papers, that the walls will be treated in the same way as were the walls of the Cathedral in 1857. With regard to the square-headed windows, which, we fear, are condemned, if not already destroyed, we beg to quote a letter of our Carlisle correspondent, already published: "They record a most interesting page in the architectural history, not only of the Fratry, but of the whole Diocese of Carlisle. After 1660, these two windows were inserted; no doubt, they were the work of Machell, who, in his manuscripts, prides himself that he and Addison, of Kirkbythore, were the first to introduce into the Diocese of Carlisle the revival of Classical Architecture. He was the adviser of Dr. Smith, the munificent Dean and Bishop, who did so much both at Carlisle and at Rose. Independently of the artistic character that these windows have, they record the Classic revival in this part of England, and should not be effaced without grave reason."

It is the destruction of local history in a ruthless manner, as well as the loss of the venerable and interesting associations, that we deplore.

On behalf of the Committee of the Society for the Protection of Antient Buildings.
(Signed)
NEWMAN MARKS, Secretary.

[Copy.]

The Carlisle Journal, 30th Jan., 1880.

THE FRATRY.

To the Editor of *The Carlisle Journal*.

SIR,—You are usually so accurate in your information that I am slow to disbelieve anything you state, but a paragraph in your last Friday's issue taxes my credulity heavily.

It cannot be true that Mr. Street, after all he has said and written about St. Mark's, Venice, can be going to *reface the walls of the Fratry outside, and remove the square-shaped windows*, which were, I believe, inserted by the great Antiquary, Machell.—Yours truly,

(Signed)
RICH. S. FERGUSON.

CARLISLE REFECTORY.

MY DEAR SIR,—As I think the objections of your Society to all Restoration of old buildings, when applied to such a building as this, quite demonstrably absurd, I have not the slightest hesitation in saying so. The question is simply this, Are the owners of old buildings to be allowed to use them or not? If they may use them, they must repair them. I believe Mr. Ferguson has no warrant whatever for fathering the two windows I have removed on Mr. Machell, or on anyone else. They were identical with two windows in a house near the gateway to the Close, on which is the date 1699, which are there still, and open to study and inspection. Whoever inserted them did so because at that time the Fratry was being subdivided by floors and walls into a number of rooms, and, whilst he opened some new windows, he blocked some old ones, without any regard to anything but his own ideas of convenience. He tore down also a good deal of old masonry, and built it up in a new wall, which I have taken down, and, as the old stones are all exactly worked for certain heights of courses, we know exactly whence they came, and are carefully putting them back again in their old places, with the old mason's marks restored to view. The two windows of 1699 were singularly bad specimens of their age, and, what is more important, they were inserted with grave risk to the stability of the structure, and in the meanest and most careless manner. The whole wall above them was carried upon slight wooden lintels. In one window the lintel had been propped with a huge pier of brickwork, which could not safely be removed, and the other window, not being so supported and blocked inside, was in a dangerous state, until I had it shored up. These two windows were twice the size of the windows above them, and were with ingenuous ignorance of the risk involved, inserted under the piers, instead of under the windows. On structural grounds, therefore, no honest or practical architect would allow such openings to exist a day longer than could be helped. And now, allow me to say that I should like your Society to explain to us why, if it was lawful for Mr. Machell (or someone else) to block some windows, and open out others, in 1699, it is not lawful for me to do the same thing now, in 1880?

His alterations ended by obscuring every feature of interest in the interior of the building: mine will end by exhibiting every old feature of interest, and in its old place and state. One part of the "history" of this building was made in about 1808. At that time, three canopied niches were removed from the east wall, and put as ornaments against the north wall, being fixed in front of the old north windows. I am "ruthlessly" going to put these niches back in their old place above the dais, and to open the blocked-up windows. I know your Society will be sorry to hear of this "ruthless" alteration of the existing work, but as the Dean and Chapter wish me to be responsible for the work, I fear I must take the course which my experience and commonsense suggest, without regard to the feelings of your Society.

In the same way, part of the history of the fabric was made a few years ago by the introduction of some rather eccentric stone props under the groining of the crypt. These, I understand, were executed from the designs of the brother of your correspondent, Mr. Ferguson, who used to be Surveyor to the Chapter, and I feel myself obliged to take them away, and to rebuild this damaged portion of the crypt exactly on its old lines. Again, in the same spirit, I am going to take away a doorway inserted some fifty years since by Sir Robert Smirke, in order that I may be able to restore a very fine fourteenth-century doorway, of which we have discovered the base and jambs in their original place below Sir Robert Smirke's work. Smirke's Gothic work bears precisely the same relation to good Gothic work that the two 1699 windows do to good Italian or Renaissance work, and, as he was born in the eighteenth century, I fear your Society will be grieved to hear of this last act of vandalism of which I am guilty. When the Refectory is restored, I shall look forward to the day when a cloister may also be built, following the old lines, and it would give me I cannot say how much pleasure, to restore, as I could, from the fragments that remain, the ancient octagonal Chapter-house. In my opinion, such works as these are desirable, and in every way to be encouraged; and the Dean and Chapter of Carlisle are to be congratulated on having the proper sense of their duty, shown by their determination to remove all unsightly walls, and doors, and ceilings which have been formed in their magnificent Refectory, and to restore it to its old state. No one who knew its late state, and who still retains a grain of common-sense, could doubt for an instant the propriety of the course they are adopting, in what you call a "ruthless destruction" of a page of "local history." It is a history of barbarous destruction of which no one, I believe, in Carlisle (not even Mr. Ferguson) is proud.

I must have lived and worked in vain for a good many ears if it is necessary for me to refer to the assumption n Mr. Ferguson's letter that I am going to reface the external walls of this interesting building. As to the "venerable and interesting associations," "the loss of which you deplore," I, of course, can only regret that your Society is so hopelessly at issue with me as to what associations deserve such adjectives. To you all the miserable and pitiful alterations which have been made in a noble building, the walls which have divided its interior into a number of rooms, where there was only one intended by the founder, the lath-and-plaster linings to the walls, the mean plastered ceilings, the concealment of the beautiful and perfect pulpit, and the ruinous state of part of the crypt, appear to have venerable and interesting associations, for, no doubt, great men have gone in and out of these poverty-stricken rooms, and good works have been done in them. But I am an architect, and an antiquary. I have all my life been devotedly fond of ancient buildings, and to me the "venerable and interesting associations" were all wrecked when impious hands set to work to mar every feature of this noble Refectory. Fortunately (from my point of view) it rests with me rather than with you to decide, in this case, which class of associations really deserves consideration at our hands at this time. I cannot say how glad I am, for the sake of the building, that this is so. I have written at some length on this occasion; but I must, in conclusion, say that I do not understand why you should demand such explanations from me. You *must* know by this time what my architectural practice is, and I have not the slightest intention of giving it up at your request.—Believe me,

Yours very faithfully,
(Signed) GEORGE EDMUND STREET.

14, Cavendish-place, London, W.
February 20th, 1880.

To Newman Marks, Esq., Secretary,
The Society for the Protection of Antient Buildings.

COMPETITIONS AND THE INSTITUTE.

SIR,—Will you kindly, in your next, correct a printer's error in my letter that appeared in last week's BUILDING NEWS?—viz.—Instead of "the architect offered to do the work for £1,200," it ought to be "for £12." This, in lieu of his 5 per cent. commission, which would have been £30. I think this won him the competition more than anything. CHAS. CLIFTON.

Liskeard, Feb. 21.

SITTINGBOURNE HOSPITAL COMPETITION.

SIR,—I think the statement of your correspondent "Hospitaller," coupled with your report of the meeting of the Board, fully justify competitors in sending memorials to the Local Government Board, and also to the Sittingbourne Local Board, asking that *all* the designs sent in may be submitted to an impartial architect appointed by the former body.

As "Hospitaller" has seen the selected design, I presume he has some *locus standi*, and will probably be able to obtain the addresses of the competitors. If he can do so, and will draw up the memorials, I for one shall be happy to sign them.—I am, &c., A COMPETITOR.

SIR,—Having had an opportunity of inspecting the whole of the designs submitted in the above competition, I cannot conceive for what reason your correspondent, Mr. G. G. Hoskins has rushed into print to proclaim the undoubted superiority of his design over those of other competitors.

The designs submitted were, on the whole, only indifferent specimens of architectural draughtsmanship, and, no doubt, it will be very discouraging to the authors of "beautiful" drawings to be informed that the plans most seriously entertained by the Hospital Board were the least pretentious in their get-up. It is not my intention to defend the action of the Hospital Board, but, seeing that no professional criticism has been published, it is only fair to state that other competitors have greater cause for grievance than your correspondent, their plans having more successfully embodied the requirements of the Hospital Board. No doubt each competitor considers his own attempt the best. Mr. Hoskins is clearly of this opinion.

The letter of "Hospitaller" is one of those undignified stabs in the back which it is hard to reconcile with any sense of professional *etiquette* and fair-play. It displays the chagrin of an unsuccessful competitor. His communication, like the French savant's definition of the word crab, would be excellent did it contain *one* correct statement. (1) The drawings were *not* exhibited in a public room communicating with the surveyor's office. (2) The successful competitor did not submit two sets of plans "*neither* of which were approved." (3) The so-called sketch plan was *not* "prepared to meet subsequent requirements of the Committee." (4) Abundant information was *not* derived "from the twenty-one designs sent in." (5) The Local Board, by which, I presume, "Hospitaller" means the Hospital Board—have not instructed their surveyor to prepare *another* set for the Local Government Board.

In view of the remarkable accuracy of your correspondent, the opinion he expresses, that not one of the schemes yet submitted by the successful competitor will pass, cannot obtain much deference. The remainder of his remarks with regard to the first rural hospital and the Local Government Board, &c., shows—(1) That he is not a diligent reader of his BUILDING NEWS, (2) That he has limited knowledge of the Local Government Board's requirement, and (3) He quite mistakes the functions of that body.

"Hospitaller" should, if he intends to maintain his position—and has the courage of his opinions—in any future communication, attach his name and address. This is only fair to those whom he attacks.—I am, &c.,

JAMES GEORGE BUCKLE,
Adam-street, Adelphi.

SCOTTISH ARCHITECTURE.

SIR,—I observe that Mr. W. H. Brewer, in a paper lately read before the Architectural Association, says, "There was little exaggeration in the statement of Erasmus, that a citizen of Nuremberg was better lodged than a King of Scotland." Both Erasmus and Mr. W. H. Brewer seem to have written without knowledge of the facts. The Kings of Scotland, although they made more than one King of England shake in his shoes, were certainly not first-rate potentates; but they possessed Stirling, Linlithgow, and Falkland, not to mention the abbeys of Scone and Holyrood, which were richly endowed by them, and therefore legitimately made places of occasional residence. The three palaces I have named were quite equal to the ordinary average of European royal residences. If any one doubts this, let him study Stirling in its decay, or Linlithgow and Falkland in their ruins, and let him consult the view of the courtyard of Falkland given by Slezer, which is a fair specimen of seventeenth-century magnificence. (The London editions of Slezer's "Reviews of Scottish Buildings" are of 1693 and 1718.) But even this is hardly necessary, when they can be

compared with St. James's Palace in London, as it now exists, or with the Hof-Burg of Vienna, though that is thought sufficient for the accommodation of Austrian emperors in the nineteenth century. Before English architectural writers indulge in taunts which are the mere offspring of ignorance and impertinence combined, it would be well to make themselves acquainted with the facts of the case. Linlithgow Palace was burnt down in 1715, by the two English regiments which occupied it, and Falkland was allowed to decay by the shameful niggardliness of the Government of Whitehall. Doune Castle, the residence of the Dukes of Albany, the brothers of the Scottish kings, was far superior to anything allowed to a modern Prince of Wales or Duke of York; but it was also ruined and plundered in the same year, and was never restored. It little becomes an Englishman, who knows how little has been spent in Scotland since the Union, by the Government, for architectural objects, to taunt Scotland with inferiority; and it seems to have been forgotten by many who have written in the present day, that London and Oxford are indebted to Scotchmen—Gibbs, and two of the three Adams'—for some of their finest buildings. But what can we expect when lectures are delivered by professors of architecture which make absolutely no mention of Scotland at all?

I may here observe that the description of the Jacobean style by Sir Walter Scott, quoted in Mr. Brewer's paper, is hardly a fair one, and it seems remarkable that it should have been written by one who had Heriot's Hospital before his eyes when living in Edinburgh. There is no jumble of the different orders in that building, nor is there anything impure in its style, unless we are at once to condemn a turret, or gloriette, placed on a building of Classical outline as an impurity. The ornamentall scrollwork of interlaced fillets over the windows is a peculiarity which, I believe, is only found in Scottish architecture, for I have never met with it in any other European country, and it forms the most graceful heading to a window with which I am acquainted. This may be seen in full perfection in Heriot's Hospital, which was built in the reign of Charles I., and is one of the finest collegiate buildings ever raised.—I am, &c.,

VITRUVIUS CALEDONIUS.

"QUEEN ANNE STYLE."

SIR,—I had no intention of taking up your valuable space with a discussion on architecture; this may be left to others more competent. I merely wished to protest against the uncalled-for sneering tone employed by Mr. Seddon against the cottage-villas on the Bedford Park Estate. Surely it was quite *infra dig.* for an architect of so evident high-class culture—sitting in his chambers at Westminster—to take umbrage at subjects so much beneath his contempt at such an out-of-the-way place as Turnham Green!

I only contend that the so-called "Queen Anne Style" may be made "the right thing in the right place," and I am not alone in this opinion. This was the sole argument of my letter; I had no intention of anything else.

Mr. Allen (who is evidently wedded to the Scotch) would have us all adopt "the pointed turrets, overhanging corbels," and massive masonry of the borrowed Flemish.

I certainly admire very much the fine old baronial castles and mansions of this country, situated generally amidst grand romantic scenery; but would it not be absurd to attempt to copy these on a Liliputian scale, applied to cottages intended only to meet the wants of small families with limited means!

Admitted that many incongruities are practised on this "Queen Anne," sensible men will dispense with them, and if carried out in its simple quaintness with a few modifications, this style will present features for pictorial effect, which must obtain with those (other perhaps than architects) who have an artistic leaning for something more than a few plain walls perforated with holes to represent doors and windows!

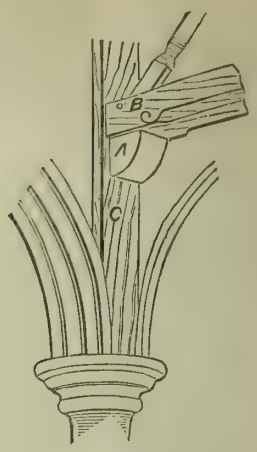
Architects *may* overlook (in their own peculiar walk) the "light and shade" so pleasant to everyday life, and the fact that a little more variety—even in buildings—is charming to those who are not educated to admire only certain types of architecture!

Allow those who are not rigid adherents to *school* to indulge a penchant—in their own quiet way—for the rustic and quaint, and so long as they do not intrude it, let their endeavours be respected.—I am, &c.,

Edinburgh, Feb. 23. E. CALVERT.

"QUEEN AN(NE)TICS."

SIR,—When Mr. Romilly Allen uses such terms as "the horrible monstrosities" of the Queen Anne style, in his letter under the above heading in last week's BUILDING NEWS, calling the present the "age of plate-glass," it is certain that he is not far wrong when he concludes his epistle with the pious reflection that any attempt on his part to convert those bitten with what he calls "the Queen Anne craze" to his way of thinking "would be a hopeless waste of time." No one, even of moderate views, could patiently follow a writer who characterises the sober and quiet Renaissance of the 17th century as "simply hideous nightmares," while he ignores such charming examples of the same class of work in Scotland as the old Glasgow University, illustrated by you last week on p. 217. In this age of eclecticism it, of course, will never be possible for all professors of art to agree as to which is the best style for modern purposes in building, but it is equally certain that no good taste will ever be promoted by such letters as Mr. Allen and Mr. Seddon have favoured your readers with in the last few numbers of the BUILDING NEWS. Mr. Seddon, in his last letter, seems to pine for what he calls "the true, homely, and comfortable structures left to us from the Middle Ages," whatever that may mean, and one cannot but offer him some sympathy that he should be condemned by fate to reside in the 17th or 18th century-street at Westminster called Queen Anne's-gate; indeed the very name of his home must be a constant source of discomfort to him. But then it can hardly be possible that he should really intend what he says about the "homely comfort" of a Mediæval house, unless he be the veritable "Georgius Oldhousen," of Prof. Kerr's novel "The Ambassador Extraordinary," who burnt gas in an asbestos stove in the centre of his hall because the Insurance Company and Board of Works would not allow a log-fire in the same position in the true Mediæval fashion round which his family-circle might sleep with their toes to the fire on rush mats and straw. This of course, was only the professor's little fun; but surely Mr. Seddon himself is not prepared to tell us that even Mr. Burges's 13th-century style house at Holland-park, perfect as it is as a specimen of the Mediæval style, is in any way suited to ordinary 19th-century "homely comfort." It is certainly complete and thoroughly well done, no cost and care having been spared in its erection and decoration; but whose imagination is vast enough to conceive anyone living there with "homely comfort," save Mr. Burges himself?—whose house is unique, and will probably remain so unless its author or Mr. Seddon will show us more completely than they have thus far done how to adopt Mediæval forms to every-day 19th-century wants and requirements. That the Queen Anne style is by no means perfect few will deny, and when its followers perpetrate "hideous nightmares" they must expect to be told of it, and no one has any right whatever, professing himself an artist, to build with false construction be his style of architecture what it may, especially in this "the age of plate-glass." Now the leaders of the "Queen Anne" movement are by no means free from these sins, and by this time they ought to know it, and for what good reason Mr. Norman Shaw sometimes does the things which bear his name his most ardent admirers must be at a loss to conceive. I lately took occasion to visit the Queen Anne church, which Mr. Shaw is building under his own supervision, as the foreman told me, at Bedford-park, Chiswick, and I was much interested, and I may say satisfied, with the building, which for its purpose and site seems very well planned. There were several details, however, which I could not make out, and not to trouble you with more than one example, I send you a sketch from memory of the singularly queer way in which the stone corbels over the imposts on the aisle side of the nave arcade are made to rest on timber uprights—by which sketch it will be seen that the stone corbels, A, appear themselves to be simply stuck up into the right angle formed by the aisle roof tie-beams, B, and wall uprights, C, and this arrangement is made more conspicuous by the dark green paint of the woodwork! If this is a "Queen Anne antic," it is not worthy of Mr.



Norman Shaw, and I cannot think he means to let it pass?—I am, &c., F. S. A.

THE OXFORD HIGH SCHOOL FOR BOYS.

SIR,—I was somewhat surprised to see in your last issue a letter from Mr. Codd in reference to the competition which took place for this work last year.

It was one to which the strongest opponent of competitions (except in one particular) could scarcely raise an objection: it was limited, I might say extremely limited, to three architects, each one being paid an honorarium of £50 or guineas.

The one point alluded to is, that no professional referee was called in; but having devoted some time to the study of the plans, when on view, I am bound to say in justice to the governing body that had one been engaged the result could scarcely have been different, for there can be little doubt that the design sent in by Mr. Jackson was by far the best and most economical in the room.

It is now some months since the designs were exhibited, so that I cannot remember the detail arrangement of the plans; but I believe I am right in saying that in neither of the three sets sent in by Mr. Codd had he so arranged his buildings as to give three entrances to the school, or anything like the space for recreation shown, either in Mr. Jackson's original plan, or those illustrated by you on Feb. 13th.

Whether the charge made by Mr. Codd be true or not, it would, I think, have been advisable for him first to have looked at home; for, unless I am greatly mistaken, Mr. Codd has been guilty of a similar practice himself.

It was reported during the time the plans were sub-judice that a petition was presented to the Governors signed by most of the members of the Corporation on behalf of Mr. Codd, praying that the competition should be awarded in his favour. If this be correct, and I heard it on good authority. I think you will agree with me that Mr. Codd should have refrained from passing any comment on the subject.—I am, &c.,

A LOOKER ON.

[In obedience to the requests, both of Mr. Jackson and Mr. Codd, arrangements have been made to illustrate these gentlemen's designs side by side, when our readers will be enabled to judge for themselves.—ED. B.N.]

ART SYMBOLISM.

SIR,—I am fully alive to the research, learning, and agreeable style of French antiquaries, from Durand to Didron, who sought inspiration from objects in their own country; but I could wish that these admirable qualities were imitated in the same national spirit in England. Nearly every illustration in your columns is drawn from Continental sources, which have been reprinted many a time and oft; they are, unfortunately, all second-hand, and, moreover, not English. There are, however, MSS. in abundance, and early-printed books, lying ready to reward honest and original study. As a mere sample, I will copy a few notes from "Dives and Pauper" (1496), which give proof that there was an English school of art and symbolism, which proceeded on certain

principles. I have modernised the spelling:—"Imagery is but a token and a book of the lewd (lay) people. The image of Our Lady is painted with a Child in the left arm, in token that she is Mother of God, and with a lily or else with a rose in her right hand, in token that she is maiden without end, and a flower of all women. And so of other saints, whose images have divers signs in their hands, and other places, for divers virtues and martyrdoms that these saints suffered, and had in their life. The image of (1) St. Peter is painted with keys in his hand, in token that Christ betook St. Peter the keys of Holy Church and of the Kingdom of Heaven. (2) St. Paul is painted with a sword in his hand, in token that he was headed with a sword for Christ's sake, and also in token that sometime he pursued Holy Church with the sword. St. John the Evangelist is painted with a cup in his hand, and an adder therein, in token that he drank deadly venom, and, through the virtue of the cross, it lost his malice and did him no harm; and in his other hand he beareth a palm, in token that he was a martyr, and had the palm of martyrdom, although he was not slain, for yet his will was for to die for God's sake. (3) St. John Baptist is painted in a camel's-skin, in token that his clothing was full hard and sharp; he beareth a Lamb with a cross in his left hand, and his finger of the right hand theretoward, in token that he showed God's Lamb God's Son, that died for us on the cross. St. Katherine is painted with a wheel in the one hand, in token of the horrible wheels which the tyrant Maxentius ordained, to rend her from lyth to lyth, but the angel destroyed them, and many thousands of heathen people, and so did her no harm. She hath a sword in the other hand, in token that her head was smitten off with the sword for Christ's sake. St. Margaret is painted also with a dragon under her feet, and with a cross in her hand, in token that when the dragon devoured her she blest her, and by the virtue of the cross the dragon burst, and she came out of him in good health and whole. (4) And so forth of divers images of other saints, which images be made to represent to man the virtuous living of saints, and the holy ending of their temporal life. Commonly all the Apostles be painted bare-foot, in token of innocency and penance. Also the Apostles, commonly, and other saints, be painted with mantles, in token of the virtue and poverty which they had. (5) The round things painted on their heads betoken the bliss that they have without end. (6) Angels be painted like young men, beardless, in token that they be endless and elden not, ne feeble not, but alway in one liking, in one estate, alway mighty and strong. And also they be painted with curled hair, in token that their thought and their love is set always in right order. Also, they be painted with stoles about their necks, in token that they be always ready to serve God and man at God's bidding. They be painted feathered, and with wings, in token of lightness and deliverness in her (their) works. They be painted with wheels under their feet, in token that they move and rule the round bodies, the wheels and the circles in heaven, and also in token that as the wheel alway turneth about the centre and her midst, so the angels' doing is alway about God and alway be nigh Him wherever they be. Also, sometime they be painted, armed with spear, sword, and shield, in token that they be ready to defend us from the fiends that be busy night and day to lese us. (7) The four Evangelists be painted in divers likeness; St. Matthew in the likeness of a man, for he principally wrote and taught the Manhood of Christ, and told how He became Man; St. John in likeness of an eagle, for he spake and wrote highest of the Godhead, and had more insight and understanding in the Godhead than the other Evangelists; St. Luke in the likeness of an ox or of a calf, because that he speaketh most openly of the Passion of Christ, which was betokened by the sacrifice of the ox; St. Mark is painted in likeness of a lion, because he spake most openly of Christ's resurrection [here follows the legend of the lion], and therefore his Gospel is read on Easter-day. (8) They be painted on the four corners of the cross, in token that He that died on the Cross is King of all things, as four divers kings in kind, four king's heralds blazoning His arms, and the great battle and victory that He did against the fiend for mankind upon the Cross." [They were also painted in four parts of a dwelling-house.]

I turn to Durand. As regards (6) angels he refers to the description of the Winged Seraphim, and says they are represented as "in the flower of youth, for they never grow old"; (2) "St. Paul with a book and sword, with a book as a doctor, or with reference to his conversion, with a sword as a soldier"; (3) St. John Baptist "as a hermit." (5) The Saints' crown is made in fashion of a round shield, "because they enjoy the Divine protection." (7) "The Four Evangelists be painted with books by their feet. Matthew hath the figure of a man, Mark of a lion (8); these be painted on the right hand, because the Nativity and the Resurrection of Christ were the general joy of all. Luke is the ox, because he treateth more especially of the Passion and Sacrifice of Christ; the ox is (8) painted on the left side. John hath the figure of an eagle (8) pourtrayed above, since it denoteth the Ascension. Some of the Apostle are represented with books in their hands as doctors, as Paul and the Evangelists, (1) Peter, James, and Jude. Others with wheels as a type of their preaching (4); Martyrs with instruments of their torture, as St. Laurence with the gridiron; St. Stephen with stones, and some with palms, which signify victory; Confessors with their tokens or badges; bishops with their mitres; abbots with their cowls; and some with lilies, which denote chastity; doctors with books; virgins with lamps; St. Michael is represented trampling on the dragon."

Your readers, I think, will agree with me that the English artist and writer have the advantage. The one parallelism [7] points to a common origin in the Patristic interpretation of the Living creatures. In the other cases the illustrations possess an individuality properly their own, which holds good in other matters not immediately connected with this precise subject. One thing is clear: English subjects require English treatment.

MACKENZIE E. C. WALCOTT.

BARNARD'S "EARTH COLUMN."

SIR,—I have just seen your notice of my "earth column" in your issue of the 13th inst. I provide for closets on basement floors by sinking the column in a dry well.

In a few words at the head of the diagram I sent you I said, "one or even all the earthen vessels may be dispensed with." Their use is to retain the salts, &c., of the urine, which are the most valuable of all in the night-soil for the grower of wheat, &c., phosphates, &c.

The great advantage to the householder is this, he retains the use of the clean w.-c. People will not tolerate the earth-closet in their houses.

My earth column outside the house retains all that is valuable to the agriculturist, and only allows nearly purely water to flow into the sewer and thence into the rivers.

I shall win the King of Saxony's prize for best means of purification of rivers.—I am, &c.,

G. BARNARD.

AT the Metropolitan Board of Works last Friday it was ordered that a letter should be sent to the Home Secretary in reply to his last communication upon the subject of Artisans' Dwellings. The Board find that the refusal of Mr. Cross to allow them to take fifteen or more houses for public improvements until accommodation has been found elsewhere for the evicted inhabitants is a practical bar to street improvements on a large scale. If the Home Secretary will not relax these restrictions the Board will seek the assistance of Parliament next session.

THE annual report of the Director of the National Gallery was issued on Monday. Eighteen pictures were purchased for the Gallery during the year 1879. By the death of the late Mr. F. W. Clarke, the personal estate of his father, who died in 1856, is bequeathed on trust to the trustees of the National Gallery. The estate is estimated at £24,000. The total number of pictures now contained in the public rooms of the gallery is 1,040. The Treasury have sanctioned the annual purchase of books on art to a value not exceeding £100, for addition to the "Eastlake Library." The galleries in Trafalgar-square have been visited by 871,500 persons on the public days during the year 1879, showing a daily average attendance on such days of 4,635, or 163 less than last year. The total number of attendances on students' days (exclusive of casual visitors) during the year has been 19,434. Independently of partial studies, 862 oil-colour copies of pictures have been made.

Intercommunication.

QUESTIONS.

[6055.]—**Sight Rail and Profile.**—Will one of your readers kindly explain the use and usual form of the sight rail and profile in giving the line and level of a sewer?—A. B. C.

[6056.]—**Ceiling Decoration.**—Will any reader kindly inform student what work is necessary to be done in the first instance to an existing ceiling to be decorated with colour, and what kind of specification should be prepared in order to obtain an estimate for carrying out the whole work, including the colour decoration in a first-class manner? And also what good men are there who undertake such work?—H. S.

[6057.]—**Brewery Building and Well-Sinking.**—Will some of your well-informed correspondents be good enough to tell me what are the best works to consult upon brewery building and well-sinking? I wish to build a small brewery, and may have to sink 200ft for good water.—INVESTOR.

[6058.]—**Plaster.**—Can any of your readers tell me any other way of taking plaster off a garden wall which has had a greenhouse built against it than by chipping it? The plaster is an inch thick, and is very unsightly, and I fear that if I try cutting it part of the wall will come down with it.—BALBUS.

[6059.]—**Smoke in Brickyard.**—I shall be glad to know of any plan of preventing or consuming smoke in a brickyard having four kilns and three sheds and one boiler, with a chimney 120ft. high. The smoke goes through an underground flue to the chimney. The kilns are oblong-shape, and arched over, and the smoke goes downwards through the kilnfloor into the flue. There are a dozen or more fireholes on each side of each kiln, also fires under the sheds. See advertisement in BUILDING NEWS also.—E. M. JONES, Wrexham.

REPLIES.

[6006.]—**Old Irish Cemetery Crosses.**—An esteemed friend, writing to me recently from the extreme West of Ireland, seems to give clear answers to the question originally asked under the above heading in your issue of Jan. 3rd. He says, "Those crosses I have inspected hereabouts are of a closely-grained granite. The bottom of the shafts attached to the base by a tenon of some 8in. long. So far as my experience goes, no lead or any sort of cement whatever appears, in any instance, to have been used in their fixing." Mr. Thomas M. H. Flynn's remarks in the BUILDING NEWS for Feb. 13th are interesting, although, as regards the Chicago buildings, somewhat startling. It has been accepted as a fact that the granite buildings in Chicago did *not* stand fire. Mr. Flynn, however, tells us he went over purposely to see, and that although granite is used largely in other cities in the States, at Chicago—at least, before the fire—the material was, to all intents and purposes, unknown. I am promising myself a holiday scamper during the coming summer through America, and when at Chicago shall be only too glad to write to "Intercommunication," and no doubt, after due inquiry on the spot, to confirm Mr. Flynn's correction of what, if an error, is certainly a widely-spread one. But whilst admitting that if no granite existed at Chicago, it could not be burnt, we must not overlook that much nearer home granite has existed, and *has* been destroyed by fire. Mr. Flynn says nothing of the Devonshire church upon the Cornish border, which I cited by name, as an illustration of the inability of granite to stand heat. Upon Nov. 19, 1877, Lamerton Church, three miles from Tavistock, a Perpendicular building, built largely, like nearly all the neighbouring churches, of granite, was totally consumed by fire. The vicar, the Rev. H. T. Phillpotts, wrote to me recently upon this very subject, and this is what he says:—"The effect of the fire upon the granite in Lamerton Church was very remarkable. The various mouldings were burnt off, and the mullions and jambs of the windows became so brittle that although they were afterwards taken down most carefully they broke to pieces in the workmen's hands. The massive granite piers in the arcades crumbled to atoms in precisely the same way. We had a foreman of Messrs. Freeman and Son, the granite merchants of Penryn, here, and he tapped some of the granite that in places looked all right. It all sounded hollow, and so he declared it to be quite useless, and all had to be condemned. I do not think one single bit of granite that the fire reached has been found worth anything or sufficiently strong to be re-used." So much for granite under fire. On the other hand, we have Huntspill Church, in Somersetshire, just 80 miles from Lamerton, as the crow flies, a noble building, built wholly of Ham Hill stone. A year ago this church was totally consumed by fire. Much larger, as a building, than is the church of St. Peter, at Lamerton, the destruction was equally as complete, and hence we may fairly conclude the heat was at least as great during the Somersetshire conflagration as at the other. Note the difference of result. At Lamerton the vicar tells us no single piece of granite could be re-used. It "crumbled to atoms." At Huntspill, on the contrary, the stone quarried at Ham-Hill in the same county, instead of being destroyed, burnt like fire-brick, remained in situ, is still strong, and has positively had its beauty enhanced by the fiery ordeal through which it passed. Nothing can exceed the beauty of tint the Ham stone has acquired. The yellow has gone, and a warm reddish brown like that of Dumfries has taken its place. The internal stonework at Huntspill Church looks as much like that of Carlisle Cathedral as anything that I can liken it to. These two churches form excellent, practical, and very useful illustrations, seeing that the fire at both took place quite recently, both were under restoration together (Lamerton under Mr. James Piers St. Aubyn, and Huntspill under Messrs. Hans, Price, and Wooler), and whilst Lamerton was reopened a few weeks ago, the reopening of Huntspill is fixed for Easter Sunday next. Mr. Flynn thinks that if the excessive cost of carriage for granite could be got rid of, the material might be worked almost as cheaply as ordinary stone. As a practical man—as one having masons in my yard constantly at work upon granite as well as upon other materials, I doubt this very much. Aberdeen has been mentioned. I happened to be

at that city the other day, and in course of conversation with Mr. Mackenzie (the senior partner of the well-known firm of architects there, Messrs. Mackenzie and McMillan), that gentleman told me if he had to build a church in the very midst of the Aberdeen granite quarries he could do so at a far cheaper rate by bringing ordinary stone from England or Scotland, paying, of course, an exceedingly heavy carriage for so doing, than he could by using the granite that lay ready at hand. There is a nobility in granite, be it English, Irish, or Scotch, which, when used in large masses, gives it a majesty of appearance no other stones possess. The Thames Embankment in England, the City of Aberdeen, generally, in Scotland, are the two finest examples we have. The effect of both, of Aberdeen in particular, is a trifle cold, perhaps, but stateliness and coldness often go together. It seems to me, however, that much as we may admire granite, we shall have great difficulty in refuting the two statements put forth, that it is costly, and that it won't stand fire.—HARRY HEMS.

[6030.]—**Timber-Measuring.**—Having had something to do with measuring round timber for above 30 years past, I am interested in the correspondence now going forward in our paper, which I have taken every week for more than 20 years. I think William Jackson writes sensibly, and I for one should be sorry to see Hoppus' tables discontinued, although it is well known that the true measure is in general considerably more than Hoppus gives. The waste in round timber is so great that practically I consider the time-honoured system is a fair one. Is it not impossible to devise a system which shall be mathematically correct in all cases? Much depends on the shape of the tree, which often is very irregular. James Williamson gives a method which he says gives the "true content" of the log before being squared. Is this correct under all circumstances? Surely not; but if it can be demonstrated as correct under certain ordinary circumstances, it would be interesting and perhaps useful if he would kindly give a few explanatory examples. If the tree happens to be a perfect circle in section and perfectly straight on every "side," it is a frustum of a cone. If my memory serves me rightly, the rule I learnt many years ago for measuring this figure was "multiply the product of the largest area, the smallest area, and a mean proportional between the two by one-third the length," but this is far too difficult for ordinary practice. Is this rule correct? If so, I can hardly imagine Mr. Williamson's to be correct in all cases, as even in a straight tree the difference in sectional area is much greater in some than in others.—TEKTON.

[6035.]—**Perception of Beauty.**—I wish to thank Mr. Jno. Perry for kindly advising me from what works I may learn something on this subject. My present knowledge, I am afraid, will not enable me to write anything of sufficient merit to take up any of the valuable space in the BUILDING NEWS columns. I would *like* to suggest that no theory can rightly be considered correct or complete that will not admit of application to all objects or things we call beautiful. For instance, as far as we can learn from St. Augustine's writings, his theory is that our perception of beauty depends on a fitness or accommodation of parts, or that principle of design which fixes the relation of their various parts and presents them to the intellect or imagination as one harmonious whole. This can only be applicable to works of human design, for it is clear there is as evident traces of design in an ugly elephant or a swine as in a fine woman or a beautiful horse. The theory that was propounded in the early part of the century by Mr. Alison, and afterwards adopted by Lord Jeffrey, reprinted by Murray, seems to have a great deal of truth in it, and it is clearly and convincingly argued out. It is, "that our sense of beauty depends entirely on our previous experience of similar pleasures or emotions, and consists in the suggestion of agreeable or interesting sensations with which we had formerly been made familiar by the direct and intelligible agency of our common sensibilities. And that the vast variety of objects to which we give the common name of beautiful became entitled to that appellation merely because they all possess the power of recalling or reflecting those sensations of which they have been the accompaniments or with which they have been associated in our imagination by any other more casual bond of connection.—STUDENT-AT-HOME.

[6035.]—**Perception of Beauty.**—"Student-at-Home" wishes to learn something of the causes of our sensation of the beautiful, and it is gratifying to know there are a few students in the profession who are not content to take things on trust without individual inquiry, and who are not, like a large number of young men, mere "cribs" of other men's ideas in architecture, but wish to have a reason of the faith that is in them. I do not pretend to be able, in this reply, to give "Student" a complete answer, but I will tell him the works he should study, and the manner of pursuing the subject. The theories that have been broached by the earlier writers chiefly attribute our sense of beauty to causes outside the realm of sensuous phenomena. Beauty is something purely ideal and abstract in its nature, and this kind of philosophy existed from Plato throughout the middle ages. The Greek *τὸ καλόν*, according to Grote, includes the fine and exalted. A later class of writers adopted similar views. Addison, in his "Pleasures of the Imagination," resolves the æsthetic effects into beauty, sublimity, and novelty. Hutcheson maintains the existence of a distinct internal sense for the perception of beauty. Diderat, in his "Encyclopédie," says it consists in the perception of relations. Hogarth enumerates six elements, such as fitness, variety, uniformity, simplicity, intricacy, and magnitude, which enter into beautiful compositions. The theory of Burke is pretty well known—he makes smoothness an essential quality. Alison attempts to prove that this effect is quite different from sense, being a complex emotion. He shows, or tries to show, that association has a powerful influence in forming a sense of the beautiful. All ideas of beauty, according to him, excite some corresponding affection or emotion. Jeffrey adopts a similar view. Coming to recent times, I may note Ruskin, who enumerates infinity, variety, repose, symmetry, &c., as the leading attributes of beauty. "Student," however, must not place much trust in either of these theories, though they all contain an approach to the truth. It is now admitted by the most advanced authorities that our sense of beauty is dependent on a variety of effects. The best definition and theory of the beautiful is that of Professor Bain, of Aberdeen. He shows that the source of beauty is not to be sought in any single quality, but "in a circle of effects." See also Sir William Hamilton's lectures, and Guillaume's edition of Wightwick's "Hints to Young Architects." The intellect co-operates with the senses in the formation of æsthetic pleasure. Herbert Spencer and other psychologists advance similar theories, showing that the æsthetic emotions are founded upon physical causes, and if "Student" pursues his inquiries under these great lights he cannot go far wrong. The work of Professor Blackie, mentioned by J. Perry last week, is worth reading, but he is a Platonist.—G. H. G.

[6035.]—**Perception of Beauty.**—"Art Student" will, I think, find "Letters on Art" in the first or second vol. of the English edition of Goethe's works in Bohn's Standard Library; G. Bell and Sons, York-street, Covent-garden. "Idealist and Realist."—By these terms, I presume, "Art Student" would classify all artists. A Realist in art is one who seeks to represent facts pure and simple; to show things as they actually are. He would give us Nature as he sees it: beautiful or ugly, gross or refined; but still Nature, *i.e.*, material fact and reality. Among the Italians, such is called a Naturalist. Mr. Ruskin calls him also a Man of Facts. The three terms mean the same. I venture to think Literalist would be a better term still. Such men, in the religion of art, are but Sadducees. For them, the beautiful, that spirit form—so fair, yet immaterial—exists not; or, at least, is veiled from their sight; their belief is only in the letter of the law of art or Nature, and not in the spirit that giveth life and beauty. The Idealist sees a duality in Nature, viz., the letter (form or fact) and the spirit (life, beauty, enjoyableness). He also sees that, in Nature, no created thing is in all its parts beautiful; but the perceived disjoined beauties floating before him bring about in his mind the conception of a whole, in which all the constituents of beauty are compacted in perfect balance and harmony: and this conception is the ideal, the beautiful; this, it is, he endeavours to reproduce in his works. In the Italian classification of Purists and Naturalists the former class includes the Idealist. There are many artists whose works are such that it is difficult to assign them readily to either of these classes. We need to bear in mind the fact that the imagination plays a conspicuous part in an artist's work, and we feel we must make a third, or intermediate, class, which might be called Inventors. Art is not a creative faculty in man, except in the lowest sense of the term, viz., composition; it is but a composition of imitations, and the highest art will be the highest or noblest composition of the highest or noblest conceptions, representations of the beautiful, whether it be of form, colour, or sentiment. Take a few examples from the art of painting. A realist will paint a representation of a brick to look like a brick and nothing more, so of a broom, a tub, a face, or a flower.

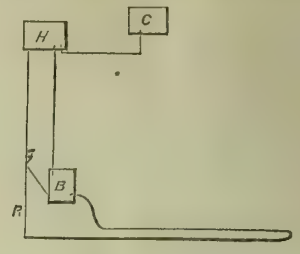
> "A primrose by the river's brim,
> A yellow primrose is to him,
> And it is nothing more."

He will paint beggars in the streets of London or on the steps of a church in Spain, or Jews in their dens round Petticoat-lane or the Ghetto in Rome, with all the filth, rags, and deformities of vicious looks belonging to them. If he paints a narrative he will try and collect the actual articles that should form the accessories to his picture, or paint their likenesses. He will locate himself in the very place where the event occurred, and if possible paint an exact portrait of the very room or spot, and for his models for the persons of the story, select natives whose portraits he can use to tell his tale. The modern Pre-Raffaelites are Realists of this strict type. Giotto, Angelico, and others of that time and school were not. The Dutch and Flemish painters, Hogarth, Wilkie, Maclise, Frith and others, also all painters of narrative, or as it is now fashionable to call them "Genre Painters," appear at first sight to be realists, and some are such and nothing more, the Dutch and Flemish painters especially, and also some modern landscapists. The inventor, or as Mr. Ruskin classes him, "Man of Design," having acquired the mere "letter of the law" of form and colour in nature and art, lets his imagination exert its full power and combines the "letters" he has learned into whatsoever shape he will, often regardless of the facts of nature; he will paint allegories and histories with his fancy as his only guide. The idealist takes the facts of nature and the laws of art only in an eclectic manner; he knows the human heart can only draw its real enjoyment from a contemplation of the good, the beautiful, the true; that it is only the debased sensualist who chooses to look upon the vulgar, the ugly, the evil, with delight: and for such impure appetite he will not cater. The ideal he will ever strive to paint, putting the spirit of truth and beauty into every scene or subject. Such pictures have been painted (some certainly not without defects) by Giotto, Angelico, Michael Angelo, Leonardo da Vinci, Raffaelle, and many of our own age and country, whose names are on our lips as household words, and who either live amongst us, or have but recently dropped the mantle of their prophecy, to be worn by others who have learned their wisdom, and trodden with them the sometimes wearying pathway of art.—JNO. PERRY, York.

[6045.]—**Felting Roofs.**—If 1in. boards are nailed closely together on to the rafters and the felt on to the boards, there is not much chance of the damp passing through to the rafters. It is a practice that has been successfully made use of in the roofs of many of our public buildings. Felt can be made absolutely waterproof by a preparation of tar.—T.

[6047.]—**Heating Conservatory.**—As the hot-water engineers agree that the heating of conservatory from kitchen boiler is not practicable, would suggest to "Manchester" Messrs. Geo. Bray and Co.'s (of Leeds) new patent gas heating apparatus, the principle of which I believe is one or more jets of gas are cased in an iron or tin box with grated door to let in air, the draft of which communicates with a coil of pipes from the box up through the roof or into chimney flue. The coil may be made so that at the outlet at the roof the pipe will be quite cool. By this you will see that all the heat is expended in the room or greenhouse. I may add there is a great heat, and not the faintest smell of consumed gas.—BUILDER, Leeds.

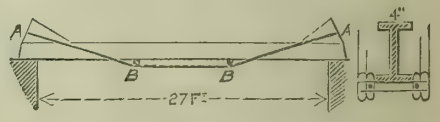
[6047.]—**Heating Conservatory.**—The only way I can suggest would be the one shown in the diagram. C= cold water cistern, H = hot, B = boiler, R = return pipe —*i.e.*, make the return-pipe from H circulate round the conservatory before entering B. The junction of return-pipe with H should be as far removed from the entrance of



the supply pipe (from C) into H, or else the conservatory would not get the full benefit of the heat from H. There should be an off-shoot return pipe from J to B, with two taps at J, so that when the conservatory was not required to be heated the water from H could go through the off-shoot pipe to B.—T.

[6048.]—**Wall and Gable.**—The gable wall belonging to A. is an external wall inclosing A.'s building. B.'s proposed brick building would not be deemed, under the Building Act in London, inclosed by it, unless B. makes it into a party wall. Assuming this question to refer to a building in London, the district surveyor would be the authority to compel B to inclose his building with proper walls according to the Act, as it would be a very dangerous precedent to allow any building to be built without either a party or external wall.—H. T. B.

[6052.]—**Strength of Beam.**—The following experiments were made at Cubitt's works in 1848 with a cast-iron girder of the annexed dimensions, and gave results as in the following table. Defiection of girder without trussing with a weight of 1 tons = 2⅛in. :—



Distance of points A A above bottom of girder.	Distance of points B B below bottom of girder.	Weight required to produce deflection of 2⅛in.
In.	In.	Tons. Cwt.
30	1	3 19
24	1	4 0
18	1	4 1
10	1	4 11
24	6¼	4 8
10	6¼	6 1
5	6¼	5 12

—T. R.

STAINED GLASS.

EXETER.—A stained-glass window has been placed in the south aisle of St. Michael and All Angels' Church, in memory of the late Dr. Wesley, organist of Exeter Cathedral. The subject treated of comprises a full-size figure of King David playing upon the harp. The window was supplied by Mr. Drake, of the Cathedral-yard, Exeter.

HEXHAM CHURCH.—Three lancet windows have been executed by Messrs. John Hardman and Co., of London and Birmingham, and erected in the north transept of this church to the memory of the Fairless family. They contain figures of Our Lord, the Blessed Virgin, St. Peter, St. Paul, St. Anne, and St. Mary Magdalen. The windows are in the style of the glass at Santa Croce, at Florence.

KING'S NORTON CHURCH.—Another window has been placed in this church by Messrs. John Hardman and Co., of London and Birmingham. It is the easternmost one on the north side of the chancel, and consists of two lights. The dexter light illustrates the text, "Sara obeyed Abraham, calling him lord"; and the sinister one, "Abraham obeyed God and went out, not knowing whither he went." The window is full of detail, and rich and effective in colouring.

PINNER.—A stained-glass window has lately been erected at Pinner parish-church, now being restored. The window consists of two lights, the subject being All Saints, and has the following inscription underneath:—"Erected by the congregation of All Saints', Woodriding, to commemorate the restoration of this their parish-church, A.D. 1880." The window, which is much admired, is from the studio of Mr. Charles Evans, of 61, Fleet-street, E.C., and Walworth, Surrey.

A new U. P. church has been erected at Ryehill, Dundee. The style is Gothic, and the building accommodates 720 persons, at a cost of £5,500. Mr. G. S. Aitken, of Dundee, is the architect.

LEGAL INTELLIGENCE.

METROPOLITAN BUILDING ACT, 1855, 18 AND 19 VICT. CAP. 122, SEC. 41.—In the Police-court at Marlborough-street on Friday, Feb. 20th, 1880, Mr. Frederick Ingle, a member of the firm of Robert, Dennett and Co., of No. 5, Whitehall, Westminster appeared to an adjourned summons taken out by Robert Kerr, of No. 22, Old Burlington-street, W., for that on 1st September, 1879, being the builder, engaged in doing certain work to and upon a building (being the St. James's Theatre, in the parish of St. James's, Westminster) within the district of St. James's, of which Robert Kerr is the district surveyor, under the above Act, did neglect to give to the said Robert Kerr, as district surveyor, two days before such work was commenced, due notice in writing, stating the situation, area, height, and intended use of the building and other particulars of such proposed work, and stating his name and address, but did execute such work before giving any such notice, contrary to the statute, whereby he had incurred a penalty not exceeding £20. —Mr. Bigham, barrister, instructed by Messrs. Taylor, Hoare and Taylor, represented the defendant.—Mr. Robert Kerr, the complainant, being sworn, said: I am the district surveyor of St. James's, Westminster. Certain works have been performed at the St. James's Theatre, and among other works certain fireproof flooring has been constructed by the firm of Robert Dennett and Co., that is, a kind of flooring which is constructed of concrete, and the efficiency of it depends very much upon the care with which the work is done. Other works were being done at the theatre by Mr. Bradwell. Mr. Bradwell, who is now present in court, told me that he was not doing that work on the staircase; it was being done by Mr. Dennett independently of him. Mr. Bigham: Is this evidence, or an opening? Which is it? Because if you are upon your oath, I object to anything Mr. Bradwell said. Mr. Kerr: It is evidence. Mr. Bigham: Then I shall object to anything Mr. Bradwell said. The Magistrates' Clerk (to witness): You say certain works were done at St. James's Theatre, and you have not received notice? Mr. Kerr: That is it. I understood from the solicitors there was to be no question of fact raised. They were anxious to try the question of law, and that is what I am anxious to try. It will save the time of the Court if no unnecessary objections are taken. I have a letter from the defendant's solicitors, dated the 10th instant, in which they say:—"Our clients are equally anxious to try the question you have raised, and we think it best to try it before a police magistrate." It is on that footing I am here. The peculiarity of this case is a public building, and—Mr. Bigham: It includes a theatre? Mr. Kerr: Yes; and, in reference to public buildings, your worship is aware exceptional responsibility is thrown upon the district surveyor. Clause 30 of the Act says, "Notwithstanding anything here contained, every public building, including walls, floors, roofs, and staircases, shall be constructed in such a manner as may be approved by the district surveyor." If the surveyor calls for anything which the builder objects to, a dispute arises, and they go before the Metropolitan Board, whose decision is final. It is, therefore, extremely important that the district surveyor should receive notice of all works being constructed at a theatre, where the lives of people are placed in danger. I don't mean, for a moment, to say Mr. Dennett's work is dangerous because I have not seen it, or had any particulars of it. What I say is, Mr. Dennett, being an independent builder, should send me notice and particulars, on which I could make a survey of the work done. Mr. Bigham: Is that all your evidence? Mr. Kerr: I have explained to you practical reasons why I am particular in this case, and in all others where I can get a footing to get a separate notice from each separate builder. The term "Builder" is defined. "Builder" shall mean "a master builder or other person employed to execute, or who actually executes, any work in any building." Now a practice prevails among contractors which you may not have heard of. A general contract is taken for the whole work; in that contract there is what is called a provisional amount. The architect, for example, says in the specification, such and such a floor shall be executed by Messrs. Dennett, and so much money shall be provided for their work.—Mr. Bigham: That is not evidence.—Mr. Kerr: It is evidence. I am stating, from my knowledge, the custom of the trade. Mr. Dennett works in that way, and as far as I understand, he claims to be exempted from giving special notice, because he says he is working under a general contractor; but inasmuch as the general contractor is not responsible for his work, and the money he is paid simply passes through his hands as a matter of convenience, and is accounted for by the surveyor in making up the accounts, our board cannot get at the general contractor, because he will at once say, "I did not do the work: I only pay the money for convenience." Therefore, the district surveyor, who is the executor of the law, must be informed who is the person actually employed in any particular work, so that he may get at him if any offence is committed. Of course the district surveyor's position is based on the assumption that offences will be committed, and the notice is intended to identify the work and the misperformance of the work should it occur. Therefore, Mr. Dennett ought to give separate notices of his own work and separate particulars, on which alone the district surveyor can act. Mr Bigham: You know nothing as to the nature of the contract between Mr. Dennett and Mr. Bradwell, except what you have been told, I suppose? Mr. Kerr: I have been told there is no contract. Mr. Bigham: You know nothing but what you have been told? Mr. Kerr: What I have been told by Mr. Bradwell, and in the solicitors' letter. I understood you would accept the facts. Mr. Bigham: Where is the letter that tells you anything? Mr. Kerr: Here is the letter. It says, "We are as anxious to try the question as you are." Mr. Bigham: That is all you know? Mr. Kerr: Yes. Mr. Bigham: Did you receive any notice at all from Mr. Bradwell? Mr. Kerr: Yes. Mr. Bigham: Have you got it? Mr. Kerr: Yes. Mr. Bigham: Let me see it. It is a notice you received on the 1st November, 1878, and it is a notice on a printed form which you keep in your office? Mr. Kerr: Yes. Mr. Bigham: It was filled up, was it not, under your direction? Mr. Kerr: I think it is my clerk's writing under Mr. Bradwell's direction. Mr. Bigham: Then Mr. Bradwell came to your office and filled it up? Mr. Kerr: Yes. Mr. Bigham: Let me call your attention to its terms. It says, "I hereby give notice of certain works at St. James's Theatre. The particulars of the works are as follows: To reconstruct auditorium, staircases, and approaches to the same." Now, did you go to see that place? Mr. Kerr: I did. Mr. Bigham: I believe the usual fees were paid. Mr. Kerr: Oh, it is not a matter of fees. I object to fees being introduced into this case. Mr. Bigham: I don't suggest it. Mr. Kerr: It always is suggested. Mr. Bigham: I do not suggest it. I ask if you had had your fees paid in respect of that notice sent in by Mr. Bradwell, or that was written at your office? Mr. Kerr: I have not. Mr. Bigham: Have you sent them in to Mr. Bradwell? Mr. Kerr: I have sent an account for all the fees properly appertaining to that notice for all that I am aware of being due from Mr. Bradwell. I think it is one fee only including all that work. The account is made out in the terms of the notice. Mr. Bigham: Now did you go to the theatre and see what was being done? Mr. Kerr: Yes, I did. Mr. Bigham: Did you see the lines set out for the staircase? Mr. Kerr: I cannot say I did. Mr. Bigham: You saw by the notice that it was proposed that the staircase or staircases should be done? Mr. Kerr: Other staircases have been done by Mr. Bradwell. Mr. Bigham: In this notice it says "staircases and approaches to the same"? Mr. Kerr: Yes. Mr. Bigham: You knew Mr. Bradwell was going to erect staircases? Mr. Kerr: Yes. Mr. Bigham: Did you look to see what the staircases were that Mr. Bradwell was going to do? Mr. Kerr: All I did was to look at the work that was done by Mr. Bradwell. You cannot carry all the notices about with you. Mr. Bigham: Is not the object of that notice to give you information of what is to be done? Mr. Kerr: Yes. Mr. Bigham: Well, if you cannot get that information in your brain, it appears to me that the information is of little value. Mr. Kerr: We can get it into the brain. Mr. Bigham: Well, then, when you went into the place, you knew what the notice was? Mr. Kerr: With the assistance of my clerk and Mr. Bradwell. Mr. Bigham: Then you were aware that staircases comprised part of the work Mr. Bradwell was going to do? Mr. Kerr: Yes. Mr. Bigham: Now, have you any copy here of the account of the fees which was sent in? Now, allow me to assure you I am not going to make this a matter of fees, but I wish to ask if you have any copy of the account for the fees which was sent in by you to Mr. Bradwell? Mr. Kerr: I have no copy of the account, but this is the phraseology used in it, namely, "enlarging auditorium, new approaches, and stairs." Mr. Bigham: Oh, I find I have a copy of the account. It is "For surveying, under the above Act, work done at St. James's Theatre, namely, enlarging auditorium, approaches, and stairs; area, 92 squares, story six." Is that correct? Mr. Kerr: Yes. Mr. Bigham: That area of 92 squares and story six comprises the whole building, does it not? Mr. Kerr: It ought to. Mr. Bigham: And also, of course, it comprised that part of the building in which the staircase was erected by Messrs. Dennett and Co., or with Dennett and Co.'s concrete? Mr. Kerr: Yes. Mr. Bigham: Now, can you tell me when your account was sent in? Mr. Kerr: My clerk will answer the question in a moment. It was on the 13th October. Mr. Bigham: On the 13th October, 1879? Mr. Kerr: Yes, within a day or two of that date. Mr. Bigham: Can you tell me how long it was before that that you had been over to see the place? Mr. Kerr: I always make a note of my final survey. Mr. Bigham: When was that? Mr. Kerr: That was on the 1st September, 1879. Mr. Bigham: When was it you observed this staircase was being erected by Dennett and Co.? Mr. Kerr? It was on that occasion. Mr. Bigham: After you had observed that, you sent in this memorandum to Mr. Bradwell of your fees for surveying the stairs comprised in the whole of the area. Mr. Kerr: No. Mr. Bigham: Just wait; let us see. Mr. Kerr: Comprised in the words of his notice. Mr. Bigham: Well, these are the words of your clerk. Mr. Kerr: No, they are his words (Bradwell's): Mr. Bigham: They were written by your clerk. Mr. Kerr: Mr. Bradwell is responsible for the notice because he signed it. Mr. Bigham: I don't dispute it. Just listen to the words of your own account, for which I suppose you are responsible. "For surveying under the above Act, work done at St. James's Theatre, namely, enlarging auditorium and new approaches and stairs." Now, I ask you, at the time you sent in that notice, had you not seen, were you not aware, these stairs had been erected by Dennett and Co.? Mr. Kerr: I had not inspected the stairs because I had not had notice. Mr. Bigham: Then what you mean to tell the learned magistrate is that, although you had had notice from Mr. Bradwell that he was going to put up stairs in the place or staircases, although you went to the place on the 1st September and saw stairs there, you did not conclude that the stairs you saw were comprised in the notice so sent on the 1st September, 1878. Mr. Kerr: I did not suppose they were, because he told me they were not work of his. Mr. Bigham: We are not concerned with what Mr. Bradwell said. Mr. Kerr: I must go into what he said. I went over the work with Mr. Bradwell, and he said, "That is not my work; it is Dennett's. Mr. Bigham: Let me ask ask you as to these stairs. Are they not an integral part of the building itself? Is it not a main approach to the building, in the inside I mean? Mr. Kerr: The approaches referred to in the notice were in the passages, the new entrance. Mr. Bigham: But the notice had the word staircases. Mr. Kerr: That was done by Mr. Bradwell. Mr. Bigham: Which are the staircases? Mr. Kerr: Stone staircases—one on the right, and one on the left. Mr. Bigham: What reason have you for suggesting that this particular staircase, of which you complain, was not comprised in the original notice? Mr. Kerr: Because Mr. Bradwell told me so, and that he was not responsible for it. Mr. Bigham: Is that the only reason? Mr. Kerr: Yes, Mr. Bradwell told me, and he is here. Mr. Bigham: I want to know whether you, of your own knowledge, can tell the learned magistrate what part of that staircase was in fact erected by any of Mr. Dennett's men? Mr. Kerr: I cannot. Mr. Bigham: You do not know? Mr. Kerr: No; I thought you were going to admit it. Mr. Bigham: For aught you know, any of it, or none, may have been done by Dennett's men? Mr. Kerr: I have told you all I know. Mr. Bigham: Then you are not able to tell me whether Mr. Bradwell or Mr. Dennett put up the staircase?—Mr. Kerr: All I can tell you is what Mr. Bradwell told me. He led me over the limits of his work, and said as to the other "That is not my work."—Mr. Bigham: That is all I want to ask you at present. That is your case is it, Mr. Kerr?—Mr. Kerr: My clerk is here, if you wish any further information, and I have got Mr. Bradwell here; but if you are going to call him I need not do so. I have not spoken to Mr. Bradwell; I don't know whether he is inimical to me or not, but I suppose he will speak the truth.—Mr. Bigham (to the magistrate): I don't know whether you think any case has been made out against Mr. Dennett. There seems to me no case at all.—Mr. Mansfield: He had better call Mr. Bradwell.—Mr. Kerr: I will call Mr. Bradwell, but I thought they were going to admit it.—Edwin Bradwell, sworn, said: I live at 112, Great Portland-street. I am a builder and contractor. I gave Mr. Kerr the usual notice in the ordinary way, towards the end of 1878. Mr. Bigham: Here it is. It has been put in. It is dated 1st November, 1878. The Clerk: It is a notice of work to be done at St. James's Theatre? Mr. Bradwell: Yes; and I brought the plans to Mr. Kerr to show him. The Clerk: Can you say what work was done by any one else? Did you do any of the work? Mr. Bradwell: I did the whole work of alteration right through. The Clerk: Well, was Mr. Dennett employed there? Mr. Bradwell: Yes; there was one portion of the floor which there was a ceiling beneath, and the stairs leading from that—the shell of the staircase—was originally to be done in stone; but then the architect said it had better be done in concrete; and he said, "As it is to be done in concrete, you had better get Dennett to do that." Therefore, I appointed Dennett to do it, as he would do it better than our own men; but it was in my contract: in my general arrangement. Mr. Kerr: Your contract was to put up a stone stair? Mr. Bradwell: There was no signed contract; only an agreement to do it in stone. Mr. Kerr: You did not tell me that at the time. What you told me was, that it was done by Dennett, and not

by you. Mr. Bradwell: Yes; you said to me, "Is that quite safe, being done in concrete?" and I said, "Oh! yes; because I employed Mr. Dennett to do it, by the architect's advice." Mr. Kerr: By the architect's direction. Mr. Bradwell: By the architect's advice. He said Dennett would be better able to do it in concrete than our men would. Mr. Mansfield: Then you would be responsible for Dennett's work being properly done. Mr. Bradwell: I fancy so. Mr. Kerr: Allow me to ask—— Mr. Bigham: Are you going to cross-examine your own witness? Mr. Kerr: Well, if I am going to be thrown out on technicalities like that I cannot help it, but I want to ask this question: Mr. Bradwell, when I met you at the theatre did you not say to me, "That work has been done by Mr. Dennett, and not by me." Mr. Bradwell: You looked at the staircase and saw it was not stone, and said, "What is it made of?" I replied, "That's Dennett's material; I got him to do it because as it was concrete our architect thought he would do it best. Mr. Kerr: Did you tell me that at the time? Mr. Bradwell: Yes. Mr. Kerr: Do you not remember me asking you, considering it was a public building, and the lives of the public had to be looked after by the district surveyor, who was to be responsible, and you said you were not, Mr. Dennett was? Mr. Bradwell: I do not remember that. I remember your asking me what material it was, and I told you it was Mr. Dennett's own material. Mr. Kerr: You know Mr. Dennett's material is a sort of patent? Mr. Bradwell: Yes. Mr. Kerr: You know it is made of concrete? Mr. Bradwell: Yes, it was made something like we would make concrete. Mr. Kerr: You know the safety of it depends a great deal upon how it is to be made? If it was rotten people would fall through. Mr. Bradwell: My own foreman fixed the iron girders in the walls for them. Mr. Kerr: This is not the only case I have against Mr. Dennett, and this information has been sprung upon me. Mr. Bradwell now says he informed me at the time that that was being done for him by Dennett. My understanding was that it was undertaken by Mr. Dennett, independently of Mr. Bradwell. Mr. Bigham: Then I can relieve you from that mistake at once. I will put Mr. Dennett into the box, and show that so far from a contract being made with the architect, the only contract—if contract it can be called—was that Mr. Bradwell employed Mr. Dennett to come there in order to make a concrete arch under the staircase, and nothing more. All the preparations for putting in the concrete, all the alterations in the building preparatory to putting in the concrete, were made by Mr. Bradwell, and Mr. Bradwell either has paid or is to pay us for putting in the concrete arch; in fact, Dennetts in this case are no more than common servants, who have been brought in to make this arch for the contractors; they have no more to do with the alterations in the building than anyone else. Mr. Kerr: I will put my clerk into the box and see what he says. Mr. Bigham: I shall object if you want him to prove conversations. The Clerk: Your clerk cannot alter Mr. Bradwell's evidence. Mr. Kerr: No; I fancy from what has come out that Mr. Dennett is not responsible, but he ought to have explained it to me, instead of holding me at arms' length, before it came before the Bench. I must now try other cases with Mr. Dennett, because he generally objects to give notice to the district surveyor of his work. Mr. Bigham: Now, what Mr. Bradwell states is material. If Mr. Bradwell did not state to Mr. Kerr what he now says he stated, then he did not give Mr. Kerr a proper version of the nature of the transaction between himself and Mr. Dennett. Whether he did or not I do not know, but Dennett and Co., have always known what their position was. Mr. Mansfield: Did Mr. Dennett give information to Mr. Kerr? Mr. Kerr: No; he objects to the jurisdiction of the district surveyor. Mr. Bigham: Dennett and Co. tell me that until the summons was served they never heard a word about it. Mr. Kerr: I have had a great deal of correspondence with Mr. Dennett. There are four cases in my district against him now; I have taken the wrong case to-day. Mr. Bigham: Had you any conversation with Dennett and Co. before the summons was taken out, in reference to this case? Mr. Kerr: I think so. Mr. Bigham: Will you just tell me, because Dennett and Co. tell me they have had no conversation with you about it? Mr. Kerr: We have been discussing the general cases. Mr. Bigham: I want to know about this particular case. Mr. Kerr: I cannot answer you in reference to this particular case. Mr. Bigham: I will call the defendant. The Clerk: I am afraid you cannot in this case. Mr. Bigham: But there is the defendant to say that he has never had any communication whatever from Mr. Kerr in reference to this particular case until the summons was read. Defendant: That is so. Mr. Kerr: He might have communicated with me when the summons was served. Mr. Bigham: He preferred to come here where he was summoned. Defendant: If Mr. Kerr had written to me, I should have waited on him, but the first intimation I received was the summons. Mr. Kerr: But you have had correspondence with me. Defendant: Yes; which I am prepared to produce. Mr. Bigham: But not in reference to this case? Defendant: No. Mr. Kerr: When you received the summons, why did you not come and tell me I had made a mistake? Defendant: I could not tell why you had served me with the summons; I don't think it is for me to come to your place when you serve me with the summons. Mr. Kerr: I am very sorry you have had the trouble of coming here through a mistake. Defendant: If I had been written to, I should have communicated with you. Mr. Bigham: Of course the case must be dismissed; I apply for costs. Mr. Mansfield dismissed the summons, but declined to allow costs.

RUSTIN V. TOBIN.—High Court of Justice.—Chancery Division.—Before Sir R. Malins.—The arguments in this case, which has lasted 14 days, were concluded on Wednesday, but the Vice-Chancellor reserved his judgment. The original plaintiffs were ten persons who claimed to have an agreement set aside for the purchase from the defendant of a patent for an improved mode of ventilating rooms and of the apparatus therefor, on the ground that they had been misled by the defendant's representations, made, as they alleged, before the contract was entered into, and which they asserted to be false, to the effect that he believed the patent to be valid and knew of nothing against it; that he had heard of but two cases of infringement, both of which were compromised, and the infringers had paid large sums of money to him; that he had searched the Patent Office for 200 years and had discovered no invention which affected the validity of his own; that his patent was very profitable, and that he had had numerous applications for licences to work it. Some of these representations were according to the plaintiffs' case, untrue, and others grossly exaggerated. The plaintiffs alleged that they had since discovered that the patent was void, and that the defendant was from the first aware of the fact. The defendant, on the contrary, denied the misrepresentation, insisted on the validity of his patent, and claimed specific performance of the agreement. After the commencement of the hearing the limited company to whom the plaintiffs had sold their interest under the agreement were, by order of the Court, added as plaintiffs to the action. The Vice-Chancellor, at the conclusion of Mr. Glasse's reply on behalf of the plaintiffs, said it was impossible to deliver judgment in this case without a careful perusal of the enormous mass of evidence on both sides, including a vast bundle of letters. The case involved an issue of the most painful character. The plaintiffs were a body of ten gentlemen, all holding high respectable positions, against whom he had said, and would say, nothing; but he could not help expressing his astonishment at the utter folly on their part in entering into a contract like the one in question without further investigation. In answer to this they said they were misled by the wilful and fraudulent misrepresentations of the defendant. He considered that the charges made against Mr. Tobin were grossly exaggerated. He very much doubted whether a single charge that had been brought against him had been or could be substantiated. There was no doubt the defendant was a most enthusiastic patentee, and took a very sanguine view of his invention; but the very letters which he wrote to the plaintiffs in reference to the patent were couched in such extraordinary language that they ought to have put the plaintiffs on their guard, and shown them that they were dealing with a person whose judgment in the matter of this patent was not to be relied on. There had, he considered, been great exaggeration and great folly on the part of the plaintiffs. If possible, he would deliver judgment before Easter.

VIRGIN SOIL.—John Kember, a builder, of Gayford-road, Starch-green, appeared last week, at the Hammersmith Police-court, to answer an adjourned summons, at the instance of Mr. Knightley, district surveyor of Hammersmith, for commencing to build houses without covering the site with a layer of concrete, contrary to the by-laws made by the Metropolitan Board, under the amended Act of 1878. The by-law in question provided that the site of every house or building should be covered with a layer of concrete, at least 6in. thick, unless the site thereof be "gravel, sand, or natural virgin soil."—Mr. Knightley, at the opening of the case, said the question for the magistrate to consider was, What was the meaning of virgin soil? It had been considered by the Association of District Surveyors, who agreed that it meant soil in a natural position which had not been disturbed or cultivated. He contended that the by-laws contemplated virgin soil to mean soil which had never been disturbed even by a plough, and mentioned that it was contemplated to build St. Paul's new schools in the neighbourhood upon land which had been used for market-gardening purposes. There had been a quantity of animal matter mixed with the land, and he should not think it the right soil to build upon unless the site was covered with concrete. The land upon which the defendant had erected his houses had been used for brickmaking, and the clay excavated. It was necessary to have such a site sealed with concrete to prevent the fires pumping up the unwholesome emanations into the houses. He also mentioned that the outcome of a conference of suburban builders with Mr. Cross, the Home Secretary, was the list of by-laws, and said, therefore, practically they were made with their consent.—Mr. Paget thought that if Mr. Knightley's view of the by-laws was correct there would be hardly an acre of land of virgin soil left.—Mr. Kisch, who appeared for the defence, said the land was formerly a grass field, 3ft. of which had been excavated, but it had not been filled in. His defence was that the site consisted of the virgin soil.—Mr. Knightley disputed that statement, and produced a specimen of the land which had been taken from an adjoining site. He called Mr. Stephens, his clerk, who said that the excavations had been filled up with brick, rubbish, &c. He was present before the floors were laid, and the ground appeared to correspond with the specimens produced.—Mr. Kisch produced a sample of land which his witnesses had dug up, consisting of clay, sand, and gravel, in support of his defence that it was virgin soil.—Mr. Paget, after hearing witnesses on both sides, decided that it was not virgin soil, and made an order for the site to be covered with concrete in 14 days.

Our Office Table.

THE fifteenth annual report of the trustees of the Peabody Fund has been issued; a very interesting document. The total amount bequeathed to the trustees by Mr. Peabody amounted to £500,000. The rent and interest accruing to the 31st of December last amounted to £223,917. The total expenditure to the same date was £549,934, leaving a balance in the hands of the trustees of £173,983. The trustees have provided 5,170 rooms, exclusive of bath-rooms, laundries, and washhouses; these rooms, comprising 2,355 separate dwellings, occupied by 9,905 individuals. There has been no expenditure for new buildings or purchases of land during the last year, but the trustees have entered into arrangements for acquiring from the Board of Works six plots, covering over nine acres, in the most densely populated districts of London, and they propose to expend in the erection of suitable buildings on these sites £360,000. With that object, they have obtained from the Treasury a loan of £300,000 at 3½ per cent., on condition that no more than £100,000 shall be taken up in any one year.

A CIVIL engineer sued the North Staffordshire Railway Company this week for personal injuries sustained in an accident. The case was tried before Justice Denman, and while he was summing up, one of the jurors was seized with a fit and had to be carried out of court. After some little delay the case was continued before the remaining 11 jurors. Before the summing-up was concluded, some interruption occurred in consequence of the jury-box having to be hunted over to find the hat of the absent juror. Mr. Justice Denman said that he had again and again complained of the stinginess displayed by not allowing pegs upon which jurors could hang their hats; and he dared to say that in the new law-courts this was a thing that would enter into nobody's head. He knew a learned judge who used to say that if you wanted a place built to suit you your only way to attain your end was never to let your architect know what your object was. He hoped that matters of this kind would be reported in the proper quarter. We trust any of our readers who may have to design a jury-box, will take warning and not leave a judge a peg on which to hang such another poor joke as Justice Denman's.

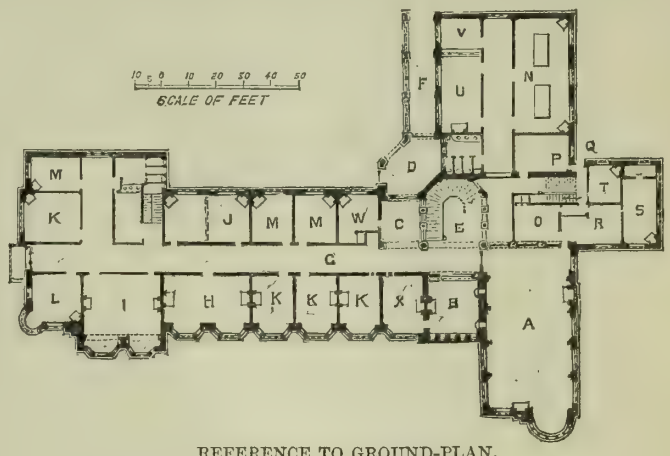
MR. C. FELLOWS, of Wolverhampton, has sent us some samples of different inks he is making. The Simplex is for ordinary writing purposes, and is a good specimen of what an ordinary ink should be. The Duplex and Sixfold are intended for copying, but the former is especially recommended as suitable for all purposes. The Sixfold is an excellent copying ink, but the tissue-paper requires to be dried more than is usual after damping, and the copies should be placed between blotting-paper, and allowed to dry gradually, a process which considerably intensifies the colour of the ink. The red ink is an excellent sample, drying with a brilliant tone, and standing out well, thus readily attracting attention.

THE BUILDING NEWS.

LONDON, FRIDAY, MARCH 5, 1880.

THE PRESTON HOTEL COMPETITION.

THE competition designs which were invited for a new hotel at Preston, by the Committee of Management of the London and North Western and Lancashire and Yorkshire Railways are now on view in the upper hall of the Euston Station. Forty-three designs have been submitted, and, as we said last week, these are in a variety of picturesque styles, ranging from Late Domestic Gothic to pure Italian. Most of the designs are illustrated by perspective views, drawn in sepia, and many of the sets of drawings exhibit a large amount of labour in their preparation. The premiums offered have induced several well-known architects to contribute designs, while the eminently picturesque site chosen for the hotel has afforded not a few architects an opportunity of displaying their skill in grouping and composition. The conditions did not bind the competitors to any cost, particular disposition of plan, or style of design, the leading consideration being that the main fronts should face south and east; that there was to be a convenient covered access to the Station, and that provision should be made for forty bedrooms with a due proportion of dressing-rooms, with capabilities for an extension to provide sixty additional bed-rooms at some future time. The last requirement seems to us to be a rather important one in deciding upon the merit of a plan, inasmuch as the addition of so large a number of bedrooms will have the effect of throwing out of scale and balance many of the apartments and elevations that are not designed with reference to such an enlargement. It also necessitates a consideration of staircase and corridor accommodation which very few of the competitors have consulted. Broadly speaking, the plans divide themselves into three classes: parallelograms or arrangements based upon that form; the three-block arrangement, or plans disposed in the shape of the letter ⊔ and the open square or quadrangle. "G" in intersecting triangles (Mr. T. Mitchell, of Oldham), is the motto of a set which the Committee have selected as the best. It has a good general arrangement. The planning of the principal apartments has been dictated by the requirements of the site, and the carriage-drive from the town is maintained. As we give a sketch of the ground-plan, it is unnecessary to describe it in detail. It will be seen that the author makes his entrance the chief feature, and places it in the angle formed by the two blocks; the staircase is well-arranged for easy communication with the two corridors; the porter's room and luggage-room are handy to visitors; the bar or inquiry-room is in front, so that the stranger cannot mistake his whereabouts; and the coffee-room is within easy reach at the end of main corridor, and can be readily served—a very desirable point. The coffee-room, best sitting-room, public reading and drawing-rooms, face the park and gardens. The visitors' lift and luggage-hoist are close to the entrance. The ladies' rooms and conveniences are located at the end of main corridor, and are removed from the busier parts of the hotel; they are reached by a short cross-corridor, which will admit of extension when the additional rooms are required. At the other end the longer cross block contains the billiard and smoking-room, with its own bar, and gentlemen's lavatories, while the waiters' rooms and serving department are placed in communication with the coffee-room, and a tradesmen's side-entrance is got under the kitchen. This distribution of the two main classes of visitors and the servants' department is desirable. The first floor is occupied by sitting and bedrooms on each side of the central corridor, and a like arrangement exists on the second floor. We find the plan, however, is not faultless; the kitchen is decidedly much too small; indeed this department is scarcely equal to the requirements of an ordinary suburban residence. The plan in this part must be altered; the approach is not good. We find also the main corridor has an unfortunate jump up of eleven steps at one end, owing to the necessity apparently the author was under to provide additional height for his coffee-room. Externally, the lines of windows of the tower, and gable-block of coffee-room, are raised, to denote this level, but this difference does not much affect the unity of the composition. The lavatories and conveniences are well arranged at each end, and the kitchen-block, being kept low and made a projection, will not cause annoyance by the fumes of the cooking. Architecturally, the author has selected a Domestic Gothic style for the exterior; the tower at the angle helps to break the composition, if it does not express any internal arrangement. The windows are all mullioned, and there is a strong emphasis in the vertical lines. The facing is proposed to be of red bricks, with mullions of the same material, and red Runcorn dressings. The grouping of the principal entrance is successful; but we do not like some of the details, certainly not the oriel corner, with its steep conical roof, nor the details of chimney-stacks, and there is a mechanical repetition in the effect. The author submits tenders from two builders, which range from £29,201 to £33,000. "Valentine" (Messrs. Salomons and Ely, of Manchester) is the motto of the design placed second. It is shown in a boldly-drawn sepia perspective, and exhibits some effective grouping in a Gothic half-timbered style. The massing of the gables slightly overhung, the bracketed dormers, and the balconies on the fourth story, with its half-timbered treatment, make up a picturesque composition of dignified elevation. There is much to commend in the planning: the luggage and porters' rooms are conveniently near the entrance; the servants' stairs are placed in handy proximity to the main staircase, which fronts the entrance-hall; the inquiry-bar, manager's room, and hoist for luggage are in the right places, and the coffee-room is well located, with a connecting angle lobby to the drawing-room, both facing the park. On the other side of corridor we have the bar, manager's rooms, and private and ladies' coffee-room; the last in a retired position. The billiard-room forms a square apartment 32ft. square on the left side of entrance, and has a smoking-room near it. We also note that the serving and still-rooms and lifts are close to each other, and near the bar. On the other hand, the covered way makes an awkward junction with the porch, which is set anglewise, and we find a scanty and insufficient supply of lavatories and conveniences, there being only three w.c.'s on the first floor. The kitchen department is in the basement. "Jacobean," in a hand we think we recognise, is a decidedly clever design, with a plan based on the central-hall principle. If anything, the plan is on too grand a scale for a small hotel. The general disposition is four blocks round an elongated hall. On the railway entrance side there is a hall and staircase, a manager's room and bar in communication, and a billiard-room and smoking-room on the right-hand side of staircase. On the park, or south-east front, the coffee-room, 47ft. by 30ft. in its widest part, occupies a corner position, and has a large square bay window facing the gardens; next to this is a reading-room and a ladies' coffee-room, and at the corner the commercial-room,—certainly too close to the ladies' room to be desirable. The serving-rooms and hoists are at the north and south ends of central hall, and form slightly-projecting blocks; the conveniences are ample and well-ventilated. The author proposes a sloped covered-way from station, a tramway and lift for luggage. On the first floor the central hall is surrounded by an arcaded gallery, which is supported on columns from the hall below, and is roofed with a glass roof. On this floor, entered from the gallery, is a drawing-room 48ft. by 23ft., overlooking Miller's Park, sitting-rooms occupying the ends of blocks with bay windows. There is one main staircase. An objection to the arrangement of the gallery is, that it will necessitate some visitors passing round the gallery to find their bedrooms. The serving, bath-rooms, housemaids' closets, lifts, &c., are placed at the two ends, and the administrative department is planned on a larger scale than necessary.



REFERENCE TO GROUND-PLAN.

A. Coffee-room.
B. Bar office.
C. Hall.
D. Porch and principal entrance.
E. Staircase.
F. Corridor to station.
G. Corridor.
H. Public reading and waiting-room.
I. Drawing-rooms.
J. Meeting-room.
K. K. Private sitting-rooms.
L. Ladies' room.
M. Bedrooms.
N. Billiard-room.
O. Serving-room.
P. Receiving stores-room.
Q. Tradesmen's entrance.
R. Waiters.
S. Butler's room,
T. Housekeeper's room.
U. Smoke-room.
V. Bar.
W. Porters' room.
X. Manager's room.

The elevations are well drawn and tinted, in a Jacobean style. A stone ashlar ground-story is shown, above which the façades are of red brick. The Miller's Park front is well balanced, and characteristic in treatment. The pilasters, dormers, cupola, and curb-roof break up the front, and the staircase on the railway side is made a dignified feature by a lofty window in a gabled projection. The author estimates his design at £26,000, and for the covered way and approaches £2,500. In style and treatment this is one of the most successful designs. Nothing could be more suitable in a red-brick district than a phase of the Domestic architecture of the time of the Stuarts. The design under the motto "Hotel" is also suitably treated in a similar style; there is an open cupola, and the front is well diversified by gabled dormer and bay windows. We take exception to the pilasters on upper story, and some of the detail, which looks tawdry. The garden-front has an arcaded balcony, and the materials are brick and stone. The plan, a parallelogram in outline, shows an entrance in communication with the corridor from railway-station, a porch forming a bay, a hall and long corridor running lengthwise with the building, and having end entrances, one having a suggested conservatory. On the entrance side the bar and staircase are placed on either side of hall, with a smoking-room and a billiard-room 40ft. by 26ft., at the left-hand corner, and a library and sitting-room at the right corner. The coffee-room is a long apartment 50ft. by 24ft., placed on the opposite side to hall in the centre, and lighted by four large bay windows facing the park; a ladies' and dining-rooms are placed at the west end, and the kitchen block forms a partly-isolated wing at the eastern end. The still-room and serving-lobby are conveniently interposed between kitchen and main corridor, which is lighted at both ends. In one alternative first-floor plan the intended extension is shown by radiating wings, not certainly a pleasing arrangement. The bed and sitting-rooms are rather long, 18ft. by 12ft., and the conveniences small. On the whole, the plan is economical; the kitchen department is well-located and partially separated from the residential part of the hotel. In our opinion the plan is one of the best. Over the porch the author shows a plant cabinet, which would make a pleasing feature on the landing of the first floor. The estimate is £17,500.

"Truth" is a cleverly-massed sepia sketch of a building, stone and half-timbered, but much too jumbled in the garden-front, and the overhanging framed stories are not desirable; the ground-plan is scattered and irregularly disposed, the large reception-rooms face the park, the billiard and commercial rooms are on the left of hall, and the dining and coffee-rooms on the right, approached by a corridor. The kitchen department forms a quadrangular arrangement. The author has placed the manager's room and bar in prominent positions, and made them group in the composition with the entrance vestibule. In the design marked "Stet," the coffee-room occupies a central position, but there is not much in the planning to demand notice. On the ground-floor, a tramway entrance and covered footway are shown; there is a lift, for luggage, and the kitchen and servants' department are on the right. The external treatment is a medley of Italian and Moorish features. The detail is lumpy and poor, but the sketch shows it to advantage. The corner cupolas, and the centre octagon turrets, which form bays in front, are pleasing in outline, but the elevations are coarsely drawn, and the turrets are surmounted with huge flying dragons, for vanes, which throw the elevation completely out of scale.

"Experience" a rather flashily-drawn Gothic design, with a centre tower, high roofs, stepped dormer-gables, and angle windows. The elevations are of red brick, but the author has produced a too-glaring effect in his colouring. In plan, a hollow quadrangle is adopted; the kitchen-offices project at one corner. There are two entrances, and a rather narrow staircase from the covered arcade on north side. We do not like the position of the smoking and billiard-rooms, which are inclosed by the internal corridors; the coffee-room is awkwardly placed at a remote corner from the entrance, and the planning is certainly extravagant. The upper floor is better. "Au Bon Droit," a feebly-drawn Gothic design, with a centre tower, is planned on a scale of magnificence. It is a solid parallelogram, with three small areas for light above, and three entrances. The coffee-room is cruciform in shape, and occupies the centre of the park-front; there is a "central" hall, as it is called, rather on one side, but the lobbies and corridors bewilder, and would perplex any stranger. The first floor is equally complex, and the author has "gone in" for the most monumental and complicated arrangement possible. This design quite throws into the shade the next one to it, "Unio Floreat," a commonplace building, with high roofs, and planned in the form of a letter ⊔. There is a manifest waste in hall; the ladies' coffee-room and the drawing room, are properly placed on the first floor.

"As You Like It" is a palatial design, in the Italian style, drawn in an ink perspective. It has a lofty central tower and pavilion roofs at the ends. The plan is based on quite academical rules. It has a principal central entrance, or vestibule, approached by a quadrant-shaped covered way from the station, leading into an octagon hall, right and left of which are wide corridors to the principal guest's-rooms. The kitchen and offices form a projecting wing of block, and we notice that the smoking and billiard-rooms are placed to balance the former, while we cannot approve of the proximity of the drawing-room to the smoking-room. We cannot understand also the use of showing, in the elaborate way it is here, the ornamental ceilings on the plan. The kitchen and billiard-room, which form extreme ends of the return wings, are low, and roofed with glass. An alternative elevation, with plainer features and good detail, is shown. "A Half-way House" is a Gothic conception, German in spirit, and might be mistaken for a convent. There is a loss of space on the ground-floor, and the principal rooms are occupied by columns which would much obstruct the available space, while impeding movement. On the railway-entrance front, the author shows a low range of offices which has the appearance of a lean-to from the main structure. The central corridors above are not over the one below, while the latter is ill-lighted. The billiard-room is at one end, and the general grouping not happy. "Fonda del Norte," shown on a large ink perspective in a heavy Jacobean style, taken from a high point of view, is remarkable, more as a drawing. It has a semicircular approach, and a *porte-cochere* on the railway front, while the covered way is made to enter the building by a side entrance, to accomplish which it deflects sharply in front, and incloses a garden in front. The coffee-room, 40ft. by 33ft., is made a central and prominent feature towards the park; the stairs are narrow. We find the billiard-room is below the coffee-room in the basement; the kitchen is not well located under the private dining-room; the commercial and smoking-rooms are also on this floor. The advantage of this arrangement may be open to question. "Experience" is in French Renaissance with steep roofs, angle cupolas, and centre clock-turret, plainly but sensibly treated; but the plan is decidedly wasteful in the means of administration, and the coffee-room, and ladies' private room or dining-hall, are not desirably placed; the latter is too close to entrance; a front terrace is shown. "A. B. C." is a strikingly-tinted set in a Free Gothic dress. The windows are round-arched in the heads, but there is a pleasing broken elevation to the park, with verandahs. The materials are red brick and stone above, upon a stone or terra-cotta basement. In plan we have a long block, with return wings at ends, traversed by a corridor. The coffee-room is in the centre of main front, and opposite entrance hall; the commercial-room at end of one wing is rather out of the way. The corresponding wing comprises the smoking and billiard-rooms. There are good points, but the stairs are inadequate. "Experientia" is in a Renaissance style, with lofty roofs at the angles, and the plan is ⊥-shaped, with centre entrance and cross corridors. The location of billiard-room, near the railway entrance opposite the commercial-room, is not judicious for an hotel. "Alto Forte Aquila" is Gothic, picturesquely broken up in features, brick and stone being the chief materials; but the tiled end harmonises ill with the massive masonry tower. In plan the same broken-up arrangement appears; the entrance from railway is not good, the coffee and billiard-rooms forming a cross wing at one end, and the general scheme has been sacrificed to grouping. "D." is a quiet, half-finished pencil set of drawings, in a Domestic Tudor style; but the irregular planning, awkward kitchen arrangements, and wasteful coffee-room and hall throw it out of the running. "Westminster" is the motto of a fine, vigorously-drawn sepia perspective, showing a design in Jacobean, with many effective features. The central tower and cupola, and the bayed projections at ends, make a bold and well-balanced front towards the park. The plan has a front block with return wings; the hall and stairs occupy the centre; the reading and coffee-rooms on one side are well placed, and approached from a long corridor. The manager's and commercial-rooms are placed in one of the return wings. We notice the corridor is badly lighted, and the offices arrangement is uneconomical. "P. P." is a clever sepia drawing, showing a considerable extent of view round a Gothic building of good general grouping and design. It has two towers towards the promenade. Brick, and stone dressings, are proposed. In plan the author is less fortunate. He shows a hollow quadrangular disposition, with kitchen and offices in the centre roofed low. The offices and corridors, and the bedrooms over dining-room, are confusedly arranged, the passages and steps to the latter are certainly wasteful, besides being awkward. "Shareholder" exhibits a quietly-treated Elizabethan building in a well-drawn sepia sketch. The entrance and stairs are awkward, and the rooms broken up; the corridors are also ill-lighted. "Utile Dulci" is a picturesque Italian composition, and the ink perspective does it justice. The parts are well massed, and the tower, with its arcaded upper stage, groups well. We cannot admire the arrangement; the entrance-hall and bar are not happy, and the coffee-room is small. There is a long wing for sitting and bedrooms. "Via Trita via Tuta" is Italian, but the plan does not bear inspection. The billiard-room is poorly lighted, and the large corridor on ground-floor is in a like condition. "Well considered" is the motto of a striking Italian design, perched on the cliff, with a corner tower drawn in sharp perspective. The plan has a long and one cross corridor, ill lighted, and we cannot say much for the disposal of the area. In the side corridor we notice two striking designs. "Preston," a cleverly-drawn sepia perspective, Gothic in style, with a well-grouped tower, but spoilt by the higgledy-piggledy arrangement, all

breaks and bays, salient and re-entering angles. "Rest" is in a florid Domestic Gothic, with French features, cleverly drawn in sepia; but the plan is hopelessly confused. The billiard-room is placed near the station entrance, and the corridors are not well lighted. The kitchen and servants' offices are inconvenient as regards access to coffee or reception-rooms. An elaborate set of plans are sent in. We can only glance at a few other designs. "Picturesque" is a straggling arrangement, with Renaissance exterior. The kitchen and conveniences are not well studied. "Omicron" is too flashily treated, and poor in plan. "Z" in circle is another bizarre Gothic design, with ill-considered plan; "Comme il faut" sadly fails in plan and in the style suited for the locality; "Princeps Facis" is much too grandiose; while we can only name "Troy," "Experience, the Source of Success," "Quantum Suff.," "Dum Spiro Spero," "Stet," "Chacun a son Goût," "Simplex," "Convenience," "Adelphi," "Labor Omnia Vincit," "Plan," and "Omega" as designs which fall short in the requirements of hotel accommodation, or are conceived in styles ill-adapted to the locality, either too meagre in scale or so grandly imposing that they might be mistaken for houses of legislature or palaces. We think the Committee have chosen one of the best plans; we are not disposed to say it is better in general design than two others we have named, but which are out of the field. The selected plan has one advantage—it is confined to three stories in height, while it does not cover a large area; on the other hand, the architectural designs we have named at the beginning (the third and fourth) have excellent points, and may make it difficult for the Committee to substantiate their choice upon the grounds of good arrangement and architectural design, and in view of the conditions the architects had to work under.

THE INDIAN VITRUVIUS.—I.

ALTHOUGH the best method of studying Oriental, as well as every other kind of architecture, is by analysis and classification of actual buildings—which is the method pursued by Mr. Fergusson, in his text-book on the "History of Indian and Eastern Architecture"—yet a knowledge of such literary works upon the subject which the native architects who formed the Indian style, or their contemporaries, may have left behind them, is not without a very special, though subsidiary, value. Whatever may be the intrinsic merits or defects of such works, however far they may fall below European standards, they at least help to show the ideals which the framers of the style had in their minds, and how far they and their successors have succeeded or failed in realising them. They may also serve to correct the conclusions and generalisations which we ourselves are sometimes inclined to draw from a too-exclusive study of their buildings. Mr. Fergusson has not scrupled to compare native Indian architecture with European, to the great disadvantage of the latter. He says that "while the educated and intellectual European always fails because his principles are wrong, the feeble and uneducated native as inevitably succeeds because his principles are right." After such a high compliment to the Indian artist, it is certainly matter for some regret that he should not have devoted some portion of his admirable book to a consideration of the works from which native architects have been instructed, and of the architectural allusions and descriptions found in the standard classical writings of India. There is no hint even of the existence of such works through his whole book, although on p. 346 he gives a drawing copied from Rām Rāz's "Hindu Architecture," and condemns the principles on which the temple there shown was built, in most unmeasured terms. An account, therefore, of the principal of these works cannot, we think, fail to be of great interest to architectural readers.

The Hindūs possess a number of treatises on arts and sciences of most ancient date, which they hold in such great reverence as to class them with their most sacred books, the Vedas, under the title of Upa-Vedas, or secondary Vedas. They are four in number, Āyur-Veda, the "science of life," or medicine; Gāndharva-Veda, the "science of music;" Dhānur-Veda, the "science of archery," or military art; and Sthāpatya-Veda, the "science of architecture," which last includes the Silpa-sāstras, or "scriptures of the arts," whereof architecture is reckoned the principal. The Silpa-sāstras enumerate as many as 64 mechanical arts, such as architecture, carpentry, jewellery, farriery, &c., upon which treatises have been composed by the ancient writers of India, but very few of them are extant at the present day. The most complete remaining work is called Mānasāra, and it is to this we give the name of "The Indian Vitruvius." The word Mānasāra is said to be the proper name of the sage who composed it; but as the name also signifies literally "the doctrine of measurement, or building," there is some doubt whether it is not merely a descriptive title of the work. This treatise possesses great native celebrity, particularly in the South of India, and is often cited by native artists as the highest authority for the solution of contested points in architecture. In many points of arrangement and style it closely resembles the work of Vitruvius, although we think it extremely improbable that the courtly Roman writer of the age of the Cæsars ever heard of the Sanskrit Mānasāra—supposing it even to have been written in his day—and equally unlikely that the Roman treatise should ever have penetrated to India. There are several other treatises on architecture; Rām Rāz mentions and describes seven—named mostly after the great sages who revealed the sacred books of India, and professedly compiled by them; but so far as they relate to architecture pure and simply, they all seem to be founded upon the Mānasāra. Copies of it are very scarce, and none quite complete, though some are nearly so; and no verbatim copy of so much as is known has yet been printed. The best account of it is by Rām Rāz, a learned native judge, under the English Government, at Bangalore, published in 1834, by the Royal Asiatic Society, shortly after his death. This work was highly spoken of at the time by the then most eminent English architects, Mr. Wilkins, Mr. Daniell, and Chas. Cockerell, and we are not aware of any more recent or full account of it. Some further particulars of the original work, and of purely native Indian architecture generally, are given by another native writer, Rājendralāl Mittra, in his "Antiquities of Orissa," published by the Indian Government, at Calcutta, in 1875. In this very learned and able work the author undertakes to dispute many of the principles laid down by Mr. Fergusson, in his "History of Architecture," and his views and opinions deserve most respectful consideration.

The treatise of Mānasāra is written in so difficult a style of Sanskrit, that the translator expresses a mild regret that the "venerable sages to whom our works on arts and sciences are attributed have been guided rather by a mistaken ambition of rendering themselves reputable by the difficulty and abstruseness of their style, than by an anxiety to make themselves intelligible." It is also so intermingled with mnemonical verses, which always suppose a pre-acquaintance with the subject, and technical phrases drawn from other languages, that the task of translation was for a long time given up by some of the most learned native scholars, and was only accomplished at last, by the aid of a good sculptor of the *Tammata* tribe, a native of Tanjore, who happened to be well acquainted both with practical Hindū architecture, and with most of the technical terms employed.* The date of its composition is very ancient, but not exactly known. Copies of it have been transmitted, as precious heirlooms, through many generations of hereditary artisans (*Silpas*) in the south of India, who, though unable to read its language, were found, at the advent of the British power, erecting buildings in accordance with the principles it prescribes. In its entire state the work consisted of fifty-eight chapters, the first of which describes the measures used in Indian architecture, sculpture and other arts; the second discusses what should be the qualifications of a *Silpi*, or artist, and specially of a *Sthāpatya*, or architect; after which, describes with considerable fulness the whole details of the art, treating, among other subjects, of the selection of sites, arrangements of ground-plans, planning of cities, villages, and towns; sites for temples of various orders, proportions and ornamentation of bases, pedestals, pillars, capital, and entablatures; the parts of temples and palaces, the "gopura," or pyramidal gateway, which forms the most peculiar feature of Indian architecture; and many other things. The purely architectural portion of the work is nearly entire, and the portion missing, being all that follows the 41st chapter, appears, from the table of contents, to have treated principally of the construction of statues and the accessories of idol-worship.

The first chapter treats of the standards of measurement. They begin with a quantity so minute as to be almost imperceptible. Mānasāra calls it "paramānu," and defines it to be "the particle perceptible only to the eyes of the sages"; that is an ultimate atom which none but a philosopher can appreciate. Other writers identify it with the motes floating in a sunbeam. Eight of these paramānus are equal to one "ratharenu," or grain of dust raised by a carriage-wheel; eight ratharenus make one "valagra," or point of a hair; eight valagras are equal in size to a louse; eight lice to a grain of yava, or barley; which, curiously enough, coincides with the assumed starting-point (the "barleycorn") of the English standards, and from whence we may form our datum for comparison of ancient Indian measures with our own.† Three, 3½, and 4 "yavas," respectively, make one "angula," or finger, of the inferior, middle, and superior sorts respectively. Twelve angulas make one "vitasti," or span, measured with the thumb and little finger. Two vitastis make one "hasta," or cubit, which is equal to 24 angulas, or about 18 English inches, and is sometimes called the "lesser" cubit, there being four several varieties of the cubit, used for various purposes, unnecessary to be detailed here. Four hastas make one "dandā," or staff, sometimes called *yesti* or *dhanus*, and eight dandus are equal to one "ryju," a cord employed in measuring all sorts of land.

The chapter on the qualifications of an architect reminds us very much of that on the same subject in Vitruvius, by its statement of the lofty moral qualities, the many varied acquirements, and the personal dignity necessary to the profession. On the

* It is very curious to observe that the technical treatises which formed the text-books of the mediæval artists of Italy were found in a very similar condition, namely, a mixture of corrupt Latin with technical phrases and local *patois*. (See Mr. Merrifield's "Original Treatises on Painting," &c.)

† In Monier Williams' Sanskrit Dictionary the barley corn (*yava*) is stated to be 1-6th according to some, and 1-8th according to others, of an angula, when considered as a measure of length; when it is a measure of weight it is equal to 6 or 12 grains of white mustard-seeds, according to various writers.

last point, although, according to the modern caste system of India, all artists are ranked with the lower orders of men, in Mānasāra their descent is traced to Visvakarma, the son of Brahma, and the architect of the Universe. The four grandsons of Visvakarma, it is said, were: 1st, the "Sūtragrāhi," or measurer; 2nd, the "Sthāpati," or architect; 3rd, the "Vardhaki," or joiner; and 4th, the "Takshaka," or carpenter; all of whom are necessary to building. The intermarriage of some of the first possessors of these arts with the most eminent characters in early Hindu traditions is cited as proof of their divine origin. And, according to one MS. copy of the Mānasāra referred to by Professor Goldstücker, the architect in ancient India was a personage who took high rank among the officials at a royal coronation. The special requirements and qualifications of each are thus stated: "An architect (sthāpati) should be conversant with all sciences, but especially arithmetic, geometry, drawing, sculpture, mythology, astrology, ever attentive to his avocations, of an unblemished character, generous, sincere, and devoid of enmity or jealousy. Of nearly equal qualification with him should be the sūtra-grāhi, or measurer; he may be either the son or disciple of the sthāpati. He should be particularly skilled in mathematics, and be strictly obedient to the will of the sthāpati. A takshaka, or carpenter, who is thus called from part of his avocation being to pare the rough wood, should be of a cheerful temper, and well versed in all mechanical arts. A vardhaki, or joiner, is he who is dexterous in joining wood and uniting other materials with one another. He should be of a calm disposition, and acquainted with drawing and perspective. As it is impossible to build houses and the like without the aid of the four descriptions of artists, sthāpati and so forth, let the enlightened twice-born gratify them in every respect."

The third chapter treats of the nature of the ground on which buildings should be erected. "Habitable ground," we are told, "may be known from its colour, smell, taste, form, and touch." "The best sort of ground," it says, "should abound with milky trees, full of fruit and flowers; its boundary should be of a quadrangular form, level and smooth, with a sloping declivity towards the east, producing a hard sound, with a stream running from left to right, of an agreeable odour, fertile, of an uniform colour, containing a great quantity of soil, producing water when dug to the height of a man's arm raised above his head, and situated in a climate of moderate temperature. The ground possessed of qualities directly opposite to these is the worst, and that which has a mixed nature is the middling." Sites of irregular shapes are recommended to be avoided, as are also those which do not face the cardinal points of the compass; and as to a spot which is slimy, damp, subject to unwholesome effluvia, near a burying-ground, or any repository of decaying matter, it says most emphatically "let such a spot be avoided on every account." These regulations correspond very closely with those laid down in the chapter on the same subject by Vitruvius, with this difference—that Vitruvius enters upon the reasons for the directions he gives, which the Hindu author entirely omits. They show that a knowledge of sanitation, even in those remote days, was considered one of the first qualifications of an architect.*

The first thing to be done with the site selected for building was to plough it thoroughly all over. This operation was performed with great ceremony, somewhat equivalent to our ceremony of laying the foundation-stone. The *sthapate* (architect) himself, clothed in fresh garments, and decorated with flowers, turned the first furrow at an auspicious moment, and made his offerings to the tutelary deity of the spot, after which the work was completed by labourers of the lower castes. Considerable importance was attached to this ceremony, and Mānasāra gives minute directions as to the structure and decoration both of the plough and the oxen to draw it; but as the reasons are all of an occult or magical nature, we need not further refer to them. In like manner, great importance is attached to the correct ascertainment of the points of the compass, but apparently less for the sake of adjusting the building to the most favourable influences of the wind, as described by Vitruvius, when treating of the same subject, than for astrological reasons, which it is impossible for us to understand or appreciate. The method, however, of finding the true cardinal points is worth shortly describing. A gnomon was to be erected, and its shadow observed and marked upon the ground at different times of the day, in a manner differing very little, if at all, from that laid down by Vitruvius. But Mānasāra goes much farther than Vitruvius in mathematical accuracy. He gives rules for rectifying the variations of the shadow, by the sun's motion in the ecliptic, the simplest of which seems to be as follows:—"The place where the shadow of the gnomon falls on two successive days at the same hour being marked, the difference between those two days is taken as the variation of the shadow for 60 *ghaticas*, or 24 hours. The interval between the times at which the western and eastern points were marked on the preceding day is multiplied by the difference of the shadow measured for one day, and the product being divided by 60 ghaticas, the result will give the difference of the shadow for the given time. It will then be only necessary to remove the east or west point so far towards the south or north, according as the difference of the shadow on the second day may be in either of those directions, or as the sun is in the northern or southern solstice." W. H. R.

* The following curious methods of determining the suitability of ground for building purposes are described by Rajendralal Mittra, quoting from the *Matsya Purana*. "Before commencing a building the proper course is to dig a hole, measuring in every direction an *aratni*, or a cubit from the elbow to the little finger. This being afterwards carefully plastered with mud, a saucer is to be filled with *ghi* (batter), provided with four wicks on four sides, and placed at the bottom of the hole. The wicks being now lighted, if they burn uniformly and brightly, the ground is fit for building, otherwise it is bad. Another and more practicable and intelligible method is to press into the hole the earth excavated from it. If the earth should fill up the hole and leave a surplus, the ground is good; if it should barely fill it up, but leave no surplus, the ground is indifferent; but if it should prove insufficient, the ground is positively bad."

THE INSTITUTE PRIZE DRAWINGS.

THE Soane Medallion Prize, for a Fine Art Museum in a provincial town, has been competed for by a large number of students this year. We first notice a Gothic design, French in detail, bearing the motto "Why Not?" in a circle; it is carefully drawn, but the composition is spoilt by the lumpy effect of roof on one side of the centre tower. There is an open arcade along the first story of art gallery, the reason of which is not apparent except to give relief to the front, and to afford the groined arcading in the gallery of antiquities below. The plan is symmetrical and Classic in character, and seems hardly to suit an exterior of Gothic design. The galleries devoted to geology, machinery, local antiquities, and natural history, are arranged at the four corners; sculpture, and fishes, and reptiles are obtained in smaller apartments right and left of the centre hall. The picture-galleries and art-library are on the first floor, lighted by lanterns, and have high waggon-boarded roofs. The corridors and hall are lighted by four open courts. The heavy roof, and the gabled end over picture-gallery, seriously detract from the composition. "Labor Omnia Vincit" is a design based upon a square plan; it has a lofty square tower in the centre over the entrance, and the façade right and left is well balanced with gabled ends and angle turrets. The spacing of the windows in the tower is faulty—there is a certain want of gradation in the parts; and the windows in the upper part of tower look short. The author shows two flanking towers, one being over the stairs. In plan there is a large square hall with an ambulatory round it in the centre of the area, round which are disposed the sculpture, medals, and coins, and local antiquities; the picture gallery and library are above with a gallery round court. The sections show three tiers of arcade round the centre court. The detail drawing of end gable is masterly in precision and detail, and the figures in the panels over windows are well put in. There are two or three designs in Classical styles worth notice. One of these has the motto "1880," and is a clever Renaissance design, marked with much feeling and good detail; the plan is parallelogrammic, with a centre hall leading to medal and coin-galleries, with cross galleries for sculpture at the ends forming wings. The apartments are well lighted. An arcaded balcony is shown along picture-gallery on the first story—these galleries are top-lighted. A dome of square plan surmounts the entrance, and a well-drawn ink perspective is sent in. Another very able design has the motto "Senza fretta Senz' Indugio." It has a French look in the draughtsmanship; the perspective is tinted with care, and the detail is well drawn and refined. The design is Italian, with some good Classic detail. A circular colonnade and terrace form the approach to the building, which is massive and heavy in proportion. A central square sculpture-hall, or lecture theatre, occupies the middle of the area on plan, surrounded by colonnades, and lighted from a glazed roof; behind this is a circular peristyle, intended for pottery, while the sculpture galleries occupy the sides of the building. Another clever design in a Classic style, French in feeling, has the device "O." The perspective, a well-coloured drawing, shows a massive rectangular treatment, monumental in character, with low wings at the sides. There is a large sculpture vestibule in front, lighted by wide windows, centre stairs, a sculpture gallery with top light, with the antiquities and medals in the wings. On the same screen there is a hybrid design, with a curious dome under the motto "Mine"; a florid Italian design, "1880," and another drawing with Latin motto. "Art," is somewhat better than some near it in plan. One design with a German motto has a low central tower and deep buttresses, much too ecclesiastical in idea. There are a few other designs, but they do not call for notice.

For Sir W. Tite's prize several competitors have tried their hands at the problem, which was a mausoleum. All of them adopt the Greek cross on plan, which, however, is developed into a superstructure having features in some cases of cathedral-like proportions. Others are travesties. "Saint Kentigern" is mausoleum-like, but its dome is heavy and ill-proportioned; the walls and vaults are proposed to be painted. "Hope" is a Doric structure with central dome and lantern, but the latter is unsatisfactory in composition, the plan has the angles between the arms filled up with square niches. "Valhalla" is too heavy, and the plan shows side-chapels. "Spero" is a miniature St. Paul's dome on a small base, with a Corinthian portico; and perhaps the best composition is that with the motto, "Mors ultima linea rerum est," a rusticated Doric structure, with a low dome over crossing, with pedimental projec-

tions round the tambour ; the detail is well-drawn. The "Grissell Medal," for a constructive problem—this time, a design for groining of church—does not go begging; the best contribution is "Spes," showing a catenarian curve as the governing line of nave and aisle vaults. The author has geometrically proportioned his section ; the nave is two squares in height, and the aisles half-a-square wide. The details of ribs, and other drawings, show study. "Nil Desperandum" is a careful set, but the detail is not up to the mark, and another, with a Greek motto, is an injudicious attempt at a perforated vault with pierced ribs in a poor style. On the staircase we see a few measured drawings for the silver medal. The best of them illustrate Dunblane Cathedral and details from Aston Hall. We think the Council of the Institute have done the right thing in exhibiting the whole of the drawings. It will be an incentive to the competitors, and will add to the educational value of the prizes among the younger men in the profession.

THE ARCHITECTURAL ASSOCIATION.

A MEETING of the Architectural Association was held on the evening of Friday, February 27th; Mr. E. G. Hayes (Vice-President) in the chair. New members were elected as follows:—Messrs. A. W. Snell, J. E. Ashmore, T. W. Garrood, A. C. Hurley, S. Hall, H. S. Tyack, jun., H. A. Jones, L. T. Waller, G. E. Halliday, R. W. Williams, G. Bridge, J. Sharp, Cole A. Adams, A. L. Worth, J. B. Calder, B. Haylor, A. B. Allin, E. M. Vaughan, W. J. Gibbon, C. J. Gunyon, S. Ward, and H. B. Best. The next visit, it was announced, would take place to-morrow, March 8th.

Mr. W. Dawes then read a paper on

ASYLUM PLANNING.

After some introductory observations, he said: The asylum architecture of the past offers little that is profitable to the student, except in affording numerous examples of failures and defects. By observing these he may learn to avoid them, and, in avoiding them, he will necessarily seek for some better plan or contrivance to supply their place. There is no doubt whatever that, as curative establishments, the asylums built forty or fifty years ago (to which I refer) were entirely unsuitabe for their purpose. The money that has since been wasted upon them in the very proper desire to make them more suitable would have been almost sufficient to construct entirely new buildings. But the mistake is still being made. Asylums that are badly planned, and are already overgrown, are being added to, and in them the existing evils are thereby aggravated. In some institutions every bed is now occupied. Lunacy is admittedly on the increase, or, at all events, patients are accumulating, and still in the majority of cases no preparations are made to meet the inevitable demand for increased accommodation until overcrowding actually commences. It is the duty—the imperative duty—of asylum committees to look well forward to their probable requirements, and to prepare for this inevitable demand in the years to come, not by adding to their already overgrown and out-of-date buildings, or by scheming the best method of overcrowding them, but by making up their minds and thoroughly maturing their plans at least two years before the first blocks of the new buildings will be required. I say the first blocks, because, in all probability, it will be found desirable, and in some cases absolutely necessary, to hurry forward and occupy the central administrative block, and the adjoining blocks to the right and left, long before the remaining portions are completed, or perhaps even begun.

Provision in Plans for Future Extension.—So long, however, as asylum committees are permitted to extend their buildings indefinitely, and are allowed to provide accommodation, good, bad, and indifferent, for any number of patients, however large, provision should be made in the original plans for future extension, so that when the time comes for such extension the added portions shall form a symmetrical part of a complete and prearranged whole. In the plan I advocate, this can be effected by leaving the main corridor unobstructed at the end, and by adding other blocks as may be required. Thus the additions could be made at any time without interfering with the buildings already erected, or disturbing the patients residing in them. In contemplating these future extensions, it must not be forgotten that the increased number of patients will require space in the central dining-hall and recreation-hall and chapel. These should, therefore, be constructed sufficiently large at the outset, or space should be set apart for their extension whenever required, so that no pulling-down or interference with parts erected should be necessary to make room for the future additions. This consideration should also extend to the administrative buildings, workshops, and laundries ; and in these cases it will be better to make the extra provision at the outset, particularly in the size of the kitchens and offices in connection with them, as the extension and rearrangement of these buildings involve many serious complications, and great expenditure without proportionate satisfaction.

Size of Asylums.—There is one important question in connection with asylum building that should be at once settled, viz., the maximum number of patients that shall be provided for in any future asylums. We all admit that 1,000 is an excessive number for one institution under the active and presumably efficient superintendence of one man, and we all even more readily admit that 2,000 is not only an excessive, but an unreasonable number. Dr. Kirkbride says: "In state institutions, when full, at least one-half of all the cases will commonly be of a chronic character, and require little medical treatment. Even when thus proportioned, 250 will be found to be as many as the medical superintendent can visit properly any day, in addition to the performance of his other duties. When the proportion of acute or recent cases is likely to be much greater than that just referred to, the number of patients should be proportionately reduced, and 200 will then be found to be a preferable maximum." I do not doubt that the majority of medical superintendents consider 250 patients a sufficient number for one institution; but at present it seems almost useless to expect that committees will have the courage to adopt this view in the face of the "almighty dollar" argument that may be brought to bear against it, and it is, therefore, for this reason I take 500 as the number that can be reasonably well accommodated and treated in one asylum. When we get beyond this number the machinery becomes "too vast and too weak."

Overcrowding.—Dr. Bucknill gives painful accounts of overcrowding in the American asylums. Among the evils of overcrowding may be included the great danger of overlooking a sane case. This evil of overcrowding extends to other kindred institutions. At the opening of the new buildings in connection with the Oldham Workhouse, on July 12, 1879, the chairman (Mr. Councillor Simmonite) made the following statement:—"The workhouse was intended to hold 650 people, but he was sorry to say there had been over 800 in at once during the last year. At the present time the number was decreasing, and there was perhaps something like 740 or 750 inmates." This overcrowding sacrifices health and comfort, irritates officials, disheartens medical officers, and increases the death-rate.

Classification.—I now come to another question which it is necessary an architect should understand. The old plan, unfortunately still existing, of herding large numbers of patients in one room, must give way to the better plan of placing smaller numbers in smaller rooms, and developing a more complete classification of cases in the various blocks. Lunacy assumes different forms, and lunatics differ one from another to an extent that not only demands different treatment from the physician, but also requires special consideration from the architect. There are patients who are refractory, and patients who are gentle and harmless ; there are the suicidal and dangerous, the moody, the cantankerous, the inoffensive, the pugnacious, the vengeful, the demented, the melancholic; patients who are chronically helpless, others who are incurable imbeciles ; those who cannot control the wants of nature, and those who are inattentive to them. There are dirty patients and clean patients, noisy and quiet, restless and tranquil, cunning and conspiring—indeed, the mad people in an asylum differ from one another as much as the mad people out, only they are more pronounced. But patients may be broadly divided into two classes—the curable and the incurable—and the primary considerations for both physician and architect are, What are the best means, and what are the best provisions that can be made for the cure of the one and the care of the other? Unfortunately, however, it is beyond the physician's skill to determine in every case to which class a patient belongs. Even after years of ineffectual treatment some cases could not be pronounced hopeless, and therefore in the attempt to separate the curable from the incurable, it would of course be found in certain cases that mistakes had been made, and that changes or exchanges would have to be effected. Recovering cases would have to be transferred from the incurable blocks, and others that developed hopelessly would have to be transferred from the curable blocks.

Dr. Kirkbride objects to this system of classifying the curable from the incurable on the ground that "no one can say with entire certainty who *is* incurable, and to condemn any one to an institution for this particular class is like dooming him to utter hopelessness." Again he says: "When patients cannot be cured, they should still be considered under treatment so long as life lasts, if not with the hope of restoring them to health, to do what is next in importance to promote their comfort and happiness, and to keep them from sinking still lower in the scale of humanity." But these objections do not, in my judgment, outweigh the great advantage that such a classification would secure. In the majority of instances curable cases will show some sign of amendment within twelve months of their admission, and, indeed, a large number will recover within even six and nine months; but it is true also that many do not recover within two or three years, some much later, and it is impossible to fix any limit of time beyond which exceptional cases may be finally pronounced incurable.

Separation of Sexes.—It is almost needless to point out the necessity for a complete separation of the sexes, both patients and attendants. There are no great objections to their attending religious services in the chapel together, or dining together in the dining-hall, or being present at entertainments together in the recreation-hall, but at all other times they should be kept entirely apart. In arranging the central block of asylum buildings, this must be kept very clearly in view. In the laying-out of the grounds, to which I shall presently refer, it forms an important consideration. The question of how far balls and social meetings are an advantage or otherwise, either to patients or attendants, is a matter more for the consideration of the medical superintendent than for the architect. If they are approved of they could be held in the recreation-hall provided for the purposes I have before named, and would need no extra provision made for them.

Separate Hospitals.—It is held by some, and Dr. Kirkbride among others, that separate hospitals should be built for male and female patients. One great advantage would certainly attend this plan, namely, the greater facilities it offers to a more complete classification of cases. The three blocks on each side the central or administrative block, according to my plan, would then form six blocks for six different kinds of female patients (or male patients, as the case may be). These blocks may be, in the case of a large asylum, again subdivided, so that in the twelve distinct divisions there would be every opportunity afforded for a complete classification of cases, and the physician would be enabled to give his patients the benefit of frequent and complete change from ward to ward whenever he may consider it desirable. This change of wards is found very effective, in many cases, in calming excited patients, and would no doubt be more frequently adopted if a sufficient number of rooms were provided.

The Commissioners say: As an approximate rule, the provision in a new asylum for the different classes of patients may be in the following proportions:—

Sick	15
Recent and acute	20
Working, quiet, and chronic	65
	100

Each of these classes admits of further classification, and indeed requires it. Dr. John Merson classifies the cases as follows for the new Hull Asylum:—

1. Acutely excited cases	30
2. Recent admissions, and other cases requiring special care	30
3. Sick and infirm	35
4. Convalescents and quiet	35
5. Chronic and working	70
	200

Dr. H. Rooke Ley, medical superintendent of Prestwich, says in his report, February, 1879: "For all practical purposes the chronic insane may fairly be divided into two classes: 1st. The idiots, imbeciles, and hopelessly demented patients, who are quiet and harmless, clean in their habits, and easily managed; 2nd. The very much larger class of incurables, whose mental condition necessitates special provisions for their care and safety."

Proportion of Sexes.—As a note I may state, according to the last census (1871) of England and Wales, for every 1,000 males there were 1,056 females. On January 1, 1871, of the insane of all classes in England and Wales the number of the males was to that of the females as 1,000 to 1,082; but in the pauper class alone the number of the latter sex was 1,242. In Surrey, at same date, there were 1,422 females to every 1,000 males, or nearly three to two. "In but few counties is this proportion exceeded."

Division of Main Buildings into Blocks.—In beginning with the main division of cases into groups or classes (without for the present considering any sub-divisions), it is necessary first to provide a separate block for each class. There are several ways of doing this, but, according to the plan I am laying before you, I suggest that, for an asylum of 500 patients of all kinds, the following blocks should be provided:—1. Central administrative block; 2. Receiving block for the males; 3. Receiving block for the females; 4. Infirmary block for the males; 5. Infirmary block for the females; 6. Epileptic block for the males: 7. Epileptic block for the females; 8. Chronic block for the males; 9. Chronic block for the females; 10. Future extension block for the males; 11. Future extension block for the females; 12. General baths block for the males; 13. General baths block for the females; 14. Workshops block for the males; 15. Laundry block for the females; 16. Medical superintendent's house; 17. Chapel. The blocks I have named should be connected by corridors or covered ways, and would therefore constitute the main buildings. In convenient positions on the site, and entirely detached from these main buildings, other blocks would have to be arranged. The following is a list of these detached blocks:—1. Hospital for infectious diseases on the male side; 2. Hospital for infectious diseases on the female side; 3. Convalescents' cottages or house for the males; 4. Convalescents' cottages or house for the females; 5. Male attendants' and workmen's cottages; 6. Female attendants' and workmen's cottages; 7. Lodges at entrance-gates; 8. Deadhouse, dissecting-room, and hearse-house; 9. Farm-buildings. In addition to these there would be a number of smaller structures that should be properly arranged on the general plan, although they may not all in the first instance be built. The following is a list of some of these:—1. Tool-houses and seed stores; 2. Skittle-alley; 3. Racket-court; 4. Orchestra; 5. Arbours or shelters; 6. Ice-house; 7. Lumbersheds, &c. Having determined the number of the blocks required, one of the most important things to be next considered in designing a large asylum is the placing of these various blocks upon the site, their position with regard to each other, their position with regard to light, and their position with regard to the scenery. To secure as much light, and to command as much of the scenery to the south, as possible, the blocks should be placed with their longest sides to the south, so that the dayrooms and corridors may command an unobstructed view of the country on that side, and receive the full advantage of all the sunshine that the day affords. In the climate of England we seldom get too much sun, and the inmate of an asylum ward cannot have scenery too beautiful or surroundings too bright, seeing that he has nothing else to look upon from day to day all the year round, and perhaps all his life long. If we place the blocks one behind the other, we shut out from all, except the front block, a great deal of the sunshine, and nearly all the landscape, and we provide in its place nothing more interesting than dreary airing-yards, and suggestive buildings. When we consider how important it is that not only should the inside of the building have a cheerful appearance, but also that the views from the various windows should be unobstructed, and free from depressing sights, and prison-like surroundings, we must all, I think, admit that the arrangement of blocks I have indicated is not the best that can be devised. The system of placing the blocks *en échelon*, as shown on the plan before you, is entirely free from the objections I have named; and, moreover, it secures, more fully than any other arrangement, so far as I know, the advantages I have referred to. But as there are many ways of sitting down, so there are many ways of stepping out, or stepping back, as the case may be; and, in echeloning the blocks of asylum buildings, some important points require consideration, and among others are the following:—1. Their position with regard to each other, so that one block will form a minimum obstruction to the view from the other. 2. The importance of securing to each block the maximum of sunshine and scenery. 3. The complete separation of the blocks. 4. The desirability of having the main corridor straight from end to end. In order to embody these requirements, it is imperative that the angle formed by the corridors, to the left and right of the centre block, should be an obtuse angle, such as those shown on plan. If the angle is less obtuse, and the various blocks are receded more quickly, it will be seen that they would be in the shade a great part of the day—those on the female side in the morning, and those on the male side in the afternoon—while, on the other hand, the nearer they approach a straight line in their formation and line of front, the more uniform would be the light as the sun travels from east to west. If formed in a straight line, however, the end windows in each block would be obstructed by the end walls of the adjoining blocks. In the arrangement I have adopted, this serious objection is entirely avoided, and the whole of the important and windows on the first and second floors, and one-half of them on the ground-floor, command unobstructed views of the country east and west, as well as a portion of that on the north. This is an advantage that cannot be too highly estimated, securing as it does to each block the effects of sunrise and sunset, in addition to the full sunlight of middle day already insured by the placing of the long frontages of the various blocks to the south. The large blocks facing the south should be equally distanced from one another by a clear space of, say, at least 10 feet. This might be reduced, but no advantage would be gained thereby. It will be seen that the whole of the day rooms, even on the ground floor, would by this arrangement receive the direct sunlight three quarters of the day; while in the plan of more quickly receding the blocks they could, at certain seasons of the year, receive it only a small portion of the day. The same proportion would likewise apply to the extent of view obtainable from the dayroom windows. The plan on which the blocks recede on lines of a less obtuse angle, possess an advantage in the reduced length of corridor required; but with the provision of tramways in the basement, the lifts in each block, and the other facilities for serving food and materials within any reasonable distance, the length of this main corridor ceases to be a point of very great importance, and is far outweighed by the other more material advantages secured by the plan I recommend for adoption. The complete separation of the blocks is of great importance, as it insures a free circulation of air round all, and reduces, if not entirely removes, the possibility of either fire or infection passing from one block to another.

We next come to the consideration of the various buildings in detail, and from this point my paper becomes as disconnected as a dictionary.

The Main Corridor.—The main corridor being planned in a straight line from end to end, its entire length can be viewed from its junction with the administrative block. If a curved or broken line be adopted, this complete supervision cannot be obtained. A curved corridor, though in some cases more attractive in its appearance on a plan, should therefore be avoided, for the sake of securing the far greater practical and more substantial advantages which a perfectly straight and unbroken line of corridor secures. The construction of the main corridor should be fireproof, provision being made to prevent a fire (should it break out in any part of the building) from passing from one block to another. In the working out it will in most cases be found that by a gentle and scarcely noticeable gradient in the main corridor connecting the blocks, the difficulty involved in a difference in levels could be overcome without the introduction of a single step. In wet weather the main corridor might be used as a promenade for the patients. It would offer opportunities for exercise in the winter months that would be in the highest degree valuable. Certain hours being allotted for the use of the patients of certain blocks, no confusion would arise, and all might in turn be benefited. With the exception of the dining-hall and conservatory, the infirmary blocks, the epileptic blocks, and the chronic blocks, the whole of the buildings are arranged on the north side of the main corridor, so that the more valuable positions on the south are entirely given to the blocks occupied by the patients.

Exercising Yards.—The exercising yards or airing courts should in all cases be immediately in front of the block of buildings to which they belong, and in every instance they should face the south. When the main blocks are echeloned, as shown on the plan, these conditions can be complied with perfectly, and a further advantage is secured in the protection afforded by the main corridor and main buildings from the north winds. As one writer on this subject says:—"Small bare yards for the refractory, containing nothing destructible and surrounded by walls too smooth and lofty to be scaled, with carefully rounded corners; a meagre and repulsive court, like some dry moat, for the feeble and melancholy; and at the utmost a cheerless expanse, bounded on all sides by barriers, designed to appear insuperable, and itself resembling a barrack-yard for parade and punishment drill, devoted to the recreation of the tolerably well conducted, is happily obsolete."

All these dreary appearances should be avoided. The airing yards should suggest pleasure grounds. "They should be of ample extent, so as to afford proper means for healthful exercise," and "should all be planted with trees and shrubs, and any trees already within them should be preserved for shade. Where walls are required they should be sunk in a ha-ha." The walks should be well laid, and the plants should be tastefully arranged. The grass-plots also should be ornamentally laid out. There should be seats and sunshades, and some appliances for amusement. "Four-fifths of all the patients will, under proper regulations, be able to take long walks in the grounds for at least a couple of hours morning and afternoon at all seasons," and during warm and favourable weather a great proportion of the remainder may be spent in the airing enclosure. Seeing, therefore, that the airing yards form the foreground in the picture that is perpetually presented to the view of the inmates, and seeing also that it is there the patients spend so much of their time, it becomes a consideration of the very highest importance how to make them ornamental as well as useful, and cheerful as well as beautiful.

Administrative Block.—A general dining-hall, for the accommodation of both sexes, should, as I have said, be provided. A scullery and other requisite offices should be attached to it. The size of the dining-hall will depend on the number of patients and the mode of arranging the tables. This should, therefore, be definitely fixed at first. There are many views with regard to the employment and arrangement of either long tables and forms, or restaurant tables and chairs in the dining-hall. In the case of long tables and forms we can keep near the minimum cost, in the other we exceed it; but, apart from the question of outlay, I am of opinion that the separate table plan, which provides for, say, eight, ten, or twelve patients each, seated in ordinary chairs, and entirely detached from the other tables, leaving ample walking and serving room round them is much to be preferred. The dining-hall should be situated near the kitchen, should be equally accessible by both sexes, and should be designed with a view to its forming both a recreation-hall and complete theatre. Provision should be made for fixed and movable scenery, and for all the matters required for a perfect theatrical representation. Dressing-rooms and water-closets should be provided for the use of the performers, and a separate gallery for the accommodation of visitors and the chief officers connected with the establishment. Another very necessary provision of separate water-closets

should be made for the use of patients during their stay in the hall, either at meal times or while attending entertainments in the evening. The dining-hall should stand east and west, so that in its length it will face the south. In this position it would possess great advantages in commanding a good view of the country and the greatest share of sunshine; and, moreover, it would form a central feature in the design. At the west end of the hall a conservatory might be built. It would, when filled with flowering and variegated plants, form an interesting and attractive addition to this portion of the building. We are told that the dining and recreation-hall "should be sufficiently large to meet the prospective wants of the asylum in case of an increase in the number of patients," but as there appears to be no limit to these additions, the calculations of the extra space will not rise much above the level of guess work.

The Attendants' Hall should adjoin the patients' dining-hall and kitchen. Its windows might be so arranged as to command a view of its entire length of the main corridors, and also of the large dining-hall. It should be built sufficiently large to accommodate at one time the whole number of attendants, both male and female, that are attached to the wards. The whole of them, however, will never be able to be present at one time. But this allowance of room will provide for any future increase in the number of patients, and consequent addition to the staff of attendants. It may be considered desirable to divide the room, or partition off the male from the female attendants, and the hall should be planned with this view, so that the alteration can be made without difficulty.

The Kitchen, and offices and storerooms connected with it, should be lofty single-storey buildings, lighted and ventilated from the roof, and also from windows looking into the areas adjoining. They should be all centrally placed and conveniently arranged. By means of lifts to the basement and upper floors, supplies would be forwarded to every part. In placing the dining-halls adjoining the kitchens an important point is secured. It would ensure a more rapid service of dinner, and, what is of immense importance (as most of us will believe), the dinner would therefore be, comparatively speaking, hot. A lukewarm friend is bad enough, but a lukewarm dinner, such as an asylum affords, is insufferable; and if an insane man feels on this subject as we feel, he will experience enough irritation from this source every day to keep him a lunatic all his life. The kitchen stores might be received, and the scullery refuse might be removed by a rollingway and cartway to the basement, where (as often occurs) it is inconvenient to provide a roadway to the kitchen offices on the ground-floor.

Bakehouse.—The bakery is sometimes attached to the administrative block, and in this position there is perhaps better supervision and better protection from pilfering; but it may also be placed in the workshop block, in which position it has the advantage of separating the male servants employed in the bakery from the female servants employed in the kitchen. In connection with the bakehouse there should be a wood and coal-shed, also a flour-store and a bread-room, both of which will be of a size proportioned to the number of inmates resident in the asylum.

Basement Corridor.—The construction of a corridor in the basement under the main corridor is is of the greatest importance. Among its other advantages are the following:—1. By means of the tramway carried to the lifts in the various blocks a simple, convenient, and rapid service of provisions, coals, and supplies of all kinds to the several wards, attendants' rooms, &c., would be provided. 2. It would prevent the constant passing of attendants along the main corridor. 3. It would afford space for the piping and flues in connection with the heating and ventilating, and for the main supply-pipes for gas and water to the whole building. 4. Branch corridors, leading to the various shoots, would afford perfect facilities for removing soiled linen, ashes, dust, &c. The corridors should be carried to both the laundry and workshop blocks, and to portions of the administrative block immediately under store-rooms, service-hoists, &c. The earth on each side the corridors should, wherever practicable, be excavated, and the banks should be sloped to easy gradients, so that perfect light, abundance of fresh air, and freedom from damp, may be fully secured.

The rooms for the Assistant Medical Officers "should be conveniently placed with regard to the wards occupied by the sick and recent cases." They should be placed on the first-floor of the administrative block, and might either occupy a position to command a view to to the south, or they may be arranged over the principal entrance and rooms to the north. In the southern position they would be nearer the wards, but the windows would look upon buildings and airing-yards, and exercising patients—scenes that would not operate pleasurably on the mind, or tend to cheer the officers in their hours of leisure. I deem it important to arrange the rooms of the medical officers in such positions that, without sacrificing in any way the interests of the patients—and this is possible—they shall at least convey an idea of distinctness and separation from the portions of the building devoted to the patients. A few extra paces will make all the desired difference, and in averting a feeling of depression that might be suggested by a gloomy outlook, or a sense of confinement among sickening associations, we avoid an evil that not only affects the physician, but extends its indirect influences to every patient in the building.

Head-Attendants' Rooms.—These rooms should be centrally placed, and attached to the administrative block, and therefore within easy call of the medical officers, and other of the principal officials engaged in the central buildings. The head-attendants do not require a separate kitchen, but would be supplied from the large kitchen.

Weighing Room.—In some asylums (as in Lancaster) the patients are weighed monthly, and their weights are registered. The Commissioners in Lunacy, in their report on Lancaster County Asylum, April 2 and 3, 1878, say: "This excellent practice in use here for some time is, we are glad to observe, still continued." In Brookwood Asylum the patients are weighed monthly, and the results recorded, so that any failure of nutrition requiring a change of food is promptly detected.

Administrative Block.—The following is a list of the rooms for which arrangements must be made in planning the administrative buildings:—Porch; vestibule; entrance-hall; staircase-hall; hall-porters' room; receiving-room for patients and their friends immediately on arrival; male visitors' room; female visitors' room; committee-room; lavatory and water-closet adjoining; clerk's office; medical superintendent's office; chaplain's office; steward's office; large general store-room adjoining; goods hoist to the basement and upper floors; receiving-room for goods; crockery store; lavatory and water-closet for steward's department; housekeeper's office; store-room for clothing, with presses all round; cutting-out room; small room for condemning clothes; blanket-room; bedding material room; lavatory and water-closets to housekeeper's department; hoist for stores. Dispensary (adjoining main corridor)—waiting-room for attendants; pathological-room. Kitchen: back kitchen; scullery; china-closet; pantry; bacon larder; meat larder; fish larder; milk and butter-room; vegetable-room, for receiving and preparing vegetables; potato-store; fruit-room; flour and bread-room; housekeeper's room (small, and overlooking kitchen); preserve store adjoining; lavatory and water-closet for kitchen servants; serving-room; dining-hall and recreation-hall (provided with stage for theatrical performances, two dressing-rooms, with lavatory and conveniences, gallery for medical officers, and visitors, &c); attendants' dining-hall (adjoining patients' dining-hall, and communicating with it); conservatory (opening out of dining-hall); lavatory and water-closet for use of patients while in dining-hall (male on one side, female on the other); beer-cellar (under stewards' rooms); coal and wood stores; lumber-rooms; staircases. Junior medical offices: dining-room, small serving-room, private sitting-room (one for each), bedrooms (one for each), spare beedrooms (one for each), small library, bath-room, lavatory, water-closet, &c. Housekeeper's sitting-room, bedroom, bathroom, and water-closet. A similar provision for steward, should he reside in the building. Bedrooms for servants; bedrooms for night attendants; bathrooms and water-closets for servants; houses linen stores; service-lifts; foul linen shoots; housemaids' closet.

(To be continued.)

SCHOOLS OF ART.

Nottingham. — The annual meeting of the Nottingham School of Art was held on the 26th ult. The report stated that 4,689 works had been executed by the pupils during the year ending July 31, 1879. In the National Art Competition, the Nottingham school obtained 1 of the 10 gold medals; 6 of the 45 silver medals; 7 of the 77 bronze medals; and 9 of the 168 Queen's Prizes—making a total of 23 awards,—or one more than last year. The awards this year are much higher in value—the number of medals being 14, against 8, last year; or two more medals than have ever yet been obtained by any school in the kingdom, excepting South Kensington. The Nottingham school has this year obtained nearly one-ninth of the entire number of medals, and about one-eighteenth of the Queen's prizes. Four students obtained "Free Art-studentships," being ten less than last year. This diminution in the number is inexplicable, as the school, in every grade of examination, exceeded the results of last year. Eighty-three works, by 59 students, were marked by the examiners as worthy of "third-grade prizes," 23 of these works having afterwards obtained National Competition awards. In the advanced third-grade examinations, held last May and June, the school was exceptionally successful, especially in painting still-life, &c., from nature. Examinations were held in the following subjects: Ornamental design, 3 excellents, 2 goods, 12 passes; painting still-life, &c., from nature, in oil and water-colours, 4 excellents, 2 goods, 3 passes; drawing from the living model, 1 pass; advanced perspective, 2 goods, 4 passes; and in styles of architecture, 1 pass. Total 7 excellents, 6 goods, and 21 passes,—altogether, 34 successes. Last year, there were 2 excellents, 7 goods, and 13 passes,—total 22 successes. Each student who obtains an "excellent" is entitled to a Queen's prize, in addition to those gained in the national competition. In the second grade examinations, in freehand drawing, practical geometry, perspective, and model drawing, 110 candidates were successful in 147 papers, and 35 papers were marked "excellent."

The Female School of Art. — Baroness Burdett-Coutts distributed the prizes to the students at this school on Monday afternoon. The statement for the past session showed that 1,982 drawings and 14 models had been forwarded from the school in South Kensington, being the work of 186 pupils. One gold, one silver, and two bronze national medals, and five Queen's prizes had been gained. Fourteen students entered for examination for art mistresses' certificates of the highest grade, all of whom passed in one or more subjects, eight completed their full certificates, five of these taking up their free studentships. The Gilchrist Scholarship of £50 was gained by Miss E. C. Nisbet. Miss F. Reason gained a Queen's Scholarship of £30; and the Princess of Wales second Scholarship, the Subscribers' Scholarship, and the national gold medal were awarded to Miss E. M. Wood. Her medal-painting, an admirable group of azaleas, has become the property of the Queen. Before the distribution of prizes Sir Coutts Lindsay addressed the meeting, and Mr. J. S. Rawle, the able head-master of the school, to whose unwearied exertions is due in no small degree the enviable success of his pupils, spoke a few words of sensible advice to the pupils and of congratulations to the audience on the progress of art and art schools.

A new clock has just been erected in the Corporation new gas-works, at Leicester, which strikes the hours upon an 11cwt. bell with a 25lb. hammer, chimes the quarters upon two other bells, and shows time upon four 5ft. illuminated dials. The clock movement is fitted with all the latest improvements, to insure accuracy of performance. It has a gravity escapement, a compensated pendulum of 2cwt., apparatus to continue the action of the clock during winding, and automatic apparatus for turning the gas up and down for the varying lengths of the days throughout the year. The entire work has been carried out by John Smith, Midland Steam Clock Works, Derby.

The days this year announced for the reception of works of art for the annual exhibition of the Royal Academy of Arts are: for paintings and architectural drawings, Monday and Tuesday, 29th and 30th of March, and for sculpture, Wednesday, March 31st.

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HOOK MEMORIAL CHURCH, LEEDS.

This important church, which we illustrate to-day in one of our double-page plates, was opened on January 29th last, and some particulars were given in the Building News the week following. The cost has been about £20,000, and Messrs. Whiteley, of Leeds, were the builders. The style chosen is that of the Transition to Early English. The chancel and sanctuary are joined, and the nave consists of six bays, with aisles on either side. The tower is not yet completed; and it is interesting to note that this feature was really the last design which Sir Gilbert Scott made before his death, since which the work has been conducted under the supervision of Mr. John O. Scott.

A SEASIDE HOUSE AT BRIGHTON.

The building, by Mr. Robert W. Edis, F.S.A., which we illustrate herewith, shows an attempt to introduce some picturesqueness and architectural character, combined with solid construction, and weather-resisting frontages. The style chosen is that of the 16th and 17th century old Sussex houses, in which tile-hanging and red brick, with flint, are the usual materials employed, as in the present instance. The interior arrangements, as shown by the plans we give, are based upon the lines determined by the walls of the old house, which Mr. Edis has remodelled and added to in its present form, which now shows the planning to be convenient and suited to the site. The work has been exceedingly well executed by Messrs. Geo. Lynn and Sons, builders, of Marlborough-street, Brighton, from Mr. Edis' designs, and under his superintendence, and the building is the only one in which coloured materials are used along the whole "three miles" of sea frontage at Brighton.

A SMALL SIDEBOARD.

Practical drawings of really useful pieces of every-day furniture of good design are even more difficult to obtain than the articles themselves, as the latter, of course, may be had at most of the leading firms of Art-furniture makers; but the high prices usually charged for them prevent people of ordinary means from purchasing them. Illustrations, however, such as we refer to, are not often met with, because those makers who have gone to some considerable expense, perhaps, in obtaining their designs are naturally averse to their publication, lest inferior makers should plagiarise the design, and fill second-rate shops with distorted and badly-worked copies at prices for which the original and properly-made article could not be produced. We think, however, that the class of people likely to purchase a soundly-constructed and well-designed piece of furniture, are not likely to be induced to buy articles produced by "slop" makers in the way referred to, because the difference of quality in every way is at once evident to persons of even very ordinary judgment and ideas of taste. The sideboard which we illustrate to-day is made by Messrs. Robertson and Son, of Narrowgate, Alnwick, and the idea of the design is that the upper portion should be capable of being used as a separate piece of furniture in the form of an overmantel, leaving the lower half complete in itself. This sideboard is intended to compete both in size and price with the class of furniture for which the Tottenham-court-road has become famous. Three good drawers are provided, the centre one being intended for the table-cloth, the side drawers being fitted, the one for plate, the other for wine. The shelves of the upper portion, like the one below, are for ornamental pottery, or plates, or books, as the case may be. The sideboard itself can really be used as such, all the space being left clear for the spreading of a cloth for side dishes, and the bracketed sides to the shelving are carried well back for this purpose. The retail price of this sideboard in walnut or wainscot is £21, and in mahogany the price is £21 10s. The design is by Mr. Maurice B. Adams, A.R.I.B.A., of London.

ELY CATHEDRAL.

This illustration shows one bay of the fine Early Norman nave of Ely Cathedral. The one chosen is the work of Hervey, first bishop of Ely, who built the inner western bay of nave, continuing the work of Abbot Richard, who built the four eastern ones, of which three only remain. These three bays are of a slightly Earlier character, and similar in every respect to the triforium and clerestory of north and south transepts which he had just completed. The outer wall of triforium was raised to its present form and position in the ninth year of Edward IV.'s reign. The old triforium wall may be seen on the east side of north transept. At the same time the aisle windows were altered; these, however, have, with one exception, been restored to their original form. The roof, now covered by a painted ceiling, is a trussed roof of seven cants, and is one of the many alterations made by Bishop Northwold.—The trace of the original roof may be seen in the projecting moulding existing on the eastern side of the great western tower under the line of rafters of present roof. It indicates a trunk roof, and probably existed with a flat panelled ceiling. The drawing is from similar and other drawings made on the spot.

E. G. N.

INTERIOR OF THE IPSWICH CORN EXCHANGE.

In our issue of Nov. 21, 1879, we published an exterior view of this design, which was the successful plan in a competition last autumn. The chief feature of the interior is that the light is mainly obtained from the north slope of the roof; this it is intended to have entirely of glass. The walls of the interior are to be lined with white Suffolk bricks, with a band or two of fawn-coloured terra-cotta ornament, as also a few terra-cotta voussoirs in the arches. The design is by Mr. Brightwen Binyon, A.R.I.B.A., of Ipswich. The builders will be invited to tender during this month.

THE ECCLESIASTICAL ART EXHIBITION.

The view of the proposed Ecclesiastical Art Exhibition, which we publish this week, represents the building designed for the purpose by John P. Seddon, architect, of No. 1, Queen Anne's-gate, Westminster. The site chosen for it is unquestionably a superb one. It is that known as the Savoy site upon the Victoria Embankment, overlooking the gardens which extend from Charing Cross to Waterloo Bridge, a little lower down the river than the Cleopatra's Needle. It will have approaches from the Strand and Savoy, as well as from the Embankment, and so is readily accessible from all parts. The building is indeed intended as a temporary one, and yet will be constructed in a durable and fireproof manner, in accordance with the requirements of the Board of Works. It will comprise a vast central hall 180ft. long by 50ft. wide, and about 50ft. high, with annexes on either side, and towards the Embankment there will be a range of saloons and refreshment rooms commanding unrivalled views of the river and its embankment. The construction is intended to be mainly of iron, with enrichments of mosaic. It will be especially arranged to accommodate stained and painted glass in windows of appropriate character, which can be modified as may be desired by the various exhibitors in that department of ecclesiastical art. A prominent place will be given for a fine organ, with a music-chamber in its immediate proximity. Artists and art manufacturers in England and abroad are earnestly solicited to avail themselves of the unique opportunity afforded by this exhibition building to display their best workmanship. The advantages of such a building in so rich a position in the metropolis are so obvious as not to need further comment, and the utmost exertions on the part of those who are interested in the class of artistic productions for which this important stucture has been designed are confidently relied upon by the committee who have promoted the undertaking. Further information can be obtained by applying to Mr. John P. Seddon, architect and vice-chairman of the committee, or of Mr. John Bray, the secretary, 267, Strand, W.C.

LIVERPOOL ENGINEERING SOCIETY.

The usual fortnightly meeting of this Society was held at the Royal Institution, Colquitt-street, on Wednesday evening last, the 25th inst., Mr. Alexander Ross, President, in the chair, when a paper entitled, "Notes on Retaining Walls," by Mr. W. Wilkinson Squire, C.E., of Hull, was read by the hon. sec., in the absence of the author.

The author commenced his paper by pointing out that lack of knowledge of the subject leads to copying old designs with alterations and amendments to suit the supposed requirements of the case, and stated that difficulty will remain until some much-needed experiments have been undertaken on a large scale, and the details of failures candidly published. Also that accurate information as to the angle of repose of different materials with varying amounts of moisture is much needed, and he would recommend every engineer to measure carefully the angles of any natural slopes he may meet with, and, if possible, ascertain the state of the material at the time it assumed that slope, as many of the published tables are misleading and wanting in details. He recommends the younger members of the profession, who have exceptional opportunities, to collect information whilst their hands are in practice with level and chain, and they are able to afford the time.

He urges engineers to describe failures fully, for the benefit of their confrères, as is done in other professions, notably surgery. He regrets that engineering literature, while abounding in descriptions and details of what it is safe to follow — says very little indeed about what should be avoided, and the various reasons for avoiding it.

Then, speaking generally, he says: Retaining walls are employed to keep back a body of water or earth which would otherwise overflow or fall down; familiar examples are dock and reservoir walls, the walls of railway cuttings, bridge-abutments, and the like. He pointed out that earth may be considered as between fluid and solid, and also treated of the method of determining the pressure on walls. He then described the numerous diagrams by which the paper was illustrated, calling particular attention to one showing how the horizontal component increased in value as the angle of repose of the contained material was diminished. And to illustrate the advantage of properly draining the ground at the back of a retaining wall, he gave particulars of a case which had come under his notice where a brick retaining wall without weeping-holes had bulged out from one-third to one-half of its height, although his calculation showed that section to be amply strong for dry ground. He also gives an example of a retaining wall which was built unnecessarily heavy, thereby wasting labour and material. The remainder of the paper is chiefly devoted to comparison of the sections quoted, and noting where the widest differences occur in practice of various engineers, and where all agree.

A table of proportions of several walls at present in existence accompany the paper.

Mr. Hill has issued a new price-list of specialities in locks and door furniture, which will be found very useful by architects specifying his goods.

The Lord Chancellor has appointed Mr. Charles Smith, F.R.I.B.A., of Reading, on the Commission of the Peace.

BANNER'S SYSTEM OF VENTILATION.

IN your important journal of the 14th January 1876, you drew the marked attention of your numerous readers to the Banner System of Sanitation.

It has since been adopted or imitated so generally that I lately saw it stated that the same system of soil-pipe ventilation is at present most extensively used by the leading sanitary engineers. It may be that the accompanying report may be deemed worthy of a place in your columns, and I therefore place it at your service.

REPORT ON THE IMPROVED VENTILATION OF THE COUNCIL CHAMBER, GUILDHALL.

The object of this is to bring what has been done towards the improved ventilation of the Council Chamber more fully and more clearly under notice than has been previously done, and in order to make myself the better understood I accompany this with fresh drawings and plans to which I beg to refer you.

I must first state what the conditions as regards the ventilation of the Council Chamber were when I first saw it. Practically, it was almost hermetically sealed—as there was no fireplace, there was consequently no chimney, and there was no outlet from the dome into the double lantern light: the only intended outlets were the small opening above the rosette in the centre of the ceiling, over the Lord Mayor's chair, and the large long horizontal tube from the sunlight in the dome, which were both carried into one large vertical shaft, commencing above the former. The second large shaft, that over centre of gallery annex, put up in July, 1878, afforded, like the other, no relief; valves, cones, and burners had to be put into both to prevent down-draught—the only windows are close to the ceiling at each side of each annex, and could only be opened with impunity in hot weather—besides the sunlight which passes through the centre of the lantern light there were eight gasaliers burning all day. Thus the Chamber was almost hermetically sealed, for practically there were neither inlets nor outlets for air, and by the time that 200 to 300 persons had been in it for an hour or two, the atmosphere became very bad indeed, and these conditions are said to have resulted in very general and serious complaints from all those who were long present, and in many in suffering from what was called "a Council Chamber headache," and there existed no real means of obviating this unpleasant state of things.

Since the alterations which I have made have been in operation, I am informed that no one has suffered from "Council Chamber headache." Repeatedly in the early autumn of last year, with the thermometer outside between 59° and 64°, when the system I have applied was allowed full play, the temperature within the Chamber never was more than two degrees above the external temperature, though 200, and sometimes nearer 300, persons were constantly in the Chamber for several hours together. What, I ask, can be thought of such a result produced entirely as it is from the system I have introduced, when I see it certified in *Sanitary Engineering*, page 107, by that well-known authority, Mr. Bailey Denton, that "In a room 13 by 15½, and 10½ft. high, after three hours, the temperature 9in. below the ceiling rose 17⅓°, and at 5ft. below the ceiling 15° above the temperature recorded before doors and windows were shut, with a fire, three gas-burners, and only two persons present." A room of the dimensions given is equal to an air-space of about 2,100 cubic feet, and two persons present, gives over 1,000 cubic feet of air-space for each. The Council Chamber is about 60ft. long, 30ft. wide, and 32ft. high (encompassed almost wholly by outside walls), giving a clear air-space, furniture, &c., deducted, of about 50,000 cubic feet, which for 250 persons, gives to each an air-space of only 200 cubic feet. To keep, then, the temperature of the Chamber within two degrees of the external temperature in summer is, I assert, a feat in ventilation which has never before been approached. A change occurs in the state of things, and we have an unprecedentedly severe winter to deal with. It must be borne in mind that I was asked to ventilate, not to warm, the Chamber, though what I have done facilitates the latter, inasmuch as the warm air is now drawn from the coils into the Chamber, instead of being left to leisurely find its way there.

The existing warming power was, and is, unquestionably very deficient, being about one-third only of what it ought to be, viz., 334ft. of 3in. pipe, instead of 2,100ft. of 2in. With the external temperature at or about 35°, and the temperature within the Chamber raised by the animal fires of 200 or 300 persons to 70°, that there is a great rush of cold air into the chamber through the door, whenever it is opened, cannot surprise any reasonable persons who will fairly consider the matter; 70° within any chamber means a large vacuum, if the atmosphere outside it be only or near 35°, it should be borne in mind that air rushes into vacuum at the rate of 1,329 cubic feet per second. On one occasion when I was myself at the Council Chamber the temperature outside was 40°; inside the Chamber at 12.15 the thermometer registered 55° (the furnace to heat the existing coils had been alight about six hours); at 2 o'clock it registered 60°, and at 5.30 it was only 64°, though over 200 persons had been in it for about six hours. It is calculated that one man heats 777ft. of air 1° per minute. Here, again, I claim to have accomplished a feat in ventilation, and this in winter with nearlyall the inlets for fresh air closed (as windows are closed in cold weather), with a sunlight and several gasaliers kept alight the whole time, without even a fireplace and chimney to assist, as they do in most rooms, to alleviate the most unhealthy state of things brought about in any unventilated room with some 200 persons present.

When the inlets for the admission of fresh air are nearly all closed, then the only means for its admission is the door, which is full 8ft. high and nearly 5ft. wide, a superficial area of about 40ft., while the whole superficial area of the 23 inlets provided by me does not exceed 8ft., and nearly all of them, as I have said, were on the occasion I refer to closed.

It is perfectly well known that before I did anything, great draughts—down-draughts at they are called—were complained of, and that the same are still at times complained of, is not chargeable to me. I must not omit to mention, as very noteworthy—especially for those who complain of down-draught—that the total length of the interstices round the inlets which are provided within the Chamber (when the valves in them are closed), and at which cold air could possibly enter, does not amount to what of necessity exists round the frames of the windows of very ordinary size for an ordinary sized room.

Let me now call attention to the fact that when the door of the Council Chamber is also shut, almost the only means left for fresh external air to enter it is through the gratings in the floor for warmed air. I had the grating which admitted the impure air of the basement into the hot-air chamber closed.

When the hour of meeting in the Council Chamber arrives, it is usual to let the fire out in the furnace, but during the most crowded meetings it is customary to keep the gasaliers burning. They of course consume a considerable amount of fresh air; owing to the very insufficient warming power it may be advisable to use these gasaliers to warm the Chamber before the time of meeting, but surely their being kept alight afterwards cannot fail to unnecessarily heat and vitiate the air of the Chamber when there are 200 or 300 persons in it.

It is authoritatively stated that carbonic acid gas, being so much heavier than air, rests mostly near the floor-level, and this was my reason for putting the extra shaft X. If even the seven exhaust cowls from the ceiling overpower it, it serves the better to diffuse fresh air drawn from the roof throughout the whole space, with which object I put the inlets, Nos. 15, 16, 17, through the floor, and when these are not required for the Council Chamber, this shaft may be used to effectually ventilate the Records.

To people variously interested in the working of any system, an inventor, or innovator, is scarcely ever a welcome personage, and is often considered one who must be kept at arms' length.

I cannot, of course, hope to satisfy every one in a body of 200 or 300 persons; a few out of the number may complain that they are subject to a draught, others that they are too hot; but the great majority, including the officials who are always present, will, I feel sure, admit, not only that the atmosphere within the Chamber is greatly improved, but will go further and say that it is now capable of being kept comfortable, healthy, and as it should be.

If it really be thought by the members generally that what I have done to improve the ventilation of the Council Chamber is detrimental in any way to their health and comfort, I have provided the means, by valves at every point, of most effectually rendering the whole, temporarily or otherwise, entirely inoperative at any time in less than ten minutes, and thus to make the Chamber what it was, as regards "ventilation," before I did anything to it. I unhesitatingly say, however, provided intelligent application be made of the means now existing, the Council Chamber is the best-ventilated room in the Guildhall or elsewhere. I may also mention that since I inaugurated this novel mode of ventilation, that the Hall of the Royal Institute of British Architects has been ventilated on almost identical lines, so far as the application of general principles is concerned, and even there, under certain modifications in other respects which I feel certain are prejudicial, the result is, I hear, considered "splendid ventilation." Complaints of draughts at the inlets were at first made by some of the members; but these, I believe, have ceased since the inlets have been heightened and valves put into them to regulate the supply, as varying circumstances render necessary, without closing their external orifices.

The system of ventilating the soil-pipe, &c., which was introduced by me a few years ago, is now so well known, and is so generally adopted, that I need only refer you to the accompanying drawing and description of it.

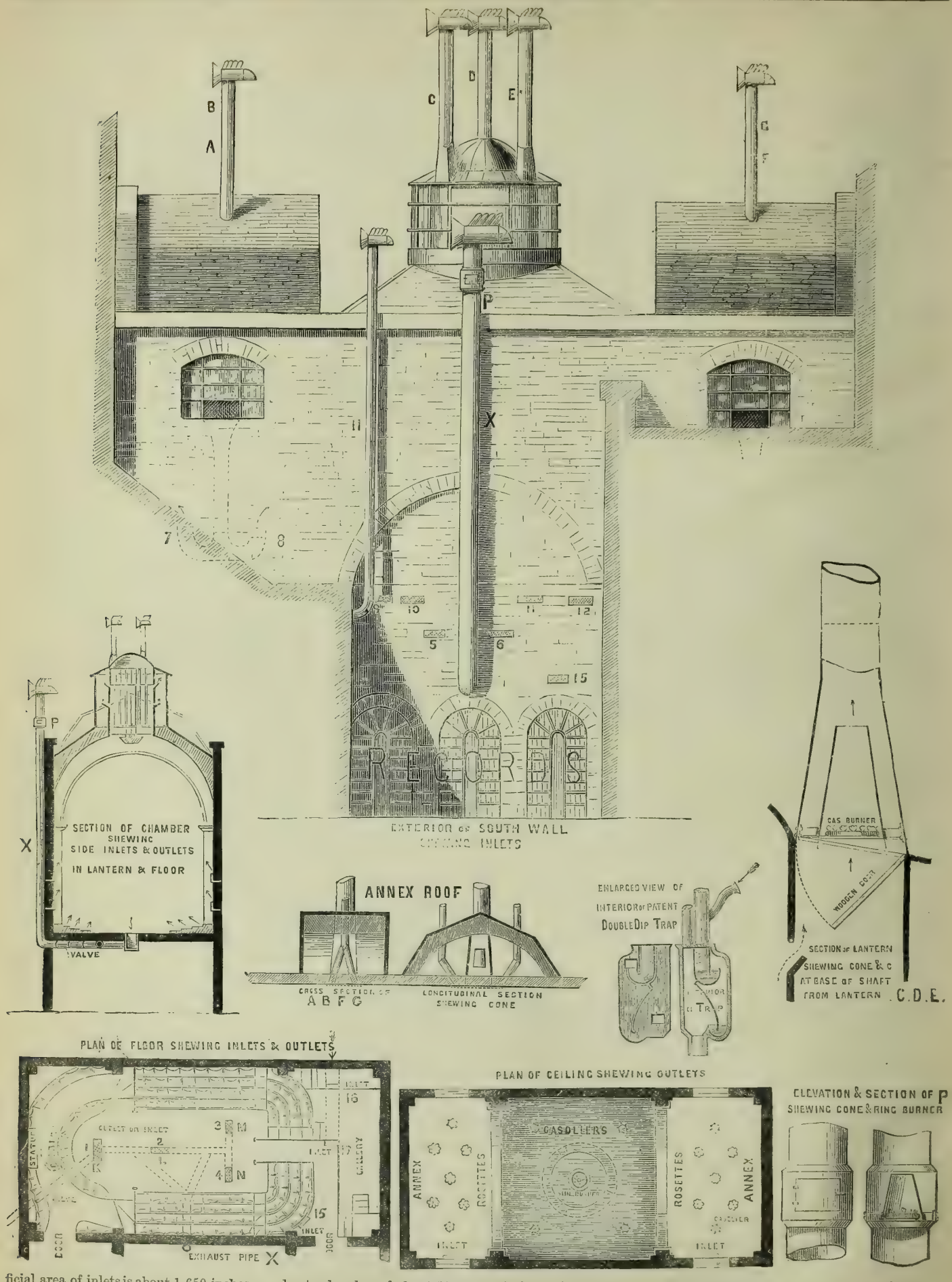
With the aid of the accompanying drawings and plans, &c., I will now proceed to explain the alterations I have made, and state the results obtained by them.

The system depends mainly on the efficient action of the exhaust ventilators, combined with the judicious arrangement of proportionate inlets for fresh air, placed at various proper positions in the space to be ventilated. The exhaust power of the ventilators varies with the velocity with which the wind passes through them. The average, accelerated by cones and burners, may be reckoned as about 300ft. per minute.

By experiments lately conducted at Hove, a given volume of air passed through a Banner cowl, at various velocities, was found to create an induced current on an average of careful tests of over 26 per cent.

I have placed above the roof eight 14in. Banner cowls on suitable shafts, in each of which the sectional area for egress of air is about one square foot, giving a total of about 1,200in. Seven of the exhaust ventilators withdraw the air at the ceiling, and one of them, X, from the floor, through the previously-existing gratings. This latter, in winter, when warmed air is required, will, by a valve for the purpose, be inoperative, but can then be used to ventilate the "Records," while in summer it may also be readily made to supply fresh air to the Chamber from above the roof. The seven from the roof are placed one at each end of each annex, each drawing from above two rosettes in the flat ceilings; the other three are carried from the space between the double lantern above the dome, into which there are seven outlets from chamber, each being 17in. long and 5in. wide, in two tiers—three in the upper and four in the lower tier. At the base of each shaft is a wooden flap or door, which on being closed renders the cowl mounted upon them completely inoperative, while, if the wind be insufficient, there are cones and gas-burners just above the wooden doors, which when lighted will very greatly increase the current of vitiated air from the Chamber, as you will notice by the annexed tests. I may mention that these cones and burners are not a mere flame in the centre of a large shaft, as was sometimes previously put, serving for little more than to show the air the way in such shafts, when it was inclined to go either up or down them. These shafts are lettered in the plan A to G and X, and the doors, valves, cones, and burners are shown in section, as well as the double lanterns, &c.

The plan, etc., also shows the inlets for fresh air placed at twenty-three different positions within the chamber, each of which is numbered 5 to 27, as per list, showing the size of each. There are ten on each side of the Council Chamber, and three, 15, 16, 17, from the floor. These latter are so placed for the purpose of obtaining a more thorough diffusion of air in the whole space, which object is further promoted by the gratings 1 to 4 in the floor, whether warmed or fresh air be drawn in thereat. The total super-



ficial area of inlets is about 1,650 inches, or about one superficial inch for every 30 cubic feet of clear room space. The whole may be entirely closed at pleasure by means of valves provided, or they may be regulated as the number of persons present, or as the velocity of the wind or the external temperature may render desirable. There is a clear air-space in the chamber of about 50,000 cubic feet. The result sought to be worked out by the foregoing arrangement, which is suitable for all public buildings and large rooms, is that at less than the average velocity of the wind the air within the Council Chamber may be imperceptibly renewed about three times within an hour, thus—

Per minute	300	feet.
1 ventilator, 1ft.; No. of ventilators	8	
	2,400	,,
Each 20 minutes	20	,,
	48,000	,,
Sun-light, etc.		,,

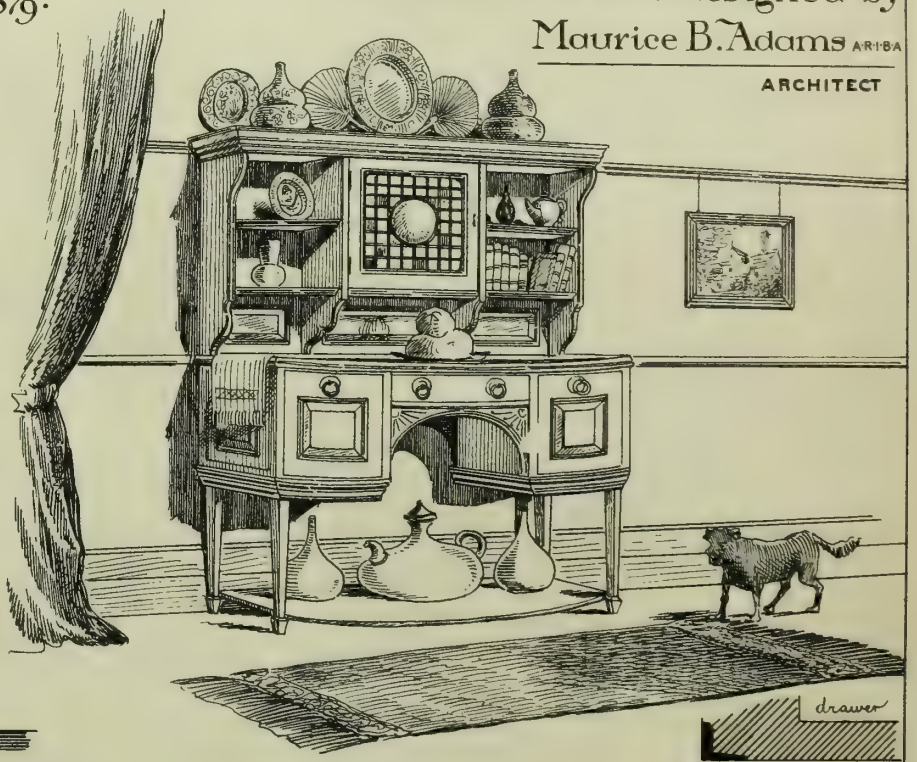
A SIDEBOARD made by Robertson & Son ✻ Alnwick ✻

for whom it was designed by

Maurice B. Adams A.R.I.B.A.

ARCHITECT

Sept. 1879.



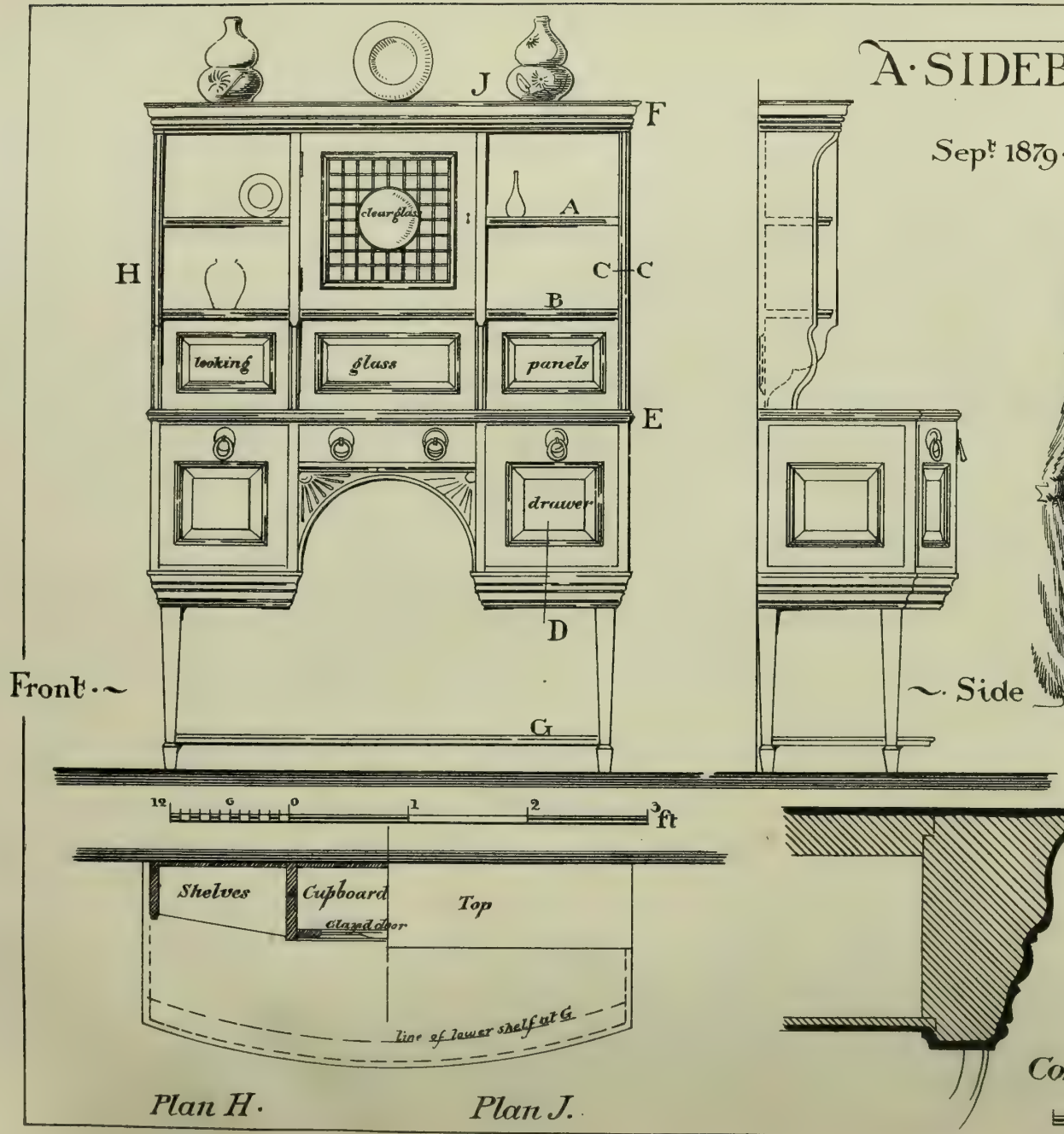


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

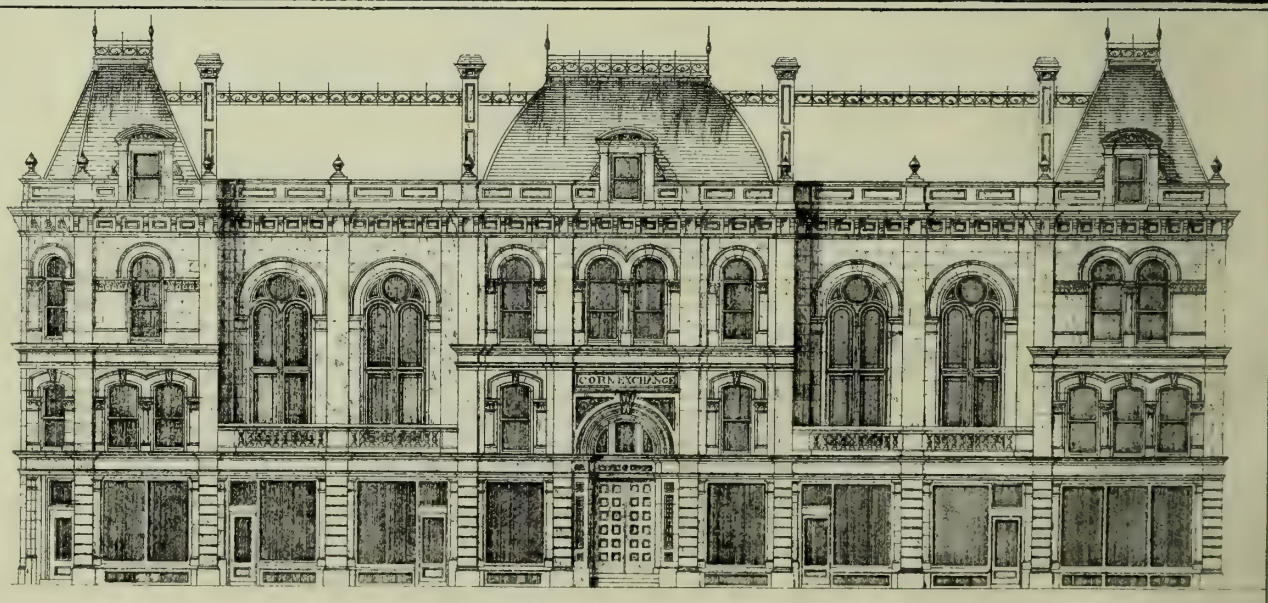
LIBRARY
OF THE
UNIVERSITY

IPSWICH NEW CORN EXCHANGE

INTERIOR VIEW

B. BINYON ARCHITECT





ELEVATION TO LITTLE KING STREET

SCALE OF FEET

Photo-Lithographed & Printed by James Akerman, 6, Queen Square W.C.

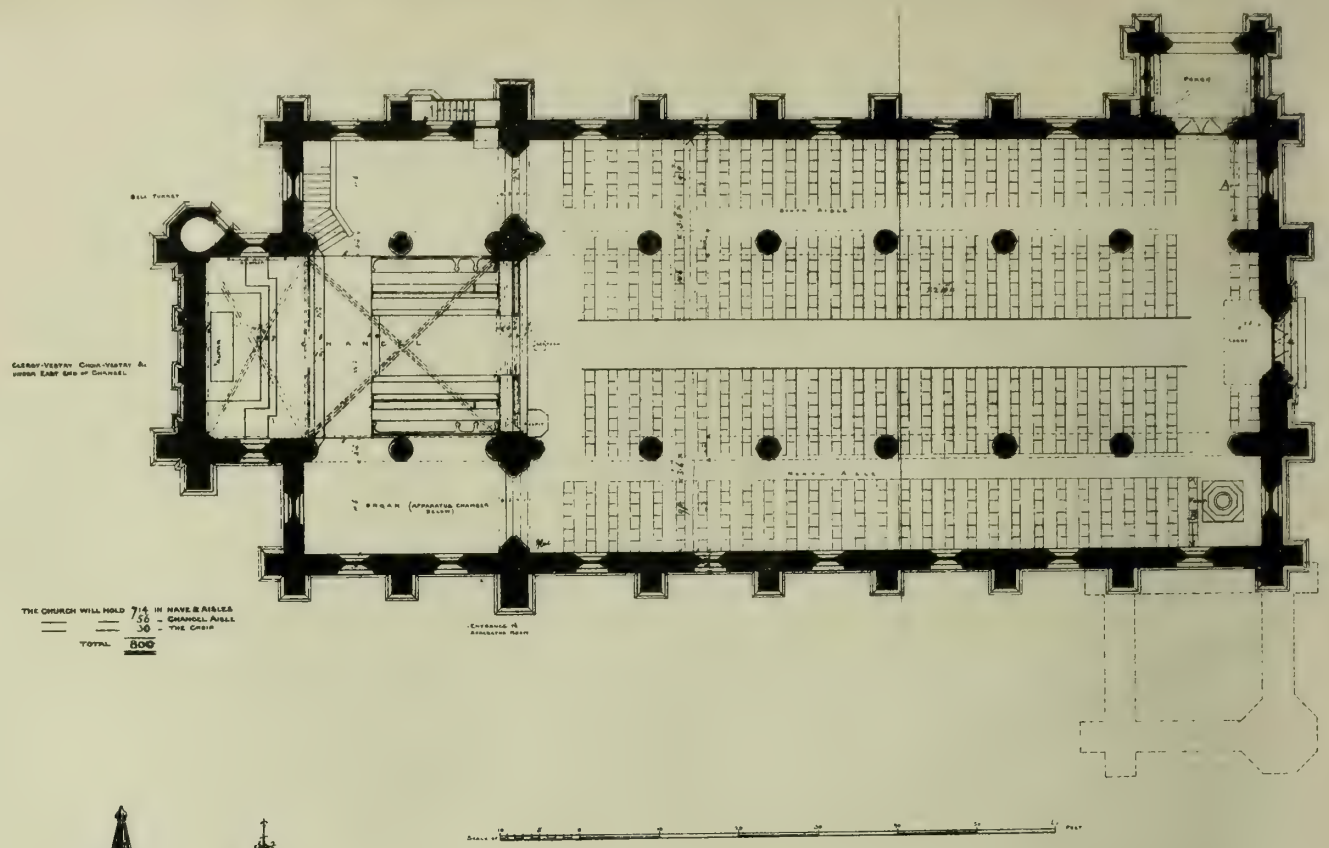




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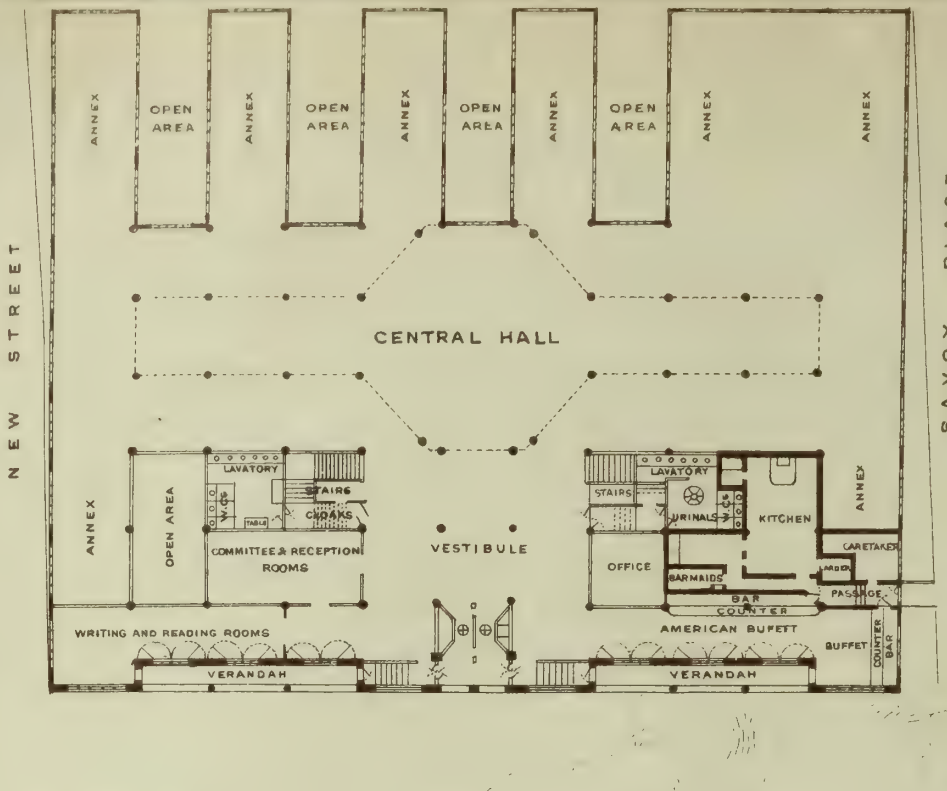
"HOOK MEMORIAL CHURCH." LEEDS.



INTERIOR VIEW LOOKING EAST.

SIR GILBERT SCOTT. R.A. ARCH.

Th
Ecclesiastical Ar
VICTORIA EMB
LOND





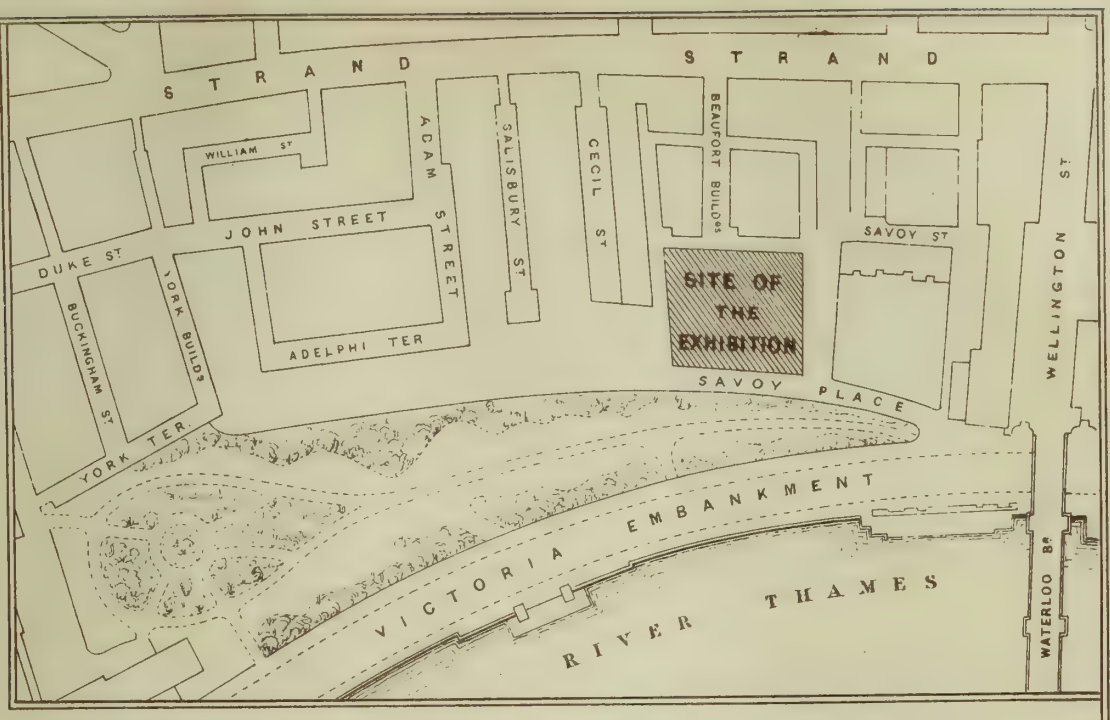
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CH 5TH 1880.

Exhibition.

NKMENT,

N.

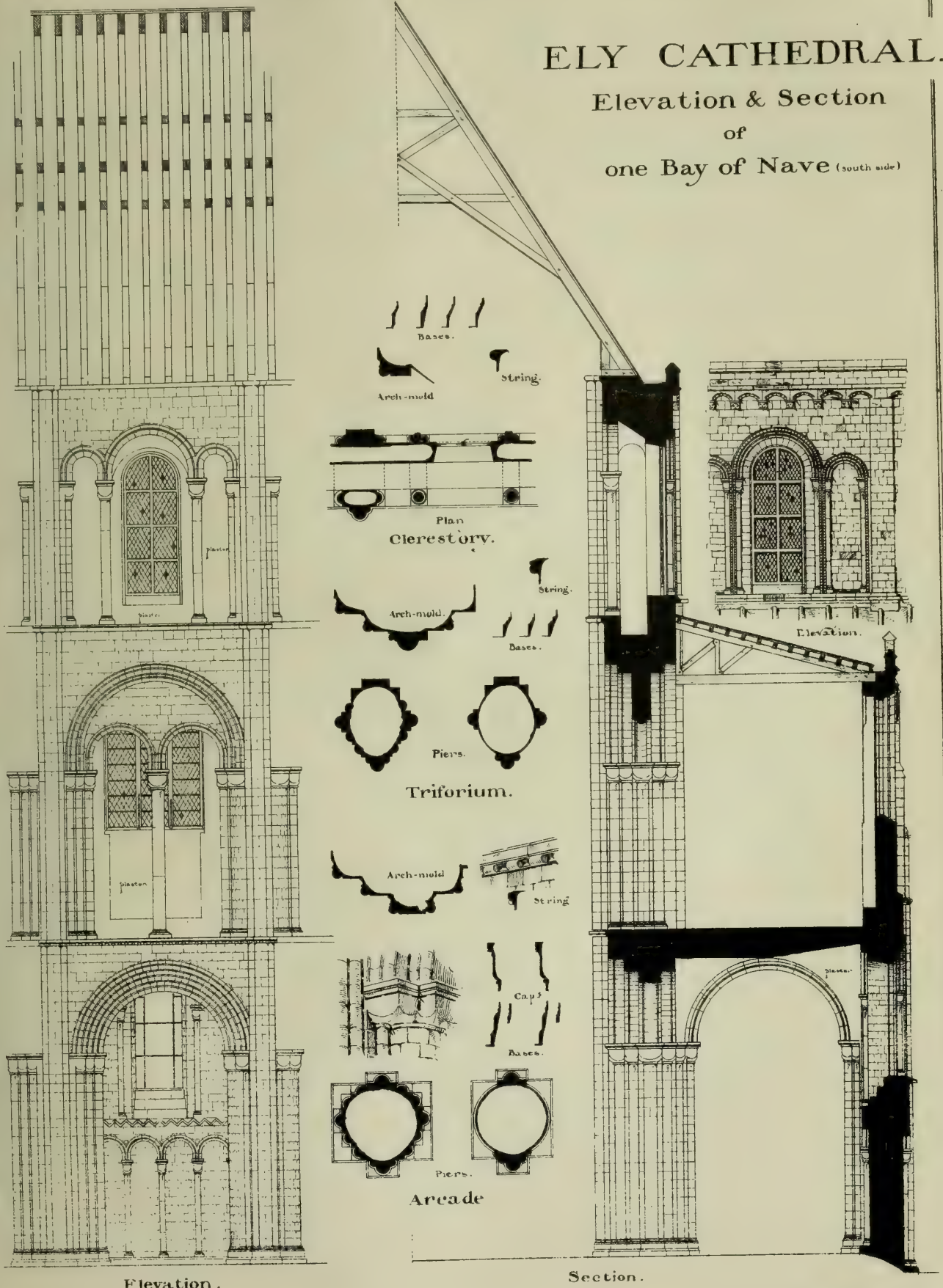




John P. Seddon. Arch.t
1, Queen Anne's Gate,
Westminster. 1880.

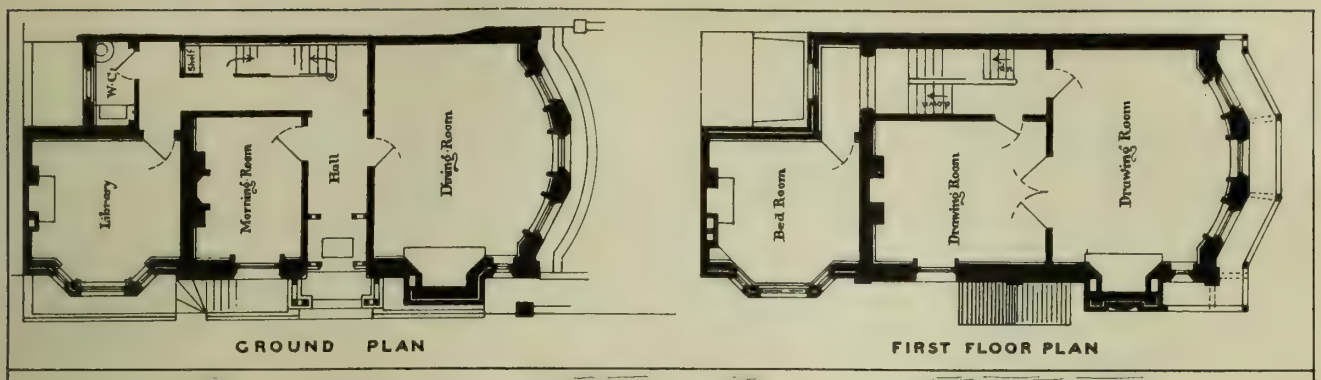
ELY CATHEDRAL.

Elevation & Section of one Bay of Nave (south side)



Measured & drawn by Edwin Harvey
Aug - Sept 79

Photo Lithographed & Printed by James Akerman, 5, Queen Square W C



GROUND PLAN

FIRST FLOOR PLAN

A SEA-SIDE HOUSE : Nº 70 MARINE PARADE BRIGHTON . Robert W. Edis F.S.A. ARCHITECT

Gratings in floor for warmed air from coils or for fresh air from roof; these may be used also as outlets at floor level.

1	2	3	4
K	L	M	N

Inlets for fresh air, covered externally with perforated zinc, and fitted with valves inside to prevent or regulate the supply.

South side, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14.

Ea. 24 × 2¼ 18 × 4 12 × 6

North side, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27.

Through floor in gallery annex, 15, 16, 17.

14 × 4 10 × 4¼ 15 × 4¼

Carried up about 5ft.

RESULTS.

17 Oct., 1878.—External temperature at 3.10, 58½°. Temperature in Chamber at—

At 11 a.m. ..... 59°
,, 4 p.m. ..... 64°

Four of the gasaliers and the sunlight burning all day.

Velocities per minute in outlets from inner lantern, 17in. by 5in.—

	Upper tier.			Lower tier.			
No. ..	1	2	3	4	5	6	7
	244	332	260	341	378	354	366

Velocities up cowl-shafts from lantern—

200 240 300

24 Oct., 1878.—External temperature at 12, 59°; the room was full; the meeting ended at 3.15. Thermometers at—

	Ld. Mayors' chair.	Prince's bust.	Princess' bust.	Gallery.
At 11 a.m...	60	60	60	60
,, 1 p.m...	61	61	61	62
,, 3.30 ,, ..	62	60	60	61

Velocities in outlets from inner lantern—

	Upper.			Lower.			
At 1 p.m....	460	620	390	484	560	550	526
,, 2 ,, ...	510	440	530	598	610	450	612
,, 3.15 ,, ...	230	286	194	350	380	406	330

The gas-burner in cones at base of shaft, from space between the two lanterns on which cowls are fixed, were put out at two o'clock. Mats were covered over the gratings in the floor; inlets all open.

2 Nov., 1878.—External temperature at 10.30, 42°.

	Inside temperature at				
	11	12	1	3	5.30
At Lord Mayor's Annex.	56	58	—	—	64
Prince's bust	52	54	—	—	58
Princess' ,, ...	50	51	—	—	56
Gallery Annex.....	55	58	61	61	62
Chamber thermometer	55	56	—	—	63

	11	12	2.30	3	5	5.30
In Lantern Light	57	61	60	62	64	65

12 Dec., 1878.—External temperature about 32. The meeting was a full one, and a long one, from 12 to 5.15. An official, whose seat is near the centre of the chamber, at 3 o'clock, said the temperature was very agreeable, and neither too hot nor too cold. There was but one complaint all day; it was at 1 o'clock, that it was rather warm. At 10.30 three of the exhaust shafts were closed, and all the gasaliers were alight.

	The temperature at					
	10.30	12	1	2	3	5.15
Lord Mayor's Annex.	52	—	—	—	—	61
Princess Bust	49	—	—	—	—	54
Prince's ,, ...	50	—	—	—	—	56
Gallery	56	58	64	66	65	64

We only had access to the gallery during the meeting. At 2 o'clock all the exhaust shafts were opened, and then the gas-burners in those from lantern were lighted, and afterwards no complaints whatever were heard; in the gallery we found the temperature very agreeable.

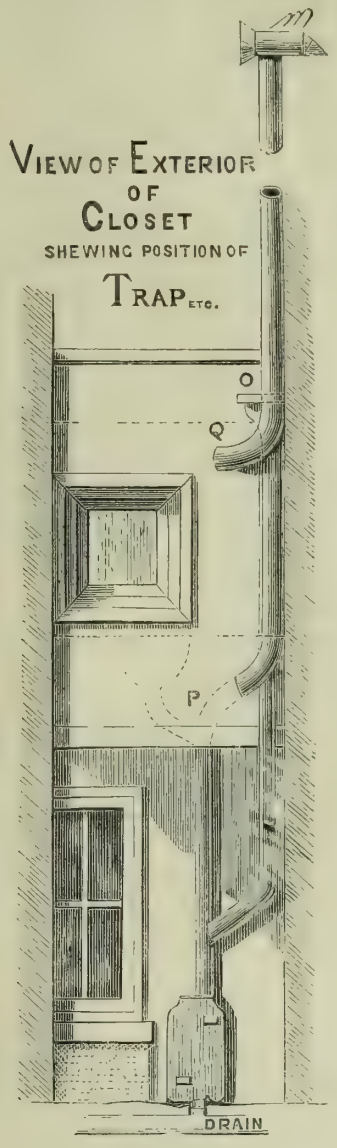
The temperature in the space between the two lanterns was at	And in the dome about ceiling level in the vicinity of the sunlight.
11.30 .... 56°	70º
1 62	74
2 66	77
3 66	76
5 68	76

13 March, 1879.—External temperature about 38°. The Council broke up at 4.30, the thermometer then stood at 64°; there were no complaints all day. The thermometer in lantern at 4.30 was 68°. The one hanging down from it at about ceiling line 67°.

27 March, 1879.—External temperature 40°. One of the aldermen who had carefully noticed the temperature of the Chamber, told me that at 12.15 it was 55°; at 2 it was 60°; at 5.30 it was 64°; and said the atmosphere was satisfactory all the day.

THE SOIL-PIPE AND CLOSET ARRANGEMENT.

This Fig. represents the soil-pipe and closet



arrangement. O is the head of a 3in. rainwater-pipe, which serves also as inlet for fresh air to the 4in. soil-pipe, a little above the double-dip trap. P is an elongation of the soil-pipe from just below a Pearson's trapless closet. From the point Q the continuation of the soil-pipe upwards, and on which is fixed a patent ventilating cowl, is 6in., and by this arrangement the room in which the closet is is ventilated through a perforated zinc grating placed at the base of Q, near the ceiling level. The trap admits of the drain also being ventilated through it without exposing even for a moment any impure matter—an advantage of the utmost importance, as any one can learn by reference to p. 60 of that able little work "Sanitary Arrangements for Dwellings."

Since writing the above, I have received the following. While the one is confirmatory of the foregoing report, the other is in direct contradiction to the results said to have been obtained by the cowl tests, as conducted at Kew, and after which the "Sham Usefulness of Cowls" was so persistently advertised, to the serious damage of a most important industry, as well as to the great detriment of the interests of the community at large. Almost every house in every town in the kingdom bears silent testimony to some great error in the conclusions arrived at.

"St Michael's, Clapham Rise. Feb. 1880.

"Sir,—I have the pleasure to enclose cheque in discharge of your account. Rayfield has done his work to our entire satisfaction. With regard to the success of the cowls, it is difficult to speak with absolute certainty in the present almost dilapidated state of the church. That they do most thoroughly sweep and cleanse the church of the vitiated atmosphere, which used before to poison me well-nigh to the death, every Sunday, there can be no manner of doubt. The only question is as to their effect upon the draughts, some thinking that they increased these, while others (and these latter the best judges) are of opinion that they considerably diminish them.

I hope we may see our way to having the inlets made, and then I shall be able to let you know exactly and fully what we think of your simple, and yet admirable and clever, invention, to which I wish all possible success.

"(Signed) M. F. Begbie."

"Hove, Brighton, Feb. 11, 1880.

"Sir,—I enclose you copy of notes of the experiments made here with your patent cowl. They show conclusively that a given volume of air, passing through the annular portion of the cowl, at a velocity of 18·72 miles per hour, will draw through the inside pipe another volume of air, which is equal to 29·12 per cent. of the first-mentioned volume.

"(Signed) J. B. Paddon."

Details of experiments made with Banner's Patent Cowl, 31st January, 1880.

An Anemometer.	Placed in outlet-pipe of air-vessel.	Placed one inch from outlet-pipe.	Placed six inches from outlet-pipe.	Placed nine inches from outlet-pipe.
	Revolutions.	Revolutions.	Revolutions.	Revolutions.
Recorded per minute	820	716	420	200
Equivalent to a velocity in miles per hour of....	18·63	16·27	9·54	4·55
Air delivered into hopper mouth of cowl, an anemometer placed at the inlet of inside pipe of cowl recorded		180 160 220	110 130 136	53 53
Average.....		186·6	125·3	53
Percentage on first mentioned vol.		26·06	29·8	26·5

The pressure of air throughout the above experiments was equal to 1·75 inches of a column of water, and was varied by distance from outlet pipe.

During delivery of air under above conditions into the hopper mouth of cowl the variation in the revolutions per minute were caused by alteration of the position of centre of cowl.

7th February, 1880.—Air was discharged into the hopper mouth of cowl through a hole in disc fitted over it.

All the following experiments were made under precisely the same conditions except as to initial velocities, which were varied by different pressures.

The results are shown in the following table:—

	Velocity of air in miles per hour.	Revolutions per minute of anemometer placed at mouth of cowl.	Revolutions per minute of anemometer placed at inlet of inside pipe	Percentage of air drawn through inner pipe upon air passed into mouth of cowl.
No. 1	30	1320	420	31·82
2	18·72	824	240	29·12
3	13·77	606	154	25·41

Thus it is guaranteed that if the wind at roof level be blowing at four miles an hour, which is only about one-third its average velocity, that fresh air is drawn in at the inlet, if it be properly arranged, and out by the cowl through any house-drain or soil-pipe in less than one minute

Nature has a sensible habit of supplying her wants from the nearest point. When this fact is borne in mind, it will not be difficult to satisfy ourselves that mere louvres, screws, and fans, however scientifically placed and guarded, cannot draw or force still air into a heavier atmosphere in motion, and which is pressing for admission at every turn and crevice all round them.

E. Gregson Banner.

11, Billiter Square, February, 1880.

WHOLESOME HOUSES.

BANNER'S PATENT SYSTEM OF SANITATION.

BANNER'S PATENT VENTILATING COWL.

No House Should be Without One Fixed in the Soil Pipe Carried above the Roof.

EXTRACTS FROM TESTIMONIALS.

Baron's Court, Dec. 6, 1879.

SIR,—I am glad to give my testimony of the complete success of the system which you have inaugurated at Baron's Court, and at my London residence, Hampden House, for the sanitary security of the drain, and I see no reason to doubt its complete success for the future. The system appears to be both simple and effective, and one which is not likely to suffer any derangement. I have to thank you for all the care and attention which was bestowed during the progress of the works, and for the very efficient way in which they were carried out under considerable difficulties here, as to limited time and other circumstances.

Faithfully yours, ABERCORN.

January, 16th, 1880.

SIR,—In reply to your letter I have much pleasure in stating that I am quite satisfied with the Banner system of Drainage, and the Ventilation of Drains, Soil-pipes, &c., &c., as carried out at Burghley House. The works have been completed for a considerable time (2½ years), and all appears to be going on satisfactorily.

Your obedient servant, EXETER.

46, Belgrave-sq., Nov. 27, 1879.

In reply to your enquiry I have pleasure in stating that I am quite satisfied with the Banner System of Sanitation, embracing ventilation of drains, soil-pipes, &c., as it has been carried out at my Irish seat, Headfort House, and The Lodge, Virginia. I know that the work at Headfort was a difficult one, as I saw it at various stages as it progressed. I am not only satisfied with the results worked out by your system in a sanitary point of view, but also consider the charge made for the important work as done very reasonable. I feel I have now a security against the ingress of sewer gas into my houses, and consequent illness, which I never before had, although I had incurred from time to time large outlays to effect this most desirable end, HEADFORT.

95, Eaton-square, Dec. 13, 1879.

Lord Erne has much pleasure in bearing testimony to the efficiency and thoroughness of Mr. Banner's System of Sanitation. Nothing can be more perfect both in theory and practice than this system when carried out in its entirety. The cause of much unpleasantness and even illness at Crom has now been quite removed, and, as far as a year's experience can prove anything, he is quite willing to recommend it as a perfect cure, always provided the work is well carried out.

Forest Lodge, Binfield, Dec. 14, 1879.

DEAR SIR,—I am very much pleased with your Ventilating Cowls—there is not the slightest smell anywhere. I have recommended your system to many of my friends, who intend to carry it out.—I am, &c., WARWICK MOORSHEAD.

Kylemoor Castle, December 5th, 1878.

I beg to enclose a cheque for the sanitary works executed at Kylemore Castle. I am quite satisfied with the charges for the extensive works that were necessary in so large a building; and now that the Banner system has been completed here, I wish to say how much delighted I am with it. Like many other great discoveries and inventions, the wonder is that it was not thought of before; and now that you have brought it to practical application, one is surprised at the simplicity with which it can be carried out.

Many persons have advocated the ventilation of sewers, &c., and in one way or another everybody has tried to do it. To reduce the formation of mephitic gases to the minimum, and to prevent altogether the accumulation of any gas that may be formed, constitutes, I suppose, the key-note of your system, and admirably it is carried out. I had done everything I could to perfect the drainage and sewerage here; we had elevation of the house, giving plenty of fall, lots of water, and a large lake for a receptacle, pipes went up from every soil-pipe of the closets, the cesspool was also supplied with a ventilating-pipe, carried into the wood, far from the house. All in vain; those abominable D traps in the closets, and the closed drains could not be ventilated by any such devices; but now that openings have been made in them, and your powerful, though simple cowls, have been adjusted to the ventilating-pipes from the closets, I venture to say that there is not, and cannot be, any accumulation of gas, because hardly any gas can be formed, and whatever is formed passes rapidly up, and escapes at the cowls. It is very doubtful whether sewer-gas can form at all in pipes and drains ventilated on your system; but it is very certain that if there is any formation, it must find its exit at the top of the building, and be dissipated in the atmosphere, where it can do no harm. My house is now perfectly pure, and I have no doubt we shall escape many evils which fell upon us under the old system of traps and bottling up of gases, contrary to all the laws of nature. I will only now add that the alterations you designed and made have proved most satisfactory, and that the facility with which they can be inspected and seen to be in order, constitutes a material advantage in the system. I have troubled you with a longer letter than I intended, but when once I get on a matter of sanitation my pen runs away. Again thanking you for the valuable work you have done here,—I am, &c.,

MITCHELL HENRY.

Hainton Hall, December 13, 1879.

I was very much pleased by the way in which the Banner System of Sanitation was carried out, with regard to my house and drains, and consider that it was a complete success. E. HENEAGE.

Monk Tower, Lincoln, Nov. 17th.

As far as I have had experience of the Banner System of drainage it has answered perfectly at Osberton; but, of course, a few months is hardly sufficient test. It appears, however, that it is impossible with such an arrangement for sewer-gas to find its way into the house. F. J. S. FOLJAMBE.

Bedford House, Streatham, Dec. 18th.

The sanitary alterations carried out at my house have given us complete satisfaction and entirely removed the offensive smells of which we so frequently had to complain before. The system you have introduced seems altogether the most perfect I have anywhere seen.—Faithfully yours, WM. GRANTHAM.

Moreton Pinkney Vicarage, Jan. 31, 1880.

The sanitary work done by you at my vicarage in 1877 has proved quite a success, and I never lose an opportunity of recommending your system.

N. D. WHITE.

List of Public Buildings, Clubs, Barracks, and Mansions, &c., amongst many others, where the Banner System has been carried out:—

His Grace Duke of Sutherland, Stafford House, St. James's.
H. P. and The Hon. Lady Vernon, Droitwich.
The Lady Chas. Paulet, Manor House, Adderbury, Oxon.
H. P. and Lady Jenkins, Upton House, Warwick.
The Earl of Dalkeith.
The Baroness Burdett Coutts, Stratton-street, Piccadilly.
Sir Daniel Cooper, Bart., South Kensington.
Admiral Sir T. Pasley, Shedfield, near Botley, Hants.
Lord Francis Cecil, Stocken Park, Little Bytham, Lincoln.
T. Thistlethwayte, Esq., Southwick Park, Hants.
Captain Lefroy, Itchell Manor, Crondall, Hants.
Major Leeds, Ryde, Isle of Wight.
Pier Hotel, Ryde, Isle of Wight.
Dr. Davey, Ryde, Isle of Wight.
Great Northern Hotel, Peterborough.
Dr. Newman, Stamford.
Uvedale Corbett, Esq., Ashfield Hall, Neston, Cheshire.
Major Corbett, Vaenor Park, Montgomery.
Charles Lee Clare, Esq., Broughton, Manchester.
Rev. W. F. Geldart, Vicarage, Kirk Deighton, York.
Lady Cardigan, Oundle, Hereford.
W. T. D. Humphreys, Esq., Miltown House, Shabane.
James Macfarlane, Esq., Melmount, Shabane, Ireland.
Rev. Dr. Price, The Philberts, Maidenhead.
Dr. Montgomery, Maidenhead.
Dr. Waggett, Notting Hill, W.
Dr. Roberts, Greenhill Villas, Hampstead.
Dr. Howse, Guy's Hospital, St. Thomas's-street.
Radley College, near Abingdon, Oxon.
Radcliffe Library, Oxford.
Major Seddon, R.E., Elgin-terrace, Notting Hill.
Mrs. Brown, 78, Holland Park, W.
J. W. Gilbertson, Esq., 8, Upper Phillimore-gardens, W.
A. Pfeiffer, Esq., Castlebar, Ealing.
S. H. Robeson, Esq., Chaworth-road, Norwood.
J. Johnstone, Esq., 52, Gower-street, W.C.
E. Capper, Esq., Shooter's Hill-road, Blackheath.
J. C. MacHardy, Esq., 1, Grenville-place, Kensington.
A. Bell, Esq., Conduit Lodge, Hampstead.
Edward Wood, Esq., 9, St. Alban's Villas, Highgate.
Crosby Lockwood, Esq., Highbury Park, N.
Rev. A Cachemaille, St. James' Vicarage, Muswell Hill.
— Manby, Esq., 54, Bartholomew-road, Kentish Town.
Mr. Alexander, St. Leonard's, Tooting.
— Hodgkin, Esq., Richmond Hill.
S. Fuller. Esq., 85, Inverness-terrace, Bayswater.
A. Vickers, Esq., 42, Inverness-terrace, Bayswater.
Theophilus Clarke, Esq., Beckenham.
W. Clarke. Esq., Lapswood, Sydenham Hill.
Messrs. Ralli Bros. and Co., 25 and 26, Finsbury-circus.
City Liberal Club, Walbrook, City, E.C.
Guy's Hospital, St. Thomas's-street, Boro'.
Middlesex Hospital, Goodge-street, Oxford-street.
Royal Ophthalmic Hospital, Chandos-street, Strand.
Ryde Infirmary, Ryde, Isle of Wight.
Bank of England, Type-room, London.
London and County Bank, High-street, Kensington.
City Bank, Threadneedle-street.
Standard Bank Africa, Clement's-lane, City.
Chartered Bank India, Threadneedle-street.
Scottish National Bank, Nicholas-lane, City.
Royal Presbyterian College, Russell-square.
Thatched House Club, St. James'-street, Pall Mall.
Naval and Military Club, Piccadilly.
Jews' Home, Wolmer-road, Notting Hill.
Cripples' Hope, High-street, Kensington.
Camden Schools, Prince of Wales' Road, Camden Town.
Royal Caledonian ditto, Caledonian-road.
St. Vincent's Presbytery, Sheffield.
West Herts Infirmary, Hertford.
Knightsbridge Barracks, Knightsbridge.
Gillett's Bank, Banbury, Oxon.
Co-operative Stores. Victoria-street, City.
Ditto, ditto, Chandos-street, Strand.
Lambeth Infirmary, Lambeth.
Camberwell Union, Peckham.
W. Grantham, Esq., M.P., Bedford House, Streatham.
Scotch Presbyterian Church, Liverpool.
Lewis Calisher, Esq., 42, Portland-place, W.
Messrs. Pinckney Bros., Bank, Salisbury.
W. Pinckney, Esq., Milford Hill, Salisbury.
J. Pinckney, Esq., Durnford, near Salisbury.
Dr. Longstaff, Southfield Grange, Putney.
G. B. Longstaff, Esq, Butterknowle, Putney.
Colonel Rose, Orphanage, Northampton.
Fire Brigade Station, Holborn.
W. H. Kersey, Esq., Wickham-road, New Cross.
Arthur Billing, Esq., Peterborough Villas, Fulham-road.
Messrs. Bevan, Harris, and Co., 27, Bishopsgate-street, E.C.
Chaplain's House, Guy's Hospital.
Dr. Ramskill, Barnes.
A. Vickary, Esq., Farringdon-street, New Offices.
The Admiralty, Whitehall, Surgeons' Department.
S. J. Foljambe, Esq., M.P., Osberton Hall, Worksop.
Hospital Wards, Aldershot Camp.
Shorncliffe Barracks, Shorncliffe, near Dover.
Guard Room, Curragh, Kildare, Ireland.
—Renton, Esq., Muswell Hill.
H. Schwartz, Esq., Denmark Hill.
R. Martin, Esq., Denmark Hill.
— Wickins, Esq., Tulse Hill.
— Wickins, Esq., (Factory) Monkwell-street.
— Brandt, Esq., Denmark Hill.
H. Heilgar, Esq., Champion Hill.
— Jacob, Esq., Lower Norwood.
A. Kleinworl, Esq., The Glebe, Camberwell.
J. H. Colls, Esq., Grove Park.
W. A. Colls, Esq., Grove Lane.
O. Dufour, Esq., Herne Hill.
— Fleming, Esq., Champion Hill.
F. W. Heilgar, Esq., Great St. Helen's, E.C.
Messrs. Eno, Court-road, Dulwich.
— Berber, Esq, Champion Hill.
Messrs. Jones and Higgins, Drapers, Peckham.
— Roberts, Esq., Champion Hill.
Colls and Sons, Camberwell-road.
— Peat, Esq., Blackheath.
Co-operative Stores, Bedford-street, W.C.
— Druce, Esq., Denmark Hill.
Rupert Potter, Esq., Bolton-road, West Brompton.
Messrs. Munt and Brown, Wood-street, Cheapside.
Messrs. Banner, Brighton, Penge, Sydenham.

FOR PRICES, &c., APPLY TO

BANNER BROTHERS & CO., 11, Billiter Sq., London.

PORTLAND CEMENT.*

By Henry Faija, Assoc. M. Inst. C.E.

(*Concluded from p.* 244.)

Table No. III.

No.	Specific Gravity.	Weight per struck Bushel.	Residue per cent.		Tensile Strength per square inch.		Increase per cent.
			No. 25 Sieve.	No. 50 Sieve.	7 Days.	28 Days.	
1	3·09	116	2	16	509	650	27·7
2	3·00	116½	½	13	400	550	37·5
3	3·00	116½	0	14	471	594	26·1
4	2·99	118	4	28	605	772	27·6
5	2·96	116	4	26	586	767	30·9
6	2·95	113½	3	33	473	558	17·9
7	2·90	111	7	30	701	718	2·4
8	2·90	118½	8	33	693	728	5·0

Table No. III. gives the results of experiments made with eight samples of cement, showing the specific gravity, weight per bushel, fineness, tensile strength at 7 and 28 days, and the increase per cent. between those dates. If we examine the specific gravity and weight per bushel in conjunction with the fineness to which the cement is ground, it will be seen that a heavy weight per bushel and a heavy specific gravity denote a well-ground cement—while a heavy weight per bushel and a light specific gravity denote a badly-ground cement. It has been proposed to substitute the specific gravity for the weight per bushel when testing cement; but it must be remembered that the object of testing cement is not only to determine the actual strength of the cement at a given date, but to be able to form a fairly-accurate opinion as to its probable behaviour in practice. I therefore think that to do away with the weight-per-bushel test, would be, to say the least, undesirable, as when taken in conjunction with the fineness, a very fair opinion can be formed of the value of a cement—an opinion which can be confirmed by afterwards taking the specific gravity; in fact the specific gravity, weight per bushel, and fineness bear a certain relative proportion to each other, indicating either a light or heavily-burned cement. By again referring to Table III. we find that the cements having a light specific gravity are quick-setting cements, which in seven days have already attained great strength, but which show but little improvement afterwards, while those having a heavy specific gravity are slower in setting, and at seven days do not show such good results but continue to improve for a longer period. It is unfortunately impossible to lay down an absolute rule by which to determine the value of a cement, almost every property, whether to its advantage or disadvantage, which it possesses, may be traced to more than one cause, and therefore might lead to opposite results in practice; and when it is remembered that an opinion, to be of any practical utility, must be given in a few days, and before the cement is required for use, it becomes entirely a matter of experience and thorough knowledge of the process of manufacture, to be able to give a reliable opinion as to the suitability of a cement to the work for which it is intended, by reference only to the problematical tests. Having considered what I have called the problematical tests of cement, viz., its weight, fineness, and specific gravity, and shown the results which may be expected by this preliminary examination, there remain to consider the absolute test of tensile strength, and the manner in which it is carried out. The object of the test for tensile strength is to obtain the best possible results under certain conditions. The conditions are generally those already given in the extract from the regulations of the Metropolitan Board of Works. It is evident that to obtain the best result much must depend on the manipulation of the cement, the manner in which it is gauged, the amount of water which is used for the purpose, the care with which it is placed into and removed from the moulds, the length of time which is allowed to elapse after gauging before it is placed in the water, the form of the mould used, and many other minutiæ of manipulation which can only be acquired by actual experience and practice. The amount of water which is required to reduce a cement to a proper consistency, or technically to properly gauge it, varies from 16 per cent. to 20 per cent. A quick-setting cement generally requires a larger per centage of water than a slow-setting one, but the exact amount required can only be determined by actual experiments with the sample under examination. The amount of water required also depends upon the skill of the manipulator, as an experienced gauger will bring the mass to a proper consistency with less water than another of less experience or skill, and as the amount of water used materially affects the result obtained, the importance of using a minimum cannot be over-estimated. Many of the discrepancies which arise when testing cement are undoubtedly due to this cause. With the object of overcoming this difficulty I have devised a small machine for gauging cement, and I find that by its use less water is required, and that the operation of gauging is done much quicker, both points which materially affect to its advantage the result obtained. The custom seems to have become general that the briquettes should be placed in water twenty-four hours after gauging; this time, though it is perhaps convenient to gauge up on one day and place the briquette in water on the next, gives a slow-setting cement every chance, still, it certainly does not act beneficially on a fairly quick-setting cement, and it is generally advisable to place the briquette in water as soon as it is possible to remove it from the mould without fear of damage; the twenty-four hours may be taken as the limit of time, as, though a cement which has not by then set sufficiently to bear removal from the moulds may be a fairly good cement, it is too slow in setting to be of much practical value. Again, with regard to the area of breaking section of the briquette, it is usual to specify that the cement shall carry so much on the square inch, and yet the briquette generally in use has a breaking section of 1·5in. square, giving an area of 2·25in. How this custom has arisen I am unable to say, but it would undoubtedly greatly assist in clearing up many of the discrepancies now to be met with if one uniform section and form of briquette were adopted, and inasmuch as the strength on the square inch is specified, it would seem natural that the briquettes should have that area of breaking section. It will be readily understood that the form of the briquette has much to do with the result obtained, and it is essential that the strain put on the briquette should be tensile only, all crushing forces being detrimental and often resulting in the fracture occurring elsewhere than at the smallest part, and hence giving a false result. Also that the briquetre should be capable of easy removal from the moulds in which it is gauged—avoiding all necessity of knocking the mould in order to remove it—as such is liable to injure the set of the cement. After experiments with many different forms of briquettes, I have adopted the form shown on

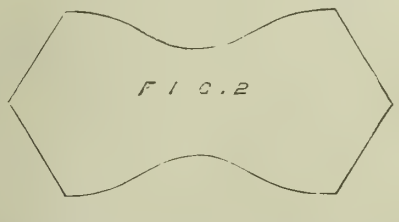


diagram No. 2 as the one which best meets most requirements, and which certainly gives the best results of any I have yet tried. There is another matter which seems to have been overlooked, or at all events not estimated at its full value, by experimenters with cements, viz., the increase in strength between a briquette broken at the expiration of seven days, and at the expiration of twenty-eight days. Many cements will stand the ordinary test at seven days, and yet be utterly worthless at twenty-eight days; others will give a good result at seven days and improve but little afterwards, while a cement that gives a comparatively low result at the expiration of several days may, at the expiration of twenty-eight, have considerably increased in value. The result of the subjoined experiments shows that this is a most important matter in estimating the ultimate strength of a cement.

* Read Feb. 23, before the R.I.B.A.

Table No. IV.

No.	Tensile Strength Section 1in. Square.			Increase or Decrease per cent. at 28 Days.	Increase or Decrease per cent. at 3 months.
	7 Days.	28 Days.	3 Months.		
	lb.	lb.	lb.		
1	380	210	..	—44·73	
2	701	718	728	+ 2·42	+ 3·85
3	510	647	716	+26·86	+40·39
4	605	772	826	+27·60	+36·52
5	476	662	..	+39·07	
6	693	728	..	+ 5·05	
7	589	764	901	+29·88	+52·97
8	666	810	..	+21·62	

By an examination of Table IV. it will be seen that No. 1 was a cement that actually satisfied all requirements at the expiration of seven days, and yet at twenty-eight days was actually worthless, being much blown, and consequently having no strength whatever; and it would undoubtedly have pulled to pieces any work in which it was used. Nos. 2 and 6 were both strong quick-setting cements, and showed good results at the expiration of seven days, in fact they seem in that short time to have attained almost their ultimate strength, as their increase during the next three weeks was but 2 and 5 per cent. The other samples show results varying from 20 to 40 per cent. increase in tensile strength between the seven and twenty-eight days, and it will be seen that at longer dates the quick-setting cements are by no means the strongest. The importance of fine grinding is again exemplified by examples Nos. 6 and 8. No. 6 is the cement as received from the works—33 per cent. of it would not pass through the No. 50 sieve: No. 8 is the same cement, but ground so fine that it would all pass the same meshed sieve—while in the cement as delivered, the increase in strength between the seven and twenty-eight days was but 5 per cent., though when ground it amounted to 21 per cent. In this paper I have treated solely of what may be considered good cements, and have given the result of the tests made with them under different conditions. The failure of a cement by expansion or contraction during the process of setting has not been brought under consideration, but it is needless to say that a cement which does either would be a dangerous cement to use, the only exception being that a good cement will sometimes blow if used too soon after it has left the mill and before it has had time to cool; such a cement would, after being properly warehoused, be perfectly reliable. The deductions which I draw, and which I have endeavoured to prove from the experiments, are:—1. That the weight per striked bushel, unless taken in conjunction with the fineness to which the cement is ground, is absolutely valueless as a guide to the quality of a cement, and that therefore the two should always be taken in combination, and that it is also advisable when possible to take the specific gravity. 2. That the finer a cement is ground the less it will weigh per striked bushel, but that it will at the same time be stronger. 3. That the core or coarse particles in a cement act deleteriously, and can be compared only to so much sand. 4. That to be able to form a true opinion of the value of cement, briquettes should, when practicable, be tested at twenty-eight days as well as at seven, and that the greater the increase per cent. is between those dates the stronger and harder is the cement likely to become. The details of the weight and fineness, and other matters deduced from the foregoing tests, I have embodied somewhat in the form of a Specification which I think meets most requirements, but the purposes for which a cement is to be used must of necessity govern many clauses. Thus:—

SPECIFICATION.

Sample.—From each delivery of cement on to the works a sample of about one bushel will be taken indiscriminately from at least twelve sacks or casks, as the case may be, and will be subjected to the following tests, with the whole of which it will have to comply. The sample thus taken will be considered to indicate the quality of the entire delivery.

Fineness.—The cement to be so finely ground that it will all pass without leaving any residue when sifted through a copper wire sieve having 625 holes to the square inch, and when sifted through a similar sieve having 2,500 holes to the square inch, the residue, or that which is unable to pass through, shall not be more than 15 per cent. of the bulk before sifting.

Weight.—The weight per striked bushel to be not more than 116 pounds nor less than 108 pounds, but the weight must in all cases depend upon the fineness:—thus, according to requirements, a cement which, when sifted through a sieve having 2,500 holes to the square inch, leaves a residue of from 12 to 15 per cent., must weigh not less than 112 pounds per striked bushel; should the residue be from 8 to 12 per cent. the minimum weight to be 110 pounds, and should there be less than 8 per cent. residue, the minimum weight to be 108 pounds per striked bushel. The bushel measure to be placed on a level floor where there is no vibration, and in every case filled from a zinc or other smooth-surfaced shoot, placed at an angle of 55 degrees, the lower end of the shoot to be 5 inches above the top edge of the measure. The cement to be allowed to run continuously along the shoot until the cement in the measure is well piled up, when it is to be struck level with a straight-edge. In no case is the measure to be in any way touched or shaken, until it has been struck.

Specific Gravity.—The specific gravity to be not less than 2·95 nor more than 3·1.

Tensile Strength.—Twenty briquettes to be gauged from each sample, ten to be broken at the expiration of seven days from the date of gauging, and ten at the expiration of twenty-eight days from the date of gauging. Those broken at seven days to carry an average weight of 400 pounds per square inch of section without fracture, and those broken at twenty-eight days to show an increase in strength of 25 per cent. over those broken at seven days.

The following particulars are to be observed in gauging the cement to form the briquettes:—The contractor to use any form or section of mould he chooses in which to make the briquettes, provided always that the breaking sectional area of the briquettes be not less than one square inch. The moulds in which the briquettes are made to be placed on glass or other non-porous beds. The amount of water used for gauging the cement not to be more than 19 per cent. of the whole. The briquettes to be removed from the moulds and placed in water within twelve hours from the time of gauging and allowed to remain therein until they are due for breaking (which will in every case be reckoned from the time of gauging and not of placing in water), and to be broken immediately on being taken out of the water.

Expansion or Contraction.—Pats about 3 or 4 inches square and about ¾ inch in thickness (gauged with the same per-centage of water as is used in forming the briquettes), placed on pieces of glass, to be immersed in water within four hours from gauging, and to show neither cracks on the edges nor on the surface, nor deviation in form when examined at the expiration of seven days.

ORIENTAL CASKETS.*

(*Concluded from p.* 247.)

INDIAN ARCHITECTURE.

INDIAN architecture may seem to occupy more than its fair share of attention on this occasion among the rival styles of Oriental art. The older the work in Eastern Asiatic countries, the better it seems to have been; and the existing monuments of India can lay claim to no high antiquity. Nevertheless they are unquestionably ancient in style, and on the whole, as far as we can judge, tolerably original in their style. Their unique condition of completeness, and the facility with which they consequently lend themselves for illustration by photography, perhaps brings them unduly into prominent notice. Still they may be considered as fairly representative of the general character of Oriental art, which has always been stagnant as regards progress, and never attained the sobriety and dignity requisite for a high class of art. Then the fact that our museum, thanks to the good offices of Sir Bartle Frere, possesses a fine collection of sculptures in marble in high relief from one of the cities in Raj-pootana, again forces us to accept Indian work as representative to ourselves of the Oriental art which I have proposed to consider on the present occasion. Jewels are special products of the East, and as the native rajahs still bedeck themselves with them in barbaric profusion and childish display, so have their buildings been always overladen with ornament in like manner. Beautiful as are many of their structures, they yet seem to resemble magnified toys, and are devoid of simplicity and of refinement in proportion. Such Oriental art as this has, therefore, served a purpose in the history of the art of the world, as having been the prolific quarry whence abler nations, like the Greeks, have extracted types whence to compose a system of architecture more consistent with reason and common-sense. That purpose having been served, Oriental art has fallen back into neglect, occasionally only exciting wonder and interest when the enthusiasm of successive explorers brings them into temporary notice.

It would be unfair to pass without mention the name of Mr. James Fergusson, as the author to whom Indian architecture owes most for having been rescued from obscurity. He has illustrated and classified it with the most ardent zeal and consummate knowledge; and I have to own that such information with respect to it as I am able to bring before you has been gleaned mainly from that acknowledged authority on the subject.

The monuments of India consist of two classes—excavated and constructed, and the latter betray the derivation of many of the details from the imitation of carpentry and wooden construction. In Early Indian Architecture the true arch was unknown, and yet they greatly affected its form, and used it decoratively without understanding its true construction. They seemed, indeed, to dread both lintel and arch, and to be afraid to trust to them, propping up the former with corbelling and brackets, altogether wooden in their conception, and making arched forms over their lintels by building out stones horizontally, till they met in the centre, without proper arched-shaped voussoirs, and cutting their soffits into cusped outlines, with much elegance and striking effect. When, however, Mahommedan architecture was introduced at a later period into the country, then the true arch and the dome make their appearance, and very beautiful combinations were the result:—

The history of India is obscure. The aboriginal (Tamul) devotees to Orphite worship were in the North of India overpowered by an invading Aryan, Sanskrit-speaking race at a remote period, say 3,100 B.C. But the Dravidians were probably equally numerous, and a vast Dasyan population were enslaved by the Aryans.

The Brahmism, their religion, became corrupted into Brahmanism after the compilation of the Vedas, some 1200 years B.C., and about 700 B.C. the Brahman priestly craft become dominant and its doctrines widely spread. Corruption, however, infected these combined nations and their religions, which we may call Hindu, when the Reformer Buddha introduced a purer religion some three or four centuries before Christ. Asoka, the most powerful monarch in India of that time, adopted it, and about the time of Nero in Rome, this reform assumed great proportions in India, and spread thence in various directions. This was a prolific period for Buddhist monuments, and to it is due the vast caves then excavated. The sculptures of the rails at Buddh Gaya and Bharhut, 200 to 250 B.C., are original, without trace of foreign feeling. The elephants, deer, monkeys, and trees are admirable, and the human figure truthful though ungraceful. The art had declined in delicacy in the gateways of Sanchi, which are of the 13th century of our Christian Era. In later works it lost many of its best qualities, and had resort to puerile expedients, such as making the principal figures double the scale of the rest. It still developed, however, in richness down to the 13th or 14th century, when Mahommedanism invaded India, and modified all its arts. Indian art has always seemed to revel in the abundant resources of natural objects and the grand scenery of the country—in its mountains and valleys, its strange flora and wild animals, &c.

Buddhist is, without question, the most important division of Indian art, and presents us with—(1) Stambhas or lats—pillars to bear inscriptions, or to support lamps or flags. These are often the most original and elegant objects of Indian workmanship; (2) Stupas or topes, built to commemorate sacred spots or to contain relics; (3) Rails—surrounding topes, temples, pillars, or sacred trees, &c.; (4) Chaityas or assembly-halls, corresponding to churches. (5) Viharas or monasteries.

The lats, from their great height, resemble wooden pillars, and are crowned with capitals bearing animals. Some of their capitals, of bulbous form, seem of Persepolitan types, and they are decorated with Assyrian honeysuckle ornamentation.

The topes are due to an extraordinary craze for relics, such as saints' teeth. Those of Bhilsa are the most extensive and interesting group. The form of the monument is domical, crowned by an ornament known as a Tee, which is a polygonal structure of railwork, with frieze of windows, and covered by three flat slabs; this is, no doubt, the reliquary. The dome was covered with cement and ornamented in relief or with paintings. Mr. Simpson, speaking of topes in the Jellalabad Valley, says that they were thickly coated with plaster and decorated with bright colours, red and yellow predominating. The Chinese pilgrim Hioueu Thsang in the 7th century describes one of these edifices in Peshawar as being 700ft. high, covered with gold, and crowned with splendid umbrellas and gilded bells hanging from them. Another Chinese traveller describes enthusiastically the gilded discs of the vane lit up at sunrise with dazzling glory, while the gentle morning breeze caused the precious bells to tinkle with a pleasing sound. The form of the domes of the topes changes until they become lofty, straight-sided, pyramidal, many-storied temples. These topes are now dilapidated and denuded of their rich ornaments; but we can still see in the sculptures clear representations of what they once were. In different parts of India they assumed very various forms.

The rails, such as those of Bharhut, are very richly-carved screenwork, formed of stone beams on upright supports, bearing in the centre a chakra, or emblem, like a wheel supported by a honeysuckle ornament of great beauty. The rails at Sanchi exhibit best the mode of construction. They are octagonal pillars, 8ft. high, 2ft. apart, joined by a top rail 2ft. 3in. deep, tenoned on to the pillars. Three lens-sectioned rails are inserted between the pillars, leaving a slight open space between each. The intervening gateways have richly-carved side-posts, bearing grotesque capitals of elephants, and there is a superstructure of carved beams ending with volutes, and intermediate uprights, forming, as it were, metope-like spaces, filled in with sculptured figures and animals. In the cave halls we get stone-hewn columns, with Persepolitan-like capitals and barrel-vaulted ceilings, and the monuments over the statues which occupy their apses are of the tope-like form, surmounted with umbrellas of state, sometimes in triple tiers. The viharas, or monasteries, cut out of rocks, consist of several-storied buildings, each having flat stone-slab roofs, supported on the outside by piers and arched-formed openings, and within by columns of the stone left and carved. Each story diminishes as it rises, leaving an extensive terrace, which supports a series of carved stone sleeping-cells, like very ornamental dog-kennels. The spaces beneath the flat roofs form halls for use in the daytime. These structures seem like copies in stone of wooden buildings which have probably perished. In Bengal we get the pillars, changing, with much grace, from the square to the octagon and circle, and with brackets left projecting from the upper portions of the columns, and springing as if to support the soffits of the beams of the cave. In others we get bases and capitals of bulbous or pudding-like forms, supporting blocks with series of slabs at top, on which animals crouch. The columns are often richly ornamented, as if hung round with embroidered draperies, and are, at times, very beautiful, though fantastic, and obedient to no law but that of caprice. In Gandura monasteries we find capitals of so classical a character as to form a puzzling problem as to their origin. Jaina architecture, date about A.D. 500 to 700, is quite peculiar. When the Buddhists were being expelled, the Jains acquired in the 11th or 12th century temporary domination. They were builders, not excavators. Their system exhibits curious bracketings to form apparent but not true arches, and their work is often very elegant.

* Second lecture, delivered at the Architectural Museum, on February 24, by J. P. Seddon, Esq., F.R.I.B.A.

They loved picturesqueness, and grouped their temples upon hills or in valleys by water, and these have endless variety of perspective and charming variety of light and shade. The form of the towers or spires called Sikras or Vimanas, which surmount cells of small dimensions, and, lighted only by the doorway, resemble a fruit called amalaka. This bears a flat dome of reverse curvature and a pinnacle in the shape of a vase. These Sikras became more and more attenuated, until they resemble spires rather than topes. Other many-storied buildings have the sets-off of the several roofs covered with verandah-like roofs, which give a pagoda-like outline to them.

The Dravidian architecture in the Madras Presidency is remarkable. The Dravidians were pushed southward by the Aryan invaders of the north of India. Buddhism did not gain great footing among them, although the Jaina religion flourished in Mysore. The Hindu Brahminical religion was supreme with them, the Vedic not being known in the south. They were divided into sects, as worshippers of Siva and Vishnu respectively, but the difference of the subdivisions is only to be detected in the sculptures, and not in the architecture.

The Dravidian temples consisted of:—1. The Vimana.—The actual temple, always square on plan, and surmounted by a pyramidal roof of one or two stories, containing the cell in which the image or emblem of the idol was placed. 2. The Mantapans, or porches, which always covered and preceded the doorway to the cell. 3. The Gopuras, or Gateway Pyramids, the principal feature in the quadrangular enclosures, which always surround the temples. 4. The Choultries, or pillared halls for various purposes, are invariable accompaniments of these temples. 5. Tanks of water, and dwellings for the various grades of priesthood, with other buildings either of state or convenience. The enormous number and extraordinary elaboration of the temples in Southern India is quite perplexing, and particularly as their erection has been continued down to quite recent times.

Wealth was concentrated in the hands of a few; labour was abundant and cheap, and there really was no means for employing it except upon such works of ostentation as these. They had no lofty ideas as to immortality, and but small intellectual status; but they could offer their labour without stint to their idols, and they did so. The cell of the god was, in fact, mean in the extreme; but upon its exterior covering was lavished all the arts and resources at their command, and the grouping of the numerous buildings in connection with it is picturesque in the extreme.

In the province of Mysore, in Southern India, the Chalukyan style attained its highest development from A.D. 1000 to 1300. Baillur, in the centre of the province, owed its origin to Vishnu Verddhana in 1114. Baillur Temple consists of one principal temple, surrounded by four or five minor ones and numerous subordinate buildings, enclosed within a court by a high wall 640ft. by 360ft., with very fine gopuras or gateways to its east front. The great temple is a very solid vimana, with anterala or porch, and in front of this is a porch of the usual starlike form, 90ft. across. The whole stands upon a terrace, which is a characteristic feature of this Chalukyan style. The arrangement of its pillars resemble the Jaina architecture, but we miss the striking feature of the dome of that style. It is, however, the marvellous elaboration and beauty of the detail and the richly-carved bases, deep cornices, and finely-pierced slabs which render this temple of Baillur a remarkable example of its class. Conjeveram is a city from which we might expect greater antiquity than in almost any to be found in the southern provinces of India. It was founded in the 11th or 12th century, and succeeded Combacomun as capital of the Chola Mandalum. The great temple at Conjeveram possesses some first-class gopuras, though no commanding vimana. It has a hall of 1,000 columns, several large and fine mantupas, a large tank with flights of stone steps to it, and all the requisites of a first-class Dravidian temple; but they are thrown together as if by accident, there being hardly a right-angle about the place, which gives great picturesqueness, if it be not conducive to dignity. Hallibeeb is another important example of this style. Mr. Fergusson says that if it were possible to compare it with the Parthenon at Athens it would be the contrast of the Alpha and Omega of architectural design. The regular but studied variety of outline of the Indian monument, with no two facets alike and every scroll different, each part showing a joyous exuberance of fancy and all that is wild in human faith or warm in human feeling, found pourtrayed upon these walls is the complete opposite of the Grecian *chef d'œuvre* of art.

The art of India was subsequently greatly modified by Mahommedan influence. The combination of Tartar, Moslem, and Hinddu architecture differ from all other Saracenic art, though resembling somewhat the Persian. It is to this period and character of mixed art that the specimens from Rajpootana that we possess in this museum belong. Mr. Fergusson informs me that the whole district of that country is strewn with similar sculptures in such profusion that they are used in the manufacture of lime. Under such circumstances, we need not grieve greatly over their loss, for they tell us no story, and evoke no artistic feelings.

We can gaze on such Oriental caskets as dreams suitable to "Arabian Nights." We can admire the rich costliness of their jewels; but, as works of true art, they are as naught compared with the smallest fragment of Greek sculpture.

If we examine into the details of these carvings, we find them to be rich from profusion, well composed as by instinct, and effective as ornament.

The string-courses, studded with elephants, the friezes of figures, separated by banded colonettes, at intervals, have an excellent bossy sculptural appearance, but they do not improve upon closer inspection. The figures are uncouth and doll-like, and we are forced to confess their quantity does not make up for the want of quality in works of art. The Kootub Minar, near Delhi, of which I have an illustration, is a huge minaret, 48ft. in diameter at its base, and 242ft. high as it stands, having lost its terminal ornament, and some 20ft. of its height in consequence. It is surrounded by four boldly-projecting balconies, between which are richly-sculptured belts, containing inscriptions. In the lower story, the projecting ribs which form the fluting are alternately angular and circular. In the second they are circular only, and in the third, angular only. Above the minaret is plain, and constructed principally of white marble, with belts of the same red sandstone of which the three lower stories are wholly composed.

As a sample of Mahommedan Indian art, perhaps the Taj Mahal may be taken as a typical one. It is almost impossible to convey by description any idea of its delicacy and beauty of material. The platform upon which it stands is 18ft. high, and 313ft. square, and composed of white marble. On this terrace stands the tomb, with its tall minarets, one at each corner of the platform, 133ft. high, and of exquisite proportions. The Mausoleum is 186ft. square, with a dome 58ft. in diameter, and 80ft. high, raised on screens of trellis-work of white marble, a *chef d'œuvre* of Indian art, inlaid with precious stones.

Beyond are two wings, one of which is a Mosque, and either, anywhere else, would appear an important building. This splendid group of buildings forms one side of a garden-court, 880ft. square, and beyond this, again, is an outer court of same width, but half the depth, entered by three gateways. In the centre of the inner wall is the great gateway of the garden-court, worthy to vie with the Taj itself.

The whole is a combination of many beauties of nature and art. Long rows of cypresses lend contrast to the fairy grace of the building. Each main avenue carried through the surrounding trees has a canal along its centre, studded with marble fountains, and leading up to some lovely architectural objects. The Taj Mahal is indeed a casket of exquisite form and material, and studded with jewels of the rarest quality.

CALLENDER'S DAMP-RESISTING SOLUTION AND BITUMEN DAMP-COURSE.

WE have had the opportunity of examining two preparations which promise to be of value in building, and we direct the attention of architects and builders to them. Messrs. Callender and Sons, of 101, Leadenhall-street, E.C., claim that they have, after many experiments, succeeded in producing a "damp-resisting solution," for rendering walls impervious to moisture. We need scarcely say that, if they have succeeded, they well deserve the thanks of the profession, and the patronage of the public; for there is, perhaps, no source of mischief so pernicious to health and so destructive to the comfort of a house, as a damp wall, and certainly there is nothing so difficult to cure, save by having resort to radical measures of an expensive kind. Messrs. Callender and Sons' solution is a dark brown fluid, made from pure bitumen, refined and mixed with certain gums, which can be readily applied, by brush, to the plastering of the walls, by any labourer. For new walls, the solution is best applied after the second coat of plaster has been put on; it should be allowed to dry three or four days before the finishing coat of plaster is laid. It has been tried, we are informed, with perfect success, in some recent buildings near London. From the manner in which a cardboard box, coated with the "solution," holds water, we are of opinion that the inventors have produced a preparation of much value; we also examined a partition that had been coated with it, and afterwards coloured, in a new building, which was perfectly dry, though another similar wall, which had not been so coated, was very much discoloured from dampness. The property of this bituminous solution, which is prepared with highly volatile spirit, is to saturate the surface upon which it is placed—in fact, it thoroughly enters the pores of the substance, and forms a coating like indiarubber itself. We have also examined a "damp-course," prepared of pure bitumen, that will become an excellent substitute for the ordinary asphalte and other damp-proof courses in use. Its cheapness, elasticity, and the ease it can be applied, are recommendations in its favour. It is really a canvas, saturated in pure bitumen, and can be obtained of any length and width at 2d. per square foot. The sizes kept in stock are 24ft. long by 10in. wide, at 3s. 6d. per piece; the same length, by 15in. wide, at 5s. per piece; by 19in. wide, at 6s; and at 24in. at 8s. per piece. These widths allow an inch in excess of the walls of the usual thickness.

ROTHERHAM PARISH CHURCH FONT AND COVER.

MR. HADFIELD and some other gentlemen at Sheffield have been alarmed by the illustration of the proposed new font and cover for Rotherham parish, which appeared in our number of Feb. 20, and a correspondence in the *Sheffield Daily Telegraph* has ensued, asking what is to be done with the old "font of black oak and the cover of extremely beautiful design, evidently made at the same time and in harmony with the magnificent black oak carved pulpit." Mr. Hadfield has been informed "that Sir Gilbert Scott did not consider the cover as an accessory, to be in character with the restored church, and of indifferent design, and that it had been moved to Greasborough church." In reply to a note addressed by us to Mr. Seddon, with the view of eliciting further information, that gentleman writes:—"I may state that I have been already written to on the subject by Mr. J. T. Micklethwaite, and that I informed him, as I do you now, that I have never been to Rotherham, and was told by those who asked me to make the design that the existing font was of no account, and I have never heard of it having a cover. I further told Mr. Micklethwaite that I would institute inquiries as to whether the cover is in existence, and to the character of the font, as I have not the slightest wish to substitute any work of my own for anything that may be of any archæological interest or artistic value of any date whatsoever."

COMPETITIONS.

BRISTOL.—From the designs submitted recently in open competition for the new church to be erected in the grounds of the Bristol and County Lunatic Asylum, that prepared by Mr. Edward Henry Edwards, architect, of Bristol, has been selected, and it is intended to proceed with the work of carrying out the design at once. The cost was limited to about £2,000, and therefore simplicity, combined with solidity, was made the basis of the design, which is Early English in character. A novel plan has been adopted with regard to the arrangement of the belfry, a ringing-stage being obtained over the crown of the chancel-arch and the nave-roof, running

through without break to the east end of the building. At the west end the portion presenting the appearance of a "narthex" is divided into two rooms, north and south, for "epileptics," and the western entrance is between these. The medical superintendent's gallery is placed on the north side, and immediately over the vestry. The building will be of local Pennant stone with freestone dressings, and the roofs will be covered with Broseley tiles. The length of the building is about 105ft.

PRESTON.—The competition for the new hotel at Preston has been decided. The first premium of £200 has been awarded to Mr. T. Mitchell, of Oldham, and the second, of £100, to Messrs. Salomons and Ely, of Manchester. Our first article is devoted to a review of the designs.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The seventh meeting of the present session took place on Wednesday. After Mr. Loftus Brock, F.S.A., had referred to the restoration of the wall paintings in the parlour of the Carpenters' Hall, which has only lately been effected, Mr. Way exhibited some fragments of glazed pottery, with a fine piece of Samian ware, found in the King's Arms-yard, Southwark. Dr. Woodhouse produced a seventeenth-century handcuff, from St. Alban's, in iron, and with a small serrated edging, which marked the date. Mr. George Adams, F.S.A., exhibited a Flemish or Fulham earthenware mug, with the well-known blue pattern band around it, and the initials "G. R.," probably referring to George the First. A few notes were then read by Mr. Wright, F.S.A., on a recent discovery of a Roman octagonal bath beneath the modern one in use at the present day at Bath, the refuse water of which is got rid of by a culvert of Roman work. Mr. Mann, the contractor for the Mayor and Corporation, has lately come across this work in some alterations being made at Bath (Aquæ Solis). A paper was then read by Mr. De Gray Birch, F.R.S.L., on "A Romano-British Interment at Fir Grove, Hants," written by Dr. Stevens. The proceedings of the evening closed with a paper by Dr. Phené, F.S.A., on "Pergamos, and its History from Ancient Times," referring especially to the Roman remains so plentifully existing on its site, as well as to the evidence of serpent-worship abounding in all parts of Asia Minor and elsewhere.

PARLIAMENTARY NOTES.

THE METROPOLIS WATER BILL.—Mr. Cross, on Tuesday, on bringing in the Metropolis Water Bill, explained, first of all, that the Government had come to the conclusion that the first preliminary to any effective measure must be an incorporation of all existing companies, and it was proposed, therefore, that the existing companies should surrender all their powers under their several Acts of Parliament to the central body, which should have absolute power over the supply of water to the metropolis. It was proposed also that they should surrender all the property and rights which they might possess on the 1st of January, or acquire before the 30th of June. It was not intended that the State should be put under any contribution for the purchase-money, but the water trust would be empowered to create a water stock at 3½ per cent., which the water companies had all agreed to take in payment of the compensation they were to receive, and it would be backed by the guarantee of the metropolitan rates. With regard to the price, he said the only matter taken into consideration was the absolute intrinsic value of the companies at the time of purchase. The net capital sum to be given was £22,000,000; but in addition to this there would be a sum of six or seven millions spread over twelve years, to be paid in different proportions to different companies, in payment for the unearned increment on the value of their shares. He calculated that the saving in the first year would be about £50,000, but, in addition, there would be further savings from consolidation of staff, &c. With regard to the composition of the water trust, he proposed that it should consist of 21 members—namely, three paid members (a chairman at £2,000 and two vice-chairmen at £1,800), the Lord Mayor and chairman of the Metropolitan Board of Works (*ex officio*), two members nominated by the Local Government Board and the Chief Commissioner of Works, two nominated by the City Commissioners of Sewers and the Metropolitan Board, and 12 members elected by the Metropolitan boroughs and by the water-consumers north and south of the Thames not comprehended in any borough. The object of the trust was defined to be the supply of wholesome water for domestic use, for watering the streets and extinguishing fires, with a constant supply at high pressure; and there was provision for a sinking fund to extinguish the debt in 80 years. Finally, it was proposed that the trust should not come into actual operation until October 1. Leave was given to bring in the Bill, and after a short conversation it was read a first time.

CASTS FROM THE ANTIQUE.—In the House of Lords on Friday, Feb. 27, Earl Cowper having moved for papers relative to the formation of a gallery of casts from the antique, Lord Beaconsfield said, in the present state of the national finances and the recent depression of trade, he could only give an assurance that the Government would, as soon as possible, do what they could in furtherance of the desired object.

Building Intelligence.

CHORLEY.—St. George-street Congregational Church has been reopened after extensive internal restoration. The whole of the old-fashioned pews and fittings on the ground-floor have been removed and replaced by open and comfortable pews of pitch-pine and a handsome glazed screen has been erected in the vestibule. The new pulpit is of selected and beautifully-marked pitch-pine, and although of simple design is effective in treatment of arcading and clustered column. All the walls have been replastered, and the original flat ceiling has been relieved by panels, moulded cornice, and ornamental trusses. The gallery front and organ-case has been re-decorated, and in good harmony with the rich tone of the varnished pitch-pine on the ground floor. The contractors are, for the joiner's work and plastering, Messrs. Whalley and Dewhurst; for the painting, varnishing, and decorating, Mr. Charles Yates, all of Chorley. The work has been satisfactorily carried out from the designs and under the superintendence of David Grant, architect, Preston.

EDINBURGH.—The foundation-stone of a new place of worship for the Morningside United Presbyterian Church was laid on Saturday last. The building, which will cost £10,000, will be in the Norman style, as it was practised in Scotland during the 12th century. The west elevation shows side-aisles and clerestory with high-pitched roof and ornamental finials; the north gable, a moulded doorway, with large three-light window above, surmounted by a small circular moulded panel. A square tower, which rises at the north-west corner to a height of 110ft. Internally the church is divided into nave and aisles. The church is calculated to accommodate nearly 1,000 persons. At the south end of the ground there is to be a hall erected capable of seating about 250. The church—the designs of which have been prepared by Mr. David Robertson, architect, Queen-street—is expected to be ready for occupation by the autumn of next year.

ON Thursday week, the new Board Schools in Wharf-lane, Hanley, were opened. The accommodation provided is for 408 children, in two departments. Each department has attached hat and cloak rooms, with lavoratories, teachers' and store-rooms. The walls throughout are plastered and finished to a height of 4ft. above the floor, with a dado of dark-red glazed tiles with Marsden's patent interlocking joints. The floors are of wood blocks laid on concrete, and the galleries in the girls' class-rooms are laid with the same material. The buildings are entirely of local bricks, with pressed brick fronts, and roofed with plain red tiles; and the style adopted is of a simple Gothic character. The building contract was commenced by Mr. William Matthews, and completed by Mr. George Ellis, builders, of Hanley. Messrs. Mintons, of Stoke, supplied the tiles. The schools are from the designs and were constructed under the supervision of Mr. W. A. Keates, architect, of Hanley, architect to the Board.

STEETON.—On Saturday afternoon the foundation-stone of a new church, to be dedicated to St. Stephen, was laid at Steeton. The building, the designs of which are from the firm of Messrs. T. H. T. Healy, of Bradford, will accommodate 272 worshippers, and will, when completed, cost about £3,500. The style is Geometrical Decorated. The tower will rise 96ft. The clerk of the works is Mr. G. H. Elliott.

YORK.—The new infantry barracks are now rapidly approaching completion. They are built by Messrs. J. and W. Beanland, of Bradford, from designs furnished by the War Department. The frontage, 1,050ft. long, has, for some distance near the centre, a dwarf wall, finished with iron palisading. There are two entrances from the Fulford-road. In the centre of these is the Armoury Keep, three stories in height, with walls 2ft. thick. It has three towers, 50ft. high, loopholed for musketry. The powder-magazine is formed on the summit of one of the towers, and the powder can be raised by means of a hoist. Every precaution has been taken, in the fitting-up of the magazine, to prevent accidents. The top of the building is flat, covered with Seyssel asphalt. The general design comprises blocks of buildings on the north side of the site for a double brigade depot, and on the south side for a battalion of the line. In the centre of the ground is an area, 600ft. wide. Besides the officers' quarters, accommodation is found in the barracks on the north side for 448 soldiers, and on the south side for 624. Captain Knocker, R.E., the superintending officer, has been assiduous in his supervision of the various works, acting under Lieut.-Col. Malcolm, C.R.E., of York. Mr. Joseph Smith is clerk of the works under the War Department, and Mr. R. Walker, the resident manager for Messrs. Beanland.

More than Fifty Thousand Replies and Letters on subjects of Universal Interest have appeared during the last ten years in the ENGLISH MECHANIC AND WORLD OF SCIENCE, most of them from the pens of the leading Scientific and Technical Authorities of the day. Thousands of original articles and scientific papers, and countless receipts and wrinkles embracing almost every subject on which it is possible to desire information have also appeared during the same period. The earliest and most accurate information respecting all new scientific discoveries and mechanical inventions is to be found in its pages, and its large circulation render its the best medium for all advertisers who wish their announcements to be brought under the notice of manufacturers, mechanics, scientific workers, and amateurs. Price Twopence, of all booksellers and newsvendors. Post free 2½d. Office: 31, Tavistock street, Covent-garden W.C.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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RECEIVED.—L. and N.—M. and Co.—J. H.—F. H. and Co.—J. F.—T. E.—R. J. A.—T. C. H.

G. BARNARD, Edinburgh. (Please send us your address.)

"BUILDING NEWS" DESIGNING CLUB.

HORNET, W. W., SOMBY, TURNER. (The picnic-room may be provided over the boat-house; about 20ft. by 15ft. would be ample. No attendant's house is required; but a caretaker's room might be got, in the rear or above the boat-house. The boat-house should have accommodation for 8-oared boats, so as to serve the purpose of a small club, if necessary.)

Correspondence.

PORTLAND CEMENT.

To the Editor of the Building News.

Sir,—On reading the account of my observations made during the discussion on Mr. Faija's paper, on Portland Cement, at the Royal Institute of British Architects, given in your impression of 27th February, I notice that your reporter has misunderstood my remarks with regard to the "tensile strength of 400lb. per square inch, for neat cement after 28 days" as specified by Mr. Faija.

I did not object at all to this; on the contrary, I quite agreed, being myself prepared to supply any quantity of German "Stern" portland cement, which manufacturers guarantee to have a minimum tensile tenacity of 711·15lb. per square inch (and which in reality often stands a strain of about 850lb. per square inch), if tested neat after 28 days, at the Royal Industrial Academy in Berlin, according to the official German rules.

However, I strongly objected to supply such portland cement at the same price at which many cements for instance could be had, that merely come up to the requirements of Mr. Faija's specification. I therefore ventured to suggest, that all portland cements, like every other merchandise, should in future be valued according to quality, namely tensile strength, as for instance in the case of alcohols, where the overproof is paid for, and as an encouragement for manufacturers to improve their produce.

For all tests of briquettes made of one of cement and three of sand, mixed with 10 per cent. of water by weight, the Academy in Berlin uses dry and clean quarry sand which has passed through a sieve of 60 meshes per square centimetre, or 387 meshes per square inch, and been retained upon one of 120 meshes per square centimetre or 774 meshes per square inch, and not prepared by sieves of 287 and 774 meshes, as mentioned in your paper.—I am, &c.,

Gustav Grawitz.

138, Leadenhall-street, E.C.

QUEEN AN(NE)TICS.

Sir,—This subject is too important for me to leave unanswered the absurdities advanced by Mr. Calvert and "F.S.A."—whoever he may be. It is not a question of the likes or dislikes of such tyros. It is a question of right and wrong—of sense versus nonsense. I write of what I do know, not of my own individual taste; and no man knows better than Mr. Norman Shaw that what I say is true, and that his practice is indefensible, except that it may be making his fortune; and much good, under such circumstances, it is likely to do him. Architectural features are a recognised language, and to make a hash of them is treason to the profession. A pediment is a feature with a meaning: cut in half, or stuck halfway up a chimney, where it has no meaning, it is worse than useless—a palpable lie. I ask for architecture based upon good detail properly applied, the best the world has seen, used, and modified with common-sense to modern requirements. I want no Mediæval castles, but houses built as Mediæval castles were, with beauty and perfect adaptation to the wants of the day.—I am, &c.,

John P. Seddon.

Queen Anne's-gate, Feb. 28.

CARLISLE REFECTORY.

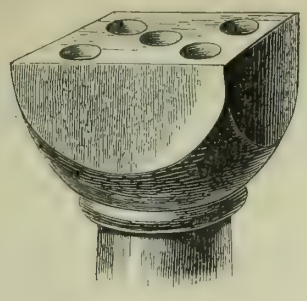
Sir,—In a letter from Mr. Street to the secretary of the Society for the Protection of Antient Buildings, published in your last issue, he gives me the credit of the design of sundry rather eccentric stone props inserted under the groining of the crypt.

I beg to point out that he has been misinformed as to this small incident in the modern history of the building, and that at no time did I insert any stone props whatever, eccentric or otherwise.—I am, &c.,

March 2. Charles J. Ferguson, F.S.A.

THE STOUP AT LEWANICK.

Sir,—A short time ago, Mr. H. Hems gave a description and sketch in your columns of a remarkable form of stoup at Lewanick, in Cornwall. Since that time I have come across some woodcuts of similar holy-water vessels in Sweden, engraved in Prof. Nilsson's "Skandinaviska Nordens Ur-invänare." I inclose a tracing of one of them from Strö church. There are two others shown, one with six cups and the other with five.



Mr. J. T. Micklethwaite seemed to think that the cups were filled with tallow and used as lamps. Would he kindly enlighten us further on this point, as to his authorities for saying so, and also tell us the names of the churches where they are to be found.—I am, &c.,

J. Romilly Allen.

MR. STREET AND THE SOCIETY FOR THE PROTECTION OF ANTIENT BUILDINGS.

Sir,—Most of your readers will await with interest the answer of the Society for the Protection of Antient Buildings to Mr. Street's question—"Why, if it was lawful for Mr. Machell (or someone else) to block some windows and open out others in 1699, it is not lawful for me to do the same thing now in 1880?" This very modern society issues instructions very clearly, that when an old building requires altering to adapt it to nineteenth-century requirements, we are to leave it alone, and build upon another site (if the site is not there, one must be made, we suppose) what we require; but, at the same time, it holds sacred the work of men who did exactly the opposite two centuries ago, viz, altered their buildings very often in the most diabolically destructive manner possible, not only for their own convenience, but often, apparently, merely to gratify their innate love of destruction. In doing this, of course they left a history behind them, a history of hatred of idolatry; and there being at all times a tendency in human nature to worship the beautiful, the destruction of the beautiful and the substitution of the ugly was of necessity a part of their creed. This history, of course, is not without interest; but surely to future generations our own history of renewed appreciation for that which is beautiful, without any fear of idolatry following therefrom, will be equally interesting. But I am rather wandering from the subject of this letter, which is to refer more especially to Mr. Street's views of restoration. "Are the owners," his letter asks, "of old buildings to be allowed to use them or not? If they may use them, they must repair them." Mr. Street evidently thinks that we are right in using our old buildings, but in restoring them for this purpose how does he proceed? Every stone, where possible, is restored to its original position; all parts are rebuilt from the fragments that remain, and it is taken for granted, in fact, that they are to be used exactly as our ancestors of the thirteenth, fourteenth, and fifteenth centuries used them, but, on no account, as our more immediate predecessors did. Cloisters, for example, are to be rebuilt, as well as such other parts as could only have been of use when cathedrals were also the homes of those connected with them. By all means preserve most carefully all traces, showing, as they do, how men then lived; but why restore them? The truly useful, we say in these days, is the truly beautiful. If Mr. Street, then, is restoring our cathedrals and churches exactly as they were originally built, they are not being restored in order that we may use them, but only so that our ancestors could have used them. In many things ecclesiastical we should perhaps be told that our mode of worship, and, therefore, requirements, should be the same as in the middle ages; but even Mr, Street would hardly think it his duty as an architect to instruct, for example, a Low Church clergyman how to conduct the service, so as to require all the adjuncts necessary for a High ritual. Why too, when telling us our antient buildings are to be used, allude so sarcastically to alterations made for this purpose by our more immediate ancestors?

Surely Mr. Street is as illogical in denouncing these men as the Protection Society is in holding their works so sacred.

One word more: Mr. Street at Carlisle takes away props supporting groining of the crypt, and refers, with something like contempt, to the architect who put them there. My memory must be strangly at fault, for, hitherto, I was sure I had Mr. Street's authority for propping with buttresses an old wall, in preference to pulling down and rebuilding, and thus destroying the character of the work. Is not this, too, what Mr. Street is so horrified with at Venice? Of course, different buildings may require this totally different treatment, but the only difference the average of mortals will be able to see is, that in one case Mr. Street is the architect, and, in the other case, he is not.—I am, &c.,

W. H. Wooler.

Western Super Mare, March 2.

THE OXFORD HIGH SCHOOL FOR BOYS.

Sir,—"Looker-on" very much misrepresents the facts of what he calls the "petition" of the corporation. No reference whatever was made to any particular design or architect.

The corporation, as founders of the school, subscribers of £4,000, and donors of the site (valued at another £4,000) with a frontage of more than 100ft. to one of the leading thoroughfares of the city, were disappointed in finding the governors of the school determined on the selection of a design which, to a large majority, seemed unworthy of the situation.

This gave rise to the "petition," which was simply an expression of opinion that no matter whose design was accepted, the main building should face the street.

A Member of the Corporation.

AMERICAN CONTRACTS.

Sir.—I have been much interested in reading the articles on Contracts, published in the late numbers of your paper. The subject has been closely studied in this country, where we have to contend with the different laws and statutes of the several States. I send for the editor's inspection a copy of the form adopted by the architects of Rhode Island; it may prove of interest. It seems to me that the clauses relating to payment of extras are clearer and more concise than those noticed in your columns.

The question of measurements and quantities we do not take into consideration, for, in general practice, they are not supplied to the contractors. Each proposer for a contract extracts and bills his own quantities in his own way. The architects usually make estimates for their own use, and for the satisfaction of their clients, thus checking any undue allowance to the contractor.

The form for proposals, which is annexed to the contract, sets forth clearly the names of all the sub-contractors to be employed. This enables the architects to reject any unsuitable or tricky mechanic before any contract is signed.—I am, &c., George C. Mason, Junr.

Newport, Rhode Island, U.S.A., Feb. 18, 1880.

CARDIFF FREE LIBRARY COMPETITION.

Sir,—In response to an advertisement for new free library, Science and Art Schools at Cardiff, about 107 architects sent in designs according to the particulars furnished by the committee to competitors, ourselves being among the number.

We now hear that, subsequent to the issue of above particulars, it was found necessary by the committee to amend the instructions in a very grave item, and several Cardiff architects, aware of the alteration, prepared second plans in accordance with the same.

Personally, we did not receive any notification of this departure from the original instructions, and trust the committee will consider the great expense and trouble to which the competitors have been put, and award the premiums in such a manner as to do justice to those architects who, like ourselves, have apparently been working in the dark.—We are, &c.,

L. and G.

ARCHITECTURAL COMPETITIONS.

Sir,—At the last meeting of the Royal Institute of British Architects, notice was formally given that at the Special General Meeting on the 8th March, I intended to move the following resolution :—

"That the Council of the Royal Institute of British Architects be requested to appoint a committee to take into consideration the subject of Architectural Competitions, that shall in concert with other London and Provincial Societies suggest certain regulations for the conduct of Architectural Competitions, and report to the Council the result of their action."

Believing that a large and influential number of the members of our profession earnestly desire to see some practical steps taken by the Institute and other architectural societies, to minimise the evils arising from the competition system as at present practised, I venture to hope that you will co-operate in any movement calculated to lead to healthy reform; and although it is not possible to legally limit the action of any single individual, it may be both desirable and expedient to frame certain regulations that shall in honour be considered as binding on all who have acquiesced in their preparation, and that whenever competitions are advertised that violate such regulations, they shall not be responded to by any member of any architectural society in the kingdom.

Not only would the profession be benefited, but I believe the public would gratefully accept any reasonable conditions that tended to secure their obtaining designs from men of competence and position.

You may possibly regret that the profession is not at once prepared to abolish competition altogether, and that the framing of healthy laws for the conduct of architectural competitions is the most that can be hoped for at the present time.—I am, &c., Thomas Porter, F.R.I.B.A.

2, Westminster Chambers, Victoria-street, S.W. March 1.

SITTINGBOURNE HOSPITAL COMPETITION.

Sir,—Kindly grant me space in your next issue to inform your correspondent, Mr. James George Buckle, that when he says I have "rushed into print to proclaim the undoubted superiority of my design over those of other competitors," he simply states that which is not true.

From the beginning to the end of my letter in your issue of the 20th ult., I defy him to find a single word of *mine* which claims for my drawings the least amount of superiority over those submitted by other competitors.

The words in my letter before referred to, and which appear to have so lacerated the feelings, and puzzled the conception, of Mr. James George Buckle, were quoted, as he knows, from the *East Kent Gazette*, which credits my design with being "generally admitted to be the best," and as he does not impugn the accuracy of any other part of the account of the meeting of the hospital board, as given by your Kentish contemporary, it is only fair to assume that my design *did* occupy the position stated; I am, as Mr. James George Buckle puts it, "clearly of this opinion."—I am, &c., G. G. Hoskins.

The "Vancorlear" is an "Apartment House," occupying the entire front of west side of Seventh Avenue in New York City. This extensive building, which has been erected from the designs of Mr. H. J. Hardenberg, is built around an extensive open court, containing an area of thirty-five hundred square feet. There are eighteen suites of apartments, for which there is an entrance from 55th street, and an equal number, the entrance for which is from 56th street, the whole building being divided into two equal and similar parts. Each suite of rooms is as complete in itself as a dwelling in a block of ordinary city houses, being entirely surrounded by brick walls, the whole structure being thoroughly fireproof. Each suite has a lobby opening on the main hall, and an ante-room in addition. The principal rooms are in all cases near to the entrance, and the kitchens so disposed as to be quite unobtrusive and unobjectionable. Four suites on first story have kitchens in basement, with dumb waiters and private stairs connecting. A servant's room is comprised in each suite, although another of good size is provided in the attic story, which can be used as a trunk-room if desired.

Intercommunication.

QUESTIONS.

[6060.]—**Stable Floors.**—Having to erect some small stables, I have specified floors to be white Suffolk brick on edge. Could any correspondent inform me whether I could advantageously substitute concrete, say, a 4in. layer, finished with Portland cement?—Quid.

[6061.]—**Fountain-Basin Lining.**—Information will oblige as to the best material with which to line a fountain-basin. I made one some six months ago with concrete, and lined it with ordinary cement, but this severe winter has caused the cement casing to peel off. Would any of your correspondents give me the benefit of their experience?—Nemo.

[6062.]—**Wooden Houses.**—Will some reader give me the names of some books, or information, on wooden houses.—New Zealander.

REPLIES.

[6030.]—**Timber-Measuring.**—Having observed some letters in your "Intercommunication" column on "Timber Measuring," we beg to draw your attention to "Horton's Complete Measurer," published by us, of which we send herewith a copy, which, on page 212, gives the answer to your correspondent's (William Phelps) question, as he states it.—Crosby Lockwood and Co.

[The book, which has already been noticed by us, is a very good one.—Ed. B. N.]

[6030.]—**Timber-Measuring.**—If a tree be a frustum of a cone, the solid contents can be ascertained as follows:—Multiply the two diameters together, add to the product the square of each, then multiply that sum by the height and by 2,618, the product will be the answer. Here $AB \times CD + AB^2 + CD^2 \times EF \times 2618 =$ to the solid contents. Waste is not so serious as some would suppose. The slabs are used for fencing, &c. A similar claim might be made on square (chopped) logs. Take a log 10ft. long, 19 × 19, and ½in. slab taken of all four sides, would be a very moderate claim, but it would reduce the contents from 25ft. 0′ 10″ to 22ft. 6in.—B., Lincoln.

[6030.]—**Timber-Measuring.**—"Tekton" still carries this subject a little further, and calls in question the method which I gave of ascertaining the true content of a log of timber—viz., to square one-fifth of the mean girt and multiply the product by double the length of the tree. I have consulted the works of several authors on timber-measuring, and I find that it is recommended as being the rule for arriving at the *nearest true* content. "Tekton" asks, "is this correct under all circumstances?" My reply is, that it must vary as the shape or irregularity of the tree to be measured varies: the greater the number of girts taken the nearer the approach to accuracy; but it is distinctly laid down in all works on the subject that the answer obtained will only be the *nearest true* content. The method, as universally adopted, is given by Young, in his "Pocket-Book," thus :—

G = ¼ girt of tree at middle, in feet
g = ¼ girt of tree at one end, in feet
g' = ¼ girt of tree at other end, in feet
L = Length of log, in feet
c = Cube content of log in feet

$$c = L\left(\frac{G + g + g'}{3}\right)^2$$

The general adoption of this rule is, no doubt, owing to the waste necessitated by the squaring of the timber, and if a log measures 30ft. long and 144in. mean girt, it is plain that, by multiplying the length of the log by the square of the quarter-girth—viz., 36in.—the calculation will stand thus :—

Ft.	In.	
3	0	= ¼ girt
3	0	
9	0	square of ¼ girt
30	0	length of log
270	0	Answer, in feet

Hence the accuracy of Hoppus's tables. Perhaps Mr. Phelps will favour us with the method he adopted to obtain his answer of 343′ 5′ 3″. The rule for obtaining the solidity of a frustum of a cone is scarcely applicable to the measurement of a tree, owing to their irregularity; and "Tekton" does not discern the distinction between the words "product" and "sum," as the rule is: multiply the sum (not the product) of the areas of the two ends, and the mean proportion between these areas, by one-third of the perpendicular height.—J. Williamson.

[6047.]—**Heating Conservatory.**—Will "T." please state how near the top of return-pipe "R.," in his diagram (reply, Feb. 27), should come to top of hot-cistern H?—C. W. F.

[6048.]—**Wall and Gable.**—I should say that no local authority would sanction such a structure as the one referred to by your correspondent. To say nothing of what would seem to me the awkwardness to B. of having a column in his room, A. can do nothing unless B. affects his gable. It is the duty of the town authorities to see to the proper construction of B.'s building.—Borough Surveyor.

[6050.]—**Baywood.**—Baywood is mahogany. Veneers are cut from it.—B., Lincoln.

[6057.]—**Brewery Building and Well-Sinking.**—Prepare a rough plan of the site, with it consult a practical brewer, and pay him. He will give rough sketches of the buildings required to work a modern plant. If you are able, then prepare finished plans, details of construction, ornament, &c., to your own taste. My experience, in preparing plans for brewery buildings and flour-mills, &c., has taught me to play second fiddle to the practical brewer and to the practical millwright. "Well-Digging, Boring, and Pump-Work," by J. G. Swindell, price 1s., Weale's rudimentary series (Lockwood and Co.).—William Jackson.

[6058.]—**Plaster.**—A good fire up against the plaster is the best thing to take it off. If "Balbus" has some good logs of wood, and makes a good fire up against the plaster, it will scale off in large pieces.—Oliver H. Kenny, Dovercourt.

Our Office Table.

Sir Frederick Leighton has finished his lunette of the "Arts of War," which decorates one end of the South Court of the South Kensington Museum. The period chosen by Sir F. Leighton is the Italian *cinque cento*. In a courtyard, inclosed by buildings of fifteenth-century Florentine style, appear groups of Italian noblemen, together with more simply-clad artificers. At the back rise buildings, cypresses, and orange-trees, under a sky overcast with clouds. Variety in arrangement for the numerous figures introduced is obtained by utilising structural devices, like platforms, which flank the gateway in the centre of the composition, flights of steps leading to different levels of the premises, and the like. Sir F. Leighton has selected what is termed "spirit fresco" as the best suited for carrying out his design of the "Arts of War." This "spirit fresco" is more closely allied to the painting in which wax is employed as an ingredient in the medium for colours than to "fresco," or painting on wet plaster. Its inventor, Mr. T. Gambier Parry, however, claims for it permanence, and all the artistic advantages of great luminousness of colour with a flat or dead surface.

Arrangements are being made for the first Spring Exhibition of the recently-formed Yorkshire Fine Art Society. It is to be held in the Athenæum Buildings, Park-lane Leeds-square, where the erection of the new galleries has made considerable progress. In these galleries there will be ample space to show at least 500 pictures, without either skying any works or placing them at an inconveniently low level. The first exhibition is to be opened on the 3rd of May, and will continue open two months. Several noblemen and gentlemen throughout Yorkshire have already promised to lend pictures from their collections, and a number of artists will also contribute. It is expected, however, to be in the first instance principally a loan exhibition, whilst the second display in autumn will, on the other hand, consist chiefly of artists' pictures, sent direct from their studios, or from the Royal Academy Exhibition, and other galleries. It is intended to distinguish each of the society's spring exhibitions by giving prominence to some special feature, and in the case of the first, it is expected that one of the main features will be a large collection of works of Art from South Kensington. For the opening exhibition, works will be received from March 22nd to April 6th, but not later.

A well-known Edinburgh citizen, Mr. Adam Beattie, of the firm of Messrs. William Beattie and Sons, builders, died on Saturday morning, at the age of 59. Mr. Beattie was a man who, in his business capacity, came prominently before the public in connection with a large number of important works. Entering the office of his father and brothers, he became associated early in life with the extensive business of the firm. When thirty years of age he was elected a member of the Edinburgh Merchant Company, and he afterwards acted as one of the Assistants of that body. He sat for a number of years as member of the Dean of Guild Court, and with the Town Council he was also for some time connected as Convener of the Trades. Among other public buildings with which Mr. Beattie's name has been associated are the new Royal Infirmary, the Museum of Science and Art, Fettes College, and the Bank of Scotland.

The first exhibition of works in oils and water-colours of the City of London Society of Artists was opened, on Monday, in the Hall of the Skinners' Company, Dowgate-hill, Cannon-street, by the Lord Mayor. The society has been formed for the purpose of holding periodical exhibitions, and in the interest of promoting the technical education of art in the City. It is proposed by the promoters of the Society to devote the proceeds of such exhibitions towards advancing the cause of art and artists in the City of London; and further, should the exhibitions prove successful, it is proposed to found a self-supporting permanent gallery, where instruction will be imparted. The works of art exhibited number some 350, and amongst the contributors are the names of Sir Fredk. Leighton, Sir John Gilbert, John E. Millais, Leslie, Pettie, Frith, Sant, Calderon, Alma-Tadema, Cole, Cooper, Davis, and others, whilst the pieces of sculpture are works from the chisels of Count Gleichen, Thornycroft, and Birch.

THE BUILDING NEWS.

LONDON, FRIDAY, MARCH 12, 1880.

A RECENT VISIT TO RUSSIA.—I.

RUSSIA is an Empire, the internal details of which are less known to the Western European than are those of any other country. This, so far as it relates to our sea-faring nation, is no doubt owing to its land locked situation, and to its by no means numerous ports being sealed with ice during the greater part of the year; but more especially to the barrier offered by the unintelligible character of the national language. Internally, it is a country where literature and science are highly cultivated; her geologists, since the classification of the rocks, by the late Sir Roderick Murchinson, are of the first rank; her highly-skilled engineers have developed the national wealth of her rocks, and to-day her mines are second to none in their wealth of metal, and her quarries are of that order that their equal is not to be found elsewhere. Her native forests, from which we draw such wealth of building material, are many and varient in their range and quality of timber. Her buildings are broad in their range: on the one hand we have the lowly wooden cabin, and on the other the stately church or palace, the erection of which has been caried out with a total disregard to cost. Her architecture is equally remarkable; that bearing the impress of antiquity being truly Asiatic, and prodigal alike in gold and colour, whereas that of the present day is amongst the most advanced and refined in Europe.

In the present instance it is our intention to touch upon the various points of interest presented by this great country, and in so doing we propose to lay before our readers some notes of a recent visit to the principal towns of the empire.

The great point from which the Western European enters Russia is

BERLIN.

This is a city of fine proportions and stately buildings, the streets of which are broad, clean, and remarkably level. As a city, since it put on the new garb of the capital of the great Empire of Germany, it is one of the most prosperous in Europe, its population having rapidly swelled until it now rates at over one million. The great street of the city is the *Unter den Linden* (Under the Limes), which runs from the palace, on the outskirts of the old town, to the Brandenburg Gate, a Classic arch or arches, occupying a stretch of 200 feet, crowned with a colossal equestrian group in bronze. The buildings lining this great street give it an air of magnificence, as they consist of palaces, opera houses, state and military buildings, churches, mansions, hotels, and public institutions, grouped with which are shops and restaurants of the first order. With few exceptions these buildings are of modern erection, the design and execution of which are highly commendable. The principal object of attraction to strangers is the great victory monument of 1870-1, erected in the park beyond the above-mentioned gate. Its forms is that of an elevated temple, circular in plan and Classic in design, from the centre of which rises the monument proper, to the height, inclusive of the statue, of 232 feet. This construction is wholly of polished marble and granite, and embellished with bronze and high-class mosaics, the latter being worked round the base of the shaft which forms the central core of the temple-like construction; the scenes depicted are the principal events in the late and other German or Prussian wars. On entering the station from the north, we were surprised to find it lit with a range of electric lamps suspended from the roof; our opinion of them, in this confined situation, is less favourable than in an open one like the Thames Embankment.

Our route lies along the Baltic coast, and we propose to glance in passing at the old Hanse or trading towns at the mouth of the great rivers, the first of which, situate on the Vistula, is

DANTZIG,

an old Prussian city of narrow streets and high-gabled brick houses, the latter mainly dating from the 16th and 17th centuries. The street architecture, although not without a certain degree of quaintness, is unpleasing to the English eye, being too German in its character. The details, where ornament is indulged in, are crude, and the general excecution inartistic. The great cathedral, or Marienkirchen, is a brick structure, 333 feet in length and 152 feet in breadth, and of amazing height; its erection dates from the 14th to the 15th century. The outer walls are peculiar for their broken line, and the general elevation from the absence of ornament and the enormous size of the windows. The impression you form upon inspecting this structure, is that Gothic architecture has here found its Northern limit, and in place of the delicacy and refinement peculiar to the South, you get great heavy features, the coarseness of which it is impossible to tone down. The most remarkable street in the city is "Fraugasse," lead-from the church to the river. The houses here are old in character and picturesque in outline, before them, and occupying the place of causeways in ordinary streets, are broad flight of steps with terrace-like accompaniments, which, being repeated on the opposite side, monopolise one half of the street, the remainder, devoted to a roadway, is paved with open gutters, into which the waste water from the roofs, conveyed in horizontal spouts running on the division walls of the steps or terraces, is discharged on or near the head of the passer-by. The materials of construction in this city differs in no way from those common with us, except that slates, always of English extraction, are rare, pantiles being the rule. In the warehouses skirting the river, some of which bear indications of age, the walls are of half-timber construction, the filling in being of brick, a system of building by no means uncommon in North Germany and in Prussia at the present day. As a port Dantzig is one from which we, in England, draw a vast amount of building material, notably oak, for ship and waggon building, and for other rough or heavy purposes. Like the English oak, that of Dantzig, is hard and tough, and, consequently, is but little used for wrought purposes. In fir or red-wood it is a great port of shipment, the goods being mainly hewn logs, sleepers, blocks, telegraph poles, &c., the virtue of which, like that of the oak, lies in its dense hard texture. Of late years, since the introduction of pitch-pine on such a large scale from the United States, the shipment of Dantzig fir to England has notably declined.

A further journey towards the Russian frontier lands us at

KONIGSBERG,

the ancient capital of Prussia, at the mouth of the Pregel. The old city is seated on a hill, or great natural mound, one half of which is skirted by the river. Occupying the crown of the hill is the old Schloss or Palace, which forms a great square with a court-yard in the centre. The south side of this immense square is formed of the Schlöss Church, the walls of which in their lower part are truly a portion of a great fortress. The upper part is very imposing, especially at the east end, where it overlooks the ancient market. The east side is formed of a quaint pile of buildings devoted to the purpose of a library. This, like the western arm, is of our Jacobean period. In the latter case, the upper floors are reached by winding stairs and wooden balconies, of quaint but imposing design, the coverings being a continuation of the main roof. The tower of the church stands in the angle of the court, and is of great elevation; high up in which, like the "bell-ringers of Notre Dame," dwells the sacristan. The general effect of this great fabric, with its conical-roofed towers attached to the outer angles, is very pleasing.

The character of the street architecture is in no way remarkable. This is no doubt owing to the seat of power being transferred to Berlin, and to the consequent check to the increase of the town; but the real cause of its unprogressive state in this century is said to be the heavy tributes exacted from the inhabitants by the First Napoleon.

Over the river, and pleasingly posed on its bank, is a considerable group of corn and goods warehouses of ancient half-timber construction. They are such that may have once occupied the river frontage of other and more southern towns, but which have been swept away by the advance of time. The builders of these stores were primarily the old Hanse town merchants, and their Dutch or Flemish character is traceable to this source. The ground or basement stories are built of unhewn stones, upon which the lighter superstructures are raised. They are all placed in a line on the quays, with their steep gables to the front; but they have no hanging stories. The upper part of the roofs are carried over the road or quay, the projection being quaintly trussed and bracketed for the accommodation of the windlasses by which the goods are hoisted to the various floors. The naked timbers are rarely shaped, a fact that is no doubt traceable to their being of hewn fir, a wood that does not correspond with our "builder oak," * its characteristics being straightness of growth. In the walls of the lower stories are rudely-carved trade-signs, or merchants' marks, most of which, in true heraldic style, are bright with gold and colour. These signs or devices, we are told, were the parents of those stencilled on the bags, bales, and packages of goods which in old and unlettered times passed through the hands of the respective merchants, a custom that is still followed in the marking of wood, where the marks are crowns, crosses, stars, arrows, or devices of letters.

The oldest-trade mark or device we noticed in the walls of these warehouses was 1588; but as a rule they were not dated until long after their construction, and then only in the case of their restoration, or renovation. This system is very misleading; but it is one well known to have been practised on old buildings in England in the last century. The nature of these devices may be briefly stated as follows. A bear with the initials, I.R.R. A rampant stag, and a goring bull. Mercury with a sealed letter in his hand. The dove leaving the Ark. A pilgrim leaning on his staff. A pelican. The Sun. The figure of Justice. A maid milking a cow. A woman with a child at her breast, under which is inscribed "AMOR." The dove and sun, a device that in one case is supplemented by a rose. We regret that these details were beyond the reach of Camden Hotten, Esq., as they would have furnished a pleasing chapter to his interesting work, "The History of Signboards."

The most noticeable feature in these old buildings is their mode of colouring, and herein we may say that they bear the impress

* . . . . "The builder oak,
Sole king of forests all."—*Spenser.*

of originality. As the question has often been asked in the pages of this journal, "how were our old half-timbered buildings coloured?" we propose to make answer by reference to these examples, which, to say the least, are truly charming. The treatment of half-timbered buildings of this kind, the erection of which is referred to this century, are—firstly black woodwork, with a filling-in of cross-bedded red brick-work; secondly, the woodwork the same, and the filling in, pebble dashed on the face and coloured brown.

The old examples noted above are smooth-drawn on the plaster-work, and coloured as follows—The woodwork finished black, and the plaster white. The woodwork a brick red and the plaster white. The same with the plaster grey. The same with the plaster brown. The woodwork blue-black and the plaster grey. The same with the plaster brown. In some cases the wood and the plaster are of one colour, viz, blue-black or lead-colour, and pea or light green. By the evidence afforded in our East-coast towns it would appear that this latter mode of colouring was at one time general in England, for it is a common occurrence to still find the houses painted in this manner, noticably in taverns, or public-houses.

Although these are safe authorities to follow in the introduction of colour to the half-timber constructions now becoming popular in England, it is beyond our reach to obtain the effect of these originals at Konigsberg, from the simple fact that there are literally streets of these old buildings clustered on this spot without the break or interruption of a modern building; the examples of colour are not single or isolated, and hence no small portion of the effect is drawn from their juxtaposition, and the variety of design and colour brought into the picture.

As a town Konigsberg is behind the times in sanitation, and in the summer-time it is generally visited by one or more of the grievous distempers common to England in the middle ages. Konigsberg is but sparingly associated with the shipments of building materials, being confined to such as are brought long distances by rail from the interior or south of Russia. Like most of these northern ports, the introduction of railways has given it new life, being of late connected by a short line with the open sea, by which means goods of the greatest value, or those most in need, can be shipped during the whole of the winter season, when the ordinary trade is interrupted by the frozen state of the river. This port is best known to us as the great mart for Amber, a fossil largely found on the neighbouring coast, from whence it is carried, as it was in times beyond the reach of history, to all parts of the world.

(*To be continued.*)

PORTLAND CEMENTS.—DANGERS AHEAD!

One of the most important constructive agents of modern times is in danger of degradation from the insidious action of fraudulent parties anxious to secure high profits by the agency of adulteration. For more than a quarter of a century slags of various kinds have been used to mix with this cement—before an accurate knowledge of its manufacture had made much progress. The intention of such admixture had a two-fold object, one being to check the tendency of a cement of light weight to expansion, and the other to meet the advantages which the increased specific gravity of the slag secured where cement was sold by the ton. Such expedients were only adopted, however, long anterior to the general use of the testing machine, and the practice remained unchallenged until it was found that the increasing quantity of the adulterant resulted in a weakening of the tensile and compressive value of the cement, rendering its use questionable, and even dangerous. The beginning of this method of introducing foreign substances into a powder of Portland cement has had most pernicious results, for it encouraged the idea (not yet exploded) that sand and similar materials continue to be used for improper purposes; and, curiously enough, the best cements, which were made specially heavy, raised the greatest amount of suspicion and doubt. The cause is readily understood, for imperfect grinding left a large percentage of residuum incapable of reduction, which in character and appearance resembled coarse sand, reduced slag, or comminuted stoneware. Although highly improper and undoubtedly fraudulent, such additions in moderate proportions were only negative in character, and simply pre-occupied so much space which would have been more cheaply, if not more beneficially, absorbed by the sand of the mortar mixture. The more recent and continuing application of the slag adulterant is in some measure due to the improved quality of Portland cement now generally manufactured, which leaves a considerable margin between the presented tests and its actual strength. The distiller reduces the products from his still by an addition of water to level the spirits to the acknowledged standard; and, when he exceeds or falls short of its level or datum, arranges its price accordingly; but when the adulterant is pure and innocuous, no objection need be made. The cement-maker, who, by the liberality and ingenuity of his system of production, can readily exceed the maximum tests imposed by his customer, may also, like the distiller, reduce the strength of his powder to the standard by which he is assessed. The more economical means to adopt would be to reduce the fuel cost; but in this direction he is sometimes unable to protect himself from being under the obligation to give cement of a high specific gravity; so that, while fulfilling the conditions in one direction, he is saddled with an excess of strength or loss to him in another. A cement weighing 112lb. per bushel, when accurately powdered, can readily meet the requirements of a test of 350lb. to the square inch; but the weight standard may be, and frequently is, 118lb per bushel, so that the difference against the maker under such circumstances is exceptionally hard and unreasonable. During a period of high prices, such an anomalous condition of things does not press so hardly on the producer, but when successive competition and low prices occur, recourse is had to improper means to maintain profit. He has now reached these times, and the correspondence and discussion at present prevailing on the question of adulteration of Portland cement with slag indicates that it will, if it has not already attained dangerous proportions.

Slag produced in the iron industry is abundant in many districts of England, Wales, and Scotland; but at present it may be regarded as a worthless waste, notwithstanding the more or less successful attempts for its utilisation. Its chemical value and resemblance in analysis to a good Portland cement indicates its suitability for purposes of adulterating that article, and the charge is made that it is now used extensively for that purpose. If so, in the interest and protection of the constructive profession and the public generally, a chemical test will have to be instituted to guard against the dangers of such a combination. We shall shortly state why such a course is imperatively necessary to check the use of so undesirable a compound as Portland cement and iron slag. Slags are of various kinds, according to the quality of the ores from which they are produced, and the fuel and fluxes used in the fabrication of the pig-iron. The best and least objectionable, however, have, in their chemical constitution varying quantities of protoxide of iron, sulphide of calcium, and magnesia, all of which are, even in moderate amounts, unsuitable, and we may say unsafe, to mix with Portland cement. In their physical characteristics slags have a striking resemblance to Portland cement "clinker," as it comes from the kiln, and, when reduced to powder, are still more similar in colour and general appearance.

In cost, however, there is a great difference in value, and hence the temptation to adulterate with slag. The majority of slags, when added to the "clinker" and ground together through the millstone, induce an energetic initial set of the powder, and generally realise high tensile breakings when the briquettes are kept out of water. Under the action of water, however, but sometimes very protracted in its character, the dangerous quality of the obnoxious ingredients named becomes apparent in the gradual degradation of the sample. We could not give a better illustration of this action than is to be seen in many districts where the slag heaps are *dusting*; and, indeed, in some of the earliest mounds, so much so has this progressed as to enable the surface to be used for agricultural purposes. The soil thus produced is found to be a fertile one, for it contains the best elements of fertility in the silica, lime and alkalies. They are, however, in a concrete or mortar mixture, dangerous ingredients; and in structures (more especially in those under water) where they are employed, the same influences which degraded the slag will ultimately reduce to powder the most elaborately-fabricated mortar. The use of slag, therefore, in any form, either as a silica agent in the manufacture of Portland cement, or as an adulterant in its finished state, should be avoided, unless some preliminary treatment of purification or elimination of the obnoxious ingredients referred to has been resorted to. We have no experience of what can be done in this direction, but we think to get rid of sulphide of calcium would involve so expensive an operation, even under the most successful circumstances, as to preclude the chance of its being resorted to—at least, for the adulteration of Portland cement.

Although Portland cement has, during late years, been made of good quality, and the fortunate rivalry amongst engineers to secure a first-class article has resulted in much good, there is still in some quarters a feeling of unrest and desire for something novel. Eccentric machines for testing, or senseless methods of treatment of the briquettes to be tested, seems to have been followed by mixtures of discordant ingredients in the belief that Portland cement can be *improved*. The simple and inexpensive character of the raw materials for producing a good cement, and the now well-known processes by and through which it is fabricated, preclude the possibility of introducing any cheaper material capable of producing like results at equal cost. If any improvement is to be realised, it will be found in the direction of the fuel cost and machinery of reduction, which departments of this industry are having due and reasonable consideration. Chalk and clay are, indeed, so plentiful in this country that there is neither immediate nor remote chance of their rising much in value. No substitute for one or the other can be found more suitable, and the builders may well feel confident that good cement from these materials can be at all times forthcoming to meet their most extended demands.

In these remarks we have assumed that many of our readers are well acquainted with the process of making Portland cement, or, at all events, understand that there is no secret in its practice, neither is there any risk in using it when they practise the most

ordinary and well understood rules for testing its quality, and guarding against its dangers when imperfect. Although this well-known cement has only been known by its general name of Portland, the rudimentary experiments which led up to its discovery may be said to have been originated by Smeaton in the middle of the last century. In his Eddystone experiments he proved that the hydraulicity of limes was due to the presence of *sand* or *clay* in their original mineral condition. Biat in France, and Pasley in this country, followed on Smeaton's lines, and Aspdin, in 1824, boldly—at least, for such a humble investigator — boldly adopted all previous knowledge, which, added to his own, culminated in his obtaining Letters Patent for the manufacture of Portland cement. The simple task of rendering ordinary limestone dust or mud hydraulic, capable of setting under water, was easily performed, and more especially when the easily-combined chalks and river clays were operated upon. The blunders committed by the early makers were due to the want of chemical knowledge, which could define with accuracy the exact proportions of the carbonate of lime (chalk) and silica and alumina (clay or river mud). The means adopted were varied, according to the experience of the operator; but usually the accurate admixture was accomplished with water as the combining vehicle. There is a gradual lessening of the hitherto objectionable amount of water so employed, and at some works on the Thames the barest quantity is now used, resulting in a considerable saving in cost. Additional machinery of a special character performs in a much less space of time the same desirable and indispensable combination or blending of the raw materials. A process which originally occupied several months in its performance can now, with equally beneficial results, be performed in a week or ten days.

Instead of differences in the mechanical tests for proving Portland cement, we should advise the adoption by all consumers and producers of one common standard, and thereby facilitate the comparison of qualities, and thus avoid differences which, under existing circumstances, are practically irreconcilable. If an approaching danger like that we have referred to should attain serious dimensions, or its progress become incapable of being checked, a new chemical test must be prepared to stultify its effects and render abortive the schemes of the dishonest or misguided adulterators. If we will have adulterated cement, let its sale be controlled by some such rules as regulate the sale of butter, and other articles of daily consumption.

In what we have said in reference to this question of the use of clay we wish it to be clearly understood that we do not object to its use as a constructive agent. As an aggregate, under certain controllable conditions, iron slag can be made exceedingly useful; but we protest against its being used as a binding agent of either mortar or concrete. In the concreted mass, wherein it only plays a comparatively subordinate part, the extent of danger, where it may exist, can be readily measured and controlled, which cannot be done when it is intimately incorporated with the cement.

THE INSTITUTE OF ART.

THE exhibitions of decorative work by ladies, held by the Institute of Art, at the Conduit-street Galleries, appear to grow in interest and popularity, and the opinion we first expressed of the promise of this recently-established society has been justified. The quality of the work is improving, and though there are, almost necessarily, a great many specimens of workmanship that show a need of art-culture, the influence of the council in setting a high standard of taste is beginning to make itself felt. To this end, in fact, the Institute have availed themselves of the services of competent judges in the various departments whose names are a sufficient guarantee; we may mention those of J. C. Buckmaster, Esq., Somers Clarke, Esq., junior, William Niven, Esq., assisted in the needlework by the Hon. Mrs. Armytage, Miss Drew, and Captain Wündt. Needlework, as usual, forms the most important feature in the exhibition, and the large gallery is filled on the tables and walls with every variety of work, from children's robes to the richest embroideries for curtains and hangings. We have only space to mention a few of the remarkable exhibits in this class. Mrs. J. Elliott obtains the prize for a tastefully-worked screen in embroidery. In place of staring red poppies and giant hollyhocks, this accomplished artist has selected a quiet spray of flowers and daisies worked in crewels and silk upon a nicely toned oatcake cloth. A Japanesque *motif* prevails, but the chief merit of the work is in the quiet colouring. Each fold is a suggestive picture. The same lady's "Bird of Paradise Screen" is even a more charming piece of workmanship. It is a perfect picture in embroidery, though the design and the grey ground and the tints of citron and gold take it out of a mere pictorial representation, and the whole conception is in excellent balance and harmony. There are few subjects that admit, however, of a nearer approach to the pictorial treatment than screens, and Mrs. Elliott, while exhibiting her dexterous handwork in the representations of flowers and plumage has taken care to generalise her drawing and colours in conformity with the rules of conventional art. The judges could not have had much difficulty in awarding the prize to this lady. Mrs. Elliott Scrivenor wins an extra prize for some silk crewel-worked curtains. The curtains are of a rich cream-colour sort of sheeting with a neat blue folial border of conventional design worked upon it. Honourable mention is bestowed on several other ladies for their work. One, a handsome pair of crewel curtains, designed and worked by Mrs. G. H. Seward, in which a boldly-drawn poppy pattern is worked on a grey material, the contrast between the rich red of the poppies and the ground being particularly effective; Mrs. A. M. Atkinson and Miss D. Stopford also deservedly win this distinction. Some of the most pleasing curtains for dark rooms are those of a light material, such as a creamy tint of satin, or waste silk fabric enriched with a light folial or spray pattern. Unbleached linen sheetings, twilled and diapered fabrics, appear to be chiefly used for this purpose, and these grounds take crewel and filosel embroidery remarkably well. In some of the specimens we notice the different directions of the stitches are made to give variety of shade and tone to the flowers and leaves, as in Mrs. Scrivener's and Mrs. Seward's work. We must also give a word of praise to Miss Tapson's fireplace curtains, embroidered with a rich foliage pattern in gold on plush velvet-bands on a blue-green material; Mrs. B. Pigott also contributes some choice work. Her folding screen No. 555, is a light sage or greyish ground canvas with conventionalised flowers painted on it. Another screen, by Mrs. Horace St. Paul, is a little "loud" in colour and design. We notice a table-cover by Miss Pigott, of red cloth ground and green foliage, with white flowers; a well-executed piece of embroidery by Miss Oldham, an Ottoman cover of silk embroidery on a maroon-coloured cloth; a banner screen; a piano-back by Mrs. Toller with green leaves and white daisies, a chair-back on green material by Mrs. Kaye, and an original design for dress-trimming by Miss A. Dolton, are characterised by good design and careful workmanship. Mrs. Elliott Scrivenor sends a few choice embroidered robes for children. We notice a handsome bracket-trimming embroidered with Indian beetle wing and gold thread on black satin. We were struck also with a piano-panel embroidered with sunflowers on a sage-green ground, and there were many good specimens worked on satin or brocatelle suited for cabinet panels. In lacework the prize has been awarded to Miss Frances Keane for some beautifully-worked Venetian point of rich design; Mrs. Parker and Miss Hoge receive honourable mention in this class. The visitor to the Institute will find a variety of miscellaneous fancy work, such as work-tubs, embroidered mantelpiece hangings, mirrors with stamped leather trimmings, painted fabrics, carved work, &c., showing the large scope of this Society, and the facilities it offers to lady-producers for the disposal of their art-work. Miss Forster obtains the prize for painting for decorative purposes.

In the class of painting on china and pottery we observe a few productions, though not of sufficient merit as works of art to call for special notice. The distinction of honourable mention has been given to Mrs. Nesbitt for a large painted plaque, displaying boldness rather than delicacy in drawing and design. The pattern is foliage conventionally rendered on a deep blue ground. Another plaque, by Miss Power, with birds on a spray of tree, painted in brown on a light buff ground, exhibits care, but the design is straggling, and lacks grouping and composition; it receives honourable mention. Miss Edith Rowlandson also obtains this distinction.

One of the galleries is set apart for paintings in oil and water colours. In the former we do not notice any work of special merit or power: a reason why there is no prize given for oils this time. There are a few good copies and studies. We may mention Miss G. Bell Irving's "Portrait of an old Man, after Rembrandt" a massively-painted head, evincing power; the "Old Hulk," by J. McAlpine, broad and effective in the touch, and the artist has given an idea of the freshness of the sea and atmosphere and the aërial appearance of the clouds.

"Tranquillity" is a pleasingly-conceived subject, a stag standing in a broad sheet of water in an extensive marsh. It is by Miss Hortense Wood. We have seen somewhere before Mr. Ludovici junior's fancy little canvas, entitled "Many Happy Returns of the Day," which receives honourable mention: it is certainly a clever bit of manners and costume of the French Court. Miss Beatrice Abbott's little study of a girl, called "A Brown Study," receives also honourable mention; so does Miss Scannell's picture, "When I was a Maiden," clever in drawing and expression, but crude in colouring. In the water-colours, there are a few highly creditable works. "Waiting for the Dance," by O. Cartandi, is a masterly sketch of a young maiden attired in a bright silk, which is handled with vigour and precision. "On the River at Nottingham" is another bold and sketchy subject, to which honourable mention is awarded. The drawing of "Rue de l'Horloge, Rouen," is a good subject; but the execution is feeble, and the drawing not up to the mark—it indicates promise. "The Forum, Rome," by H. Medlycott, is creditable for an amateur: and the honourable mention is well bestowed on Miss E. F. Jackson's beautifully-painted "Bowl of Roses," a very charming study of flower-drawing and colouring. The roses are enhanced by the turquoise bowl in which they are placed and the deeply toned background, and the study is one that will add to the laurels already earned by this accomplished flower-painter. As a study it was fully deserving of the prize, but we presume the judges took into account the successof Miss Jackson last time, and have bestowed the prize on Mrs. Warner Sleigh's fancy figure-study, "Zephyr," a pretty conception poetically embodied in the figure of a child

reposing on and wrapped in clouds. Honourable mention is also worthily won by Mrs. Guerin, in her delicately-coloured "Azaleas," and by Miss Power, for her able study of a girl's head. Mrs. Burton and another lady are also recipients of this honour. In conclusion, we need only say the galleries are well worth a visit from all interested in artistic culture, and the council and secretary deserve the success they have already won.

LAMBETH POTTERY.

MR. JOHN SPARKES, well known by his connection as an artist with the Lambeth Pottery, read a very instructive paper, at the Society of Arts on Wednesday, on the above subject; the paper, in fact, is a sequel to one read by Mr. Sparkes in 1874, and dwells on some new methods. The author first described the Lambeth ware, and showed in what properties it differs from other pottery-ware, as earthenware, china, delft, &c. In stoneware no second firing, as in the ordinary ware, is necessary to produce the glaze, for a single firing converts the dry clay into a glazed piece of pottery, and it is in this peculiarity the difficulty of decorating Lambeth ware consists. The heat necessary also is great; and this, the fusibility of some colours, and the difficulty attending the "salt glaze," were originally a source of trouble. Mr. Sparkes said that the fumes of chlorine and steam which escaped from the kilns at Lambeth in this operation are not noxious, but have disinfectant qualities; and he also describes this gaseous glaze as very hard and thin, that it does not run into thick and uneven surfaces as other kinds do. The ware at Lambeth is burnt without the use of "seggars," which are fire-clay boxes in which the ware are placed. The older methods of decoration used in 1874 may be summarised as follows:—1st. Scratching or cutting the pattern in the clay after it leaves the thrower's-wheel, by which means the colour is limited by the mechanical projections made by the tool; 2, cutting into the clay some hours after the piece has been thrown; 3, whitening the body; 4, dipping the ordinary body, usually brown, into a "slip" of lighter colour, by which means the surface can be cut through so as to expose the darker tone of the body; 5, carving out mouldings in relief; 6, the application of dots, discs, rosettes, &c., from moulds; 7, stamped patterns for the lodgment of colour. Mr. Sparkes next proceeded to describe various improvements that have been introduced, such as setting the ware in the kiln, and in other details of the decorative processes. The new "bodies" which have been discovered of late, which work well in the salt-glaze kiln, were first described. These comprise bronze, green, brown, black, blue, chocolate, grey, and white, and many specimens were exhibited to the audience. Allusion was made to some "so-called jasper bodies," a term used by Wedgwood, "a dry, unabsorbent texture"; not taking any marks from soiled hands, which takes various kinds of decoration: such as stamped, or applied ornament, or any colour. Examples of red, brown, grey, blue, and green ware were exhibited to show this. The bronze body has a close resemblance to the metal, and its future development as a material well suited for the exhibition of form was alluded to by the lecturer. In the jasper-ware the mode of decoration consists in a repetition of small parts of a pattern so as to form a whole, and the results are spoken of as highly beautiful. Other new modes of decoration consist in applying strips of coloured clays to the soft ware, and worked into the design, and in dipping the clay ware in "slips" of different colours, and afterwards scratched through; these "slips" being a clay, natural or coloured, diluted with water into the consistency of cream. The film of clay is then scraped through in lines, and the body colour shows through as a pattern. A fine vase with a bold folial pattern was shown, in which the background was scraped away. Many most delicate contrasts and harmonies of colour can, as Mr. Sparkes showed, be produced in this manner, and he mentioned that an effort had been made some time ago to obtain the blue-grey ground of the old Rhenish ware by the use of wood as a fuel. The difficulties had been overcome at last; and he pointed to the revival of the old pottery of the districts of Greuzhausen and Höhr, in Germany, which is filling our shops with specimens of crude blue-coloured ware—unpleasant imitations in which cobalt is used, a kind of ware too well known to need comment. Another method of decoration consists in raising or scolloping the margins of the patterns by pressing or modelling strips of clays laid on the vessel while soft, which plan gives variety of light and shade and colour. The most important introduction as a decorative method is called *pâte sur pâte*, or the method of decorating one body or paste with another of a different tint. This material was produced to show at the Paris Exhibition in 1867, and has since been worked with great success. To paint with the earth pigment requires great decision of hand and experience, and the peculiarity of the manipulation, the lecturer says, has produced a conventionality in the decoration, and a crisp-leaved sort of parsley or fern pattern, seems to be most easily adopted. A few beautiful specimens, with fine ornamentation, were shown. It is said that eighteen colours and tints are now able to be worked in these ways, giving an infinite variety in combination of colour and form. By an accurate adjustment of flux and pigment, the difficulties in the art have been overcome, the body and colour adhere, and a semi-transparent effect is produced. The manipulation of the clay while plastic has been turned to excellent account in the decoration of saucers, dishes, &c. The edges of ware can be scolloped, fluted, frilled, and variously formed at the will of the artist. Specimens of these, some very tasteful, were exhibited, displaying every combination of form and surface ornament, formed by depressions, spirals, and other devices. One mode of decorating these hand-moulded pots is by placing a ribbon or inlay of pierced work over the depression, so that the effect is that of a perforated band of ornament with a rich background, and the plan is said to be unique in stoneware. The names of Geo. Temworth and Frank Buller are given as two artists who have done most to develop this elaborate decorative mode, together with the late Arthur Barlow, who laboured to the last in making beautiful discs for appliqué work. The system of moulding a modelled piece of ware is discouraged as leading to mechanical reproduction, but in some vases, after the body is thrown, the separate leaves of the foliage or design are impressed on it. Allusion was made to designs in which Japanese devices are introduced, and the work of one artist, Mr. Cund, was mentioned. Japanese and Chinese dragons are his favourite subjects, and these he introduces with a spirit and fiendish energy that is remarkable. Other examples of modelling on the thrown ware were given by Mr. Sparkes. We must not omit to mention a new application in the shape of wall-decoration—a kind of mosaic formed of small pieces of stoneware closely fitted, keyed together with bosses or buttons of colour. The effect is bright and rich, is indestructible, and can be easily cleaned. The variety of diaper treatment of grounds in the vessels were referred to, and Mr. Sparkes concludes this part of his interesting and instructive lecture by naming the leading artists in the Lambeth potteries who have worked well in the recently-introduced branches of the art, together with their monograms.

The second part of the subject, relating to Lambeth faïence and impasto ware, is next referred to. After giving an historical outline of this kind of ware, Mr. Sparkes spoke of the manufactures in this ware carried on at Lambeth. The demand for a ground-colour, and for a more comprehensive treatment of plaques and panels in this material, has chiefly actuated the Lambeth artists. Over-ornamentation, as in the small and highly-finished productions of China, Japan, and Persia, is not attempted, but the decoration is limited. The material admits of engraving, from mere ornament, as in a tile pattern, to the finish of a miniature. The imitations made of Persian and Rhodian designs are excellent in their way, and many examples of vases enriched with folial and other designs were shown. General rather than finished effect in painting has been aimed at, as the uncertainty of the fire and the difficulties of the pigment prevent a close rendering from nature. Slavish copies have by this method been avoided. The "impasto" ware is the most capable of receiving artistic impressions. In this kind, the colour is applied to the raw clay, and is so thickened by the vehicle in which it is used, that it models as well as paints; and the effect of relief adds to the reality. "Impasto-painting," says Mr. Sparkes, "has all the advantages that opaque *tempera* or art-painting possesses." A beautiful specimen of the process was shown, in which a creamy-white pattern is painted on a red-brown ground. The impasto method gives an opportunity for a second colouring with under-glaze colours. The method has not been applied largely yet. Mr. Sparkes touched upon tiles for household decoration, and many, excellent for pattern and colour, are made at Lambeth, as our readers know. The lecturer concluded his paper by giving the names of several lady artists in this branch, we may mention Miss Florence Lewis, as a skilful painter, Miss M. L. Crawley, Miss Mary Capes, Miss K. Sturgeon, the Misses Armstrong, Stable, Shelly, and several others who are adepts in special treatments in the painting of faïence. The names of Mrs. Arthur Pearce as a designer, and Mrs. Vale as an impasto-painter, are specially mentioned.

THE ARCHITECTURAL ASSOCIATION.

[Asylum planning.]

(*Concluded from p.* 275.)

RECEIVING WARDS. — The Commissioners in Lunacy say, in their instructions:—"In all large asylums it is desirable that there should be a small reception-ward in both divisions, in which patients upon admission should be placed for a certain period under special observation." These may be distinct blocks in themselves, and may be placed on the north side of the main corridor (as shown on the plan), unless (as in some cases there may be) there is space on the south side. For the comparatively short time a patient would remain in this ward, the aspect would be of little consequence. But the scenery in many cases would be equally fine, and there would only be less sunshine at certain hours of the day. The receiving-block could be a single-story building, the dormitories all being on the ground-floor; or it could be a two-story building, the upper-floor being appropriated to special cases requiring special attention. These matters can only be decided as the cases arise, and will depend on the views of the medical superintendent. The patients would "remain in the receiving-ward under close observation until a clear notion has been formed of the nature of their case." As I have elsewhere pointed out, some medical men use their infirmaries for this purpose, and others object to receiving-wards altogether on several grounds. (1) "The recognition of a pretext for delay in diagnosis

and consequent injury to the prospects of a patient. (2) The serious evil of throwing together in the closest relation, cases which perhaps ought to be kept apart at a time when their mental condition is likely to be peculiarly susceptible to morbid influences." But I do not think these objections will hold good in a well-arranged and well-managed receiving block. In this block there should be good single rooms—cheerful in appearance and free from the characteristics of a prison—where the patient may spend his first hours without an overwhelming sense of captivity, but with comfort and in comparative rest. The receiving ward should in every instance be placed near the administrative block, so that frequent visits by the medical officers may be paid without inconvenience.

Infirmary Block.—The infirmary block should be placed near the administrative block. The number of patients in the infirmary wards should be calculated at one-seventh of the whole number. Each infirmary should have a day-room, and also a small kitchen with a cooking-stove. The fireplaces in the infirmary wards, if placed in the centre of the rooms, should be dwarf fireplaces, and should not be carried up to the ceiling. The cubical contents of the dormitories should be one-third more than that allowed for ordinary dormitories. Every room in this block, including the single rooms, should have an open fireplace. In many asylums the infirmary block includes a receiving ward, a ward for suicidal cases and others requiring constant attention and supervision, and a ward for bedridden patients. Where this arrangement is followed a separate staircase should be provided for the receiving-ward. This staircase should open out from the main corridor, and should not be connected in any way with the infirmary wards. A verandah for the use of recovering patients in the warm summer days should be provided on the south side of the infirmary corridor. Such patients as could be removed here on movable couches or easy-chairs during the warm weather would be hastened in their recovery (if curable cases) by the fresh air and sunshine that could be here enjoyed, but which could not be so perfectly obtainable in a hospital ward. A dormitory for, say, eight or ten patients might be advantageously placed on the ground floor in the infirmary block for the reception of certain cases; for instance, those patients who are sufficiently strong to leave their beds in the daytime, and others also who are suffering from injuries or diseases that do not confine them to their beds at all. Day-rooms should not be placed on the upper floors. Dormitories that are vacated during the day offer facilities for thorough airing, whereas those that are partly or wholly occupied never get thoroughly sweetened. Sleeping-rooms for bedridden patients should, therefore be allowed a greater number of cubic feet per patient than ordinary sleeping-rooms that are vacated during the day. Of these principal blocks a book might be written, but I am compelled to touch on them very lightly, and give only a few words to each.

Epileptic Wards.—As epileptics are, as a rule, "the most dangerous, impulsive, and unreliable of all lunatics," and are, more than others, given to plotting and combining together, the day-rooms and associated dormitories for the reception of these cases should be so planned that there shall be no escape from the attendant's eye. Even in the day-rooms there should be no bay-windows or recesses of any kind that could screen them from observation at any point. Much given to excitement, and, before their characteristic convulsions, liable to commit foolish acts that may in a few minutes disturb a whole dormitory, it becomes necessary to place them under constant and complete supervision. Dr. Sheppard says: "It is not fair to non-epileptic patients to scatter epileptics among them in associated rooms, and it is unsafe to put a number of epileptics together in one room. . . . Their great requirement, therefore, is single rooms. But the structural expense of our county asylums is so increased by a number of single rooms, that we are unable to get all we want. We are compelled, therefore, to associate the most harmless, and isolate the most dangerous. This isolation must be complete. Each single room must be a single room in the real sense of the expression, and not a mere division of one chamber into stalls open at the top—the lateral elevation of each stall being, perhaps, 4ft., for what is called complete inspection *en masse* by the night-watch. I believe, therefore, that the only real security, from themselves and from others, of dangerous epileptics lies in single visitation—i.e., in frequent (say every hour) inspection of each dormitory. There is an obvious objection to this. The unlocking and relocking disturbs and irritates, and complaints are often made about it by the patients themselves; but in doing this many an epileptic is saved from asphyxia by turning his face upon the pillow during a fit. I have the majority of my epileptics as near the head-quarters of the chief night-watch as possible. He knows those who are given to turn on their faces, and he knows the varied sounds and thick breathing which precede and accompany the seizure. It is very rarely that I have a patient suffocated—not once in two years. This is saying a great deal, and, as I take it, is an evidence of our watchfulness. It is worthy of note that many epileptics, both by day and night, are most indignant at being scrutinised and watched too closely. They protest in the strongest language, and are impressed with the most intense belief that they never had a fit in their lives." Some epileptic patients are sane for days and weeks together between their fits. When another fit is coming on, and this can be observed, the patient is removed to a single room. Two single rooms, at least, should adjoin the epileptic dormitory, which may be placed on the first-floor, although its better position is on the ground-floor, provided, of course, there are no difficulties in the way of its being placed there. The attendant in the epileptic block should never leave it at night, and the bedrooms of the day attendants employed in this block should be situated within easy call, so that they may be ready at any moment to assist the night attendant in case of need. Epileptics sometimes combine to attack an attendant or patient; and, therefore, this precautionary measure is imperatively necessary. In the superintendent's report on Hanwell Asylum, in 1874, speaking of the female side, in which there were 124 epileptic patients, he says: "Twenty of them, on an average, must sleep in single rooms, on account of their violent and irritable dispositions."

The Chronic Block.—This block is the simplest to deal with, and what I have said generally about the other blocks will apply to this block also. All the provisions should be simple and inexpensive. Brightness, cheerfulness, comfort, rest, are effects that may be obtained without extravagant outlay. They should be secured here, for these buildings (that we as architects are called upon to design) will be the last homes for thousands of hopeless sufferers in the time to come, and we should spare no pains to secure for these incurable and lingering patients at least pleasant, comfortable, and healthy habitations, even if we cannot provide them with happy homes.

Dimensions of Rooms.—The dimensions of the various rooms, and their cubical contents, and the superficial area provided for each patient, should be in conformity with the instructions issued by the Commissioners in Lunacy. But it is a matter for consideration whether these minimum allowances should not in some cases be exceeded. It is a question that is governed by the consideration of cost. If this should not prove an insuperable objection, the heights of the various wards might be increased beyond the limits laid down in the Commissioners' instructions. According to these instructions, no story should be less than 12ft. in height. In the case of the infirmary blocks and hospitals for infectious diseases, this height would, of course, have to be considerably exceeded.

Air.—Cubic feet per patient: "600 or 800 cubic feet of pure air is the smallest allowance compatible with health, and the need is even greater by day than by night, because of the vapours and exhalations from the body."

"The lowest respiratory conditions of life may be assumed to be the following:—With a pulse beating 72 per minute the respirations will be about 18, and at each respiration some 20 cubic inches of atmosphere will be taken into the lungs, and 1 cubic inch of oxygen consumed. One cubic inch of oxygen multiplied by respirations at the rate of 18 per minute gives 1,080 cubic inches of oxygen, equivalent to 21,600 cubic inches, or 12·5 cubic feet of pure air deoxydised each hour. Assuming day-rooms in a state of perfect rest and abstinence, the smallest quantity of pure air on which life could be maintained is, therefore, 150ft." Hermann observes:—"By the influence of work the consumption of oxygen per hour may be increased" to about five times this amount. "Who works harder than the busy and turbulent lunatics?"

Dayrooms.—The dayrooms should be arranged and should be fitted up so as to present an appearance of cheerfulness and an air of comfort. They should have open fireplaces and large bay windows, and should command an excellent view of the country to the south and to east or west, as the case may be.

All dayrooms appropriated to the aged, infirm, and excited patients should be on the ground-floor, and, indeed, except in very special cases, the whole of the dayrooms should be arranged on the ground-floor, and should have ready means of communication with the airing-yards or grounds. Where there are no corridors of the minimum width of 10ft., 40 superficial feet should be allowed for each patient. "Where corridors of that or any greater width exist, the dayrooms may afford only 20ft. superficial for each patient, it being understood that a space equal to 40ft. superficial be provided for each patient in dayrooms and corridors combined. Mere passages of communication are not to be considered as corridors." So say the Commissioners; and they add:—"The windows of the dayrooms and corridors should be large, having oak sashes double hung with wrought-iron sash bars, not more than 3ft. 6in. from the ground, and made to open easily, and so as to allow a free circulation of air, but not so far as to expose patients to danger. The wall below should not be sloped or splayed, but recessed to admit, if requisite, of a seat. The dayrooms should have boarded floors, and it is desirable that the boards should be tongued oak floors; capable of being cleaned by dry rubbing are preferable. Where oak is not used, it is indispensable that they should be of the best yellow deal, and thoroughly well seasoned."

The dayrooms may be decorated and furnished with much taste. Paintings and stencillings on the walls, curtains to the windows, aviaries and flower-stands, plants, statuettes, coloured hearthrugs, &c., may be freely introduced with excellent effect and at reasonable cost.

Variety in Planning.—A pleasing variety even in the form, size, and arrangement of rooms, their colouring, decorations, furniture, &c., should be adopted where possible without making any sacrifice to secure it. A diversity of clothing, of occupation, as far as possible, even of food, are essential, and ought to form component parts of the governing idea.

Dormitories.—We know how valuable sleep is to sane men. It is, if possible, more valuable to insane men, and it becomes a serious consideration for those who are engaged in building lunatic-asylums how best to provide such dormitory accommodation as will (so far as it is practicable) insure quiet and rest to those who are destined to pass the long nights of their lives in these melancholy chambers.

To my mind, the placing of forty or fifty patients in one room is about the least likely arrangement to attain this end. No gain on the ground of more effective supervision can compensate for the comparative unrest of patients who are thus herded together in one dormitory.

"It is well known," says Dr. Ray, "by medical men that if there is one bodily condition more restorative in mental diseases than another it is sleep." In large dormitories "patients disturb one another, as persons less excitable would, and for many, sound regular sleep is out of the question." Further, Dr. Kirkbride says:—"About one-fourth of the patients in a state hospital may probably be lodged in associated dormitories without material disadvantage, and perhaps a twelfth of the whole number may really do better in associated dormitories than in single rooms. These last are principally among the timid, who dread being alone at night, and some of the suicidal, who will remain quietly in bed if another patient is in the room, but who could not be trusted without company. The great majority of patients would strenuously object to such an arrangement just as much in a hospital as they would in a hotel or boarding house; and most of them regard with especial feeling the privilege of enjoying at times the privacy and quiet of their own rooms. A certain portion of the patients may, without disadvantage, be lodged in dormitories containing four to

six beds, and communicating by means of a partially glazed door with the room of an attendant."

Inspection that is made too easy in the doing is often not done at all, so that large dormitories, in which there is a good view of all the beds, do not afford any guarantee of efficient supervision.

The attendants' room adjoining a dormitory should not be made too comfortable, or it will induce what is known as "skulking." An attendant's place is in the ward, not in the room adjoining.

Dr. Granville says dormitories "for 4 or 6, instead of for 30 or 40 or more, would be more homely, without any loss, possibly even a gain of efficiency." The sleeping-rooms should be entirely separate from the dayrooms.

In the new Hull Asylum it was required that "a special dormitory for epileptics and suicidal cases should be provided, to hold about 40 patients, and in a position easily accessible from any part of the building."

In all or nearly all asylums, the epileptic associated dormitories accommodate too many patients.

Single Sleeping Rooms, when many in number, are more difficult to superintend.

They should have, according to Dr. Oppert, "a bed with horsehair mattress, a chair, a bedside carpet, and allow a cubic space of 1,000ft. This will be sufficient," he says, "as they are not occupied in the daytime."

The urinals provided in single rooms should be self-acting.

Dr. Jacobi says: "A grey is to be chosen" for the colour on walls, &c., in single rooms, "because it renders the soils and scribbling and daubing on the walls less visible, and holds out less inducement to the patients to indulge in such practices."

The relative number of associated rooms and single rooms "must be left wholly to the determination of the superintendent."

Proportion of single rooms to patients:—

In one of the Surrey asylums	1 to 3½
In the other	1 to 9½
(Rate of maintenance same in each).	
In Wandsworth in 1859.....	1 to 5
" " 1869.....	1 to 4
" " 1875.....	1 to 3

The Commissioners in Lunacy say: "The proportion of single rooms throughout the asylum need not exceed one-fourth. The single rooms should be chiefly in the wards appropriated to the excited and the sick, but a few should be available for special cases in the other wards."

"The associated dormitories for clean and healthy patients should not contain less than 50 feet superficial to each bed or patient. No associated dormitory should be designed to contain less than three beds.

"The separate sleeping-rooms generally should be of not less than 63 superficial feet. Those appropriated to sick or bedridden patients should be of larger dimensions, with extra means of ventilation, and should be provided with a fireplace. Fireplaces should be built in all associated dormitories. Particular attention should be paid to the night ventilation of the dormitories, which would be promoted if gas-burners were placed under properly-protected ventilators in the ceiling."

"In the dormitories and single rooms the windows should, as a general rule, not be placed more than 4 feet from the floor.

"Strong solid shutters should be provided for a majority of the single sleeping-rooms. The doors of the single rooms should open outwards, and be so hung that when open they will fold back close to the wall."

The domestic servants of the institution, and the patients who habitually work in the kitchens, might together occupy associated dormitories in the administrative block.

Attendants' Rooms.—When an attendant goes to bed he expects to sleep, but his bedroom is sometimes placed very unfavourably for this. It should be placed convenient to the dormitory, but not opening out of it.

An attendant should not have to pass through a dormitory to reach his own bedroom. They are not all teetotallers, and they sometimes come home after the patients are in bed. It has been said: "It is always more difficult to watch attendants than patients."

Proportion of Attendants.—At Brookwood there is one to twelve patients, women; one to ten patients, men. "I doubt whether an asylum in which acute cases preponderate can be worked effectually with less than one official to every four or perhaps six cases." At Hanwell, one to thirteen, exclusive of inspectors. At Colney Hatch, one to thirteen, excluding inspectors, head attendants, and night watchers.

"Rooms should be provided for two or more attendants to each ward, single attendants' rooms not being of less dimensions than 100 superficial feet, and, whenever practicable, such rooms should be placed between two dormitories, with glazed doors of communication. Large rooms should also be provided to some of the male wards, for the use of married men and their wives." This is not a good arrangement. Married attendants should be provided with cottages within the grounds, or have rooms provided for them in connection with the administrative block.

Workshops and Laundry Buildings.—The position of these buildings upon the site is not arbitrarily fixed, but if placed as suggested they would be for many reasons well situated. They would possess the advantages of detached buildings without being actually separated from the main block. By the connecting corridors the patients could pass to the dining-hall or chapel, and the attendants would in the same way be in easy communication with the administrative block.

The working patients are drafted from all parts of the building, and therefore cannot be provided for in one ward. Some homicidal and suicidal cases that may be, and indeed are, safe while at work, become dangerous when unemployed. Each ward should have its own linen, and the head attendant of such ward should be held responsible for it. Each lot of soiled linen should be signed for when delivered at the laundry, and when returned to the ward clean it should be signed for by the head attendant. Everything in a large institution must be carried out with method and in strict order.

Occupation.—In arranging the number and sizes of the workshops, it is necessary to consider the districts from which the patients are to be drawn, and the training and employment of the people living in those districts. Dr. Ley says: "About 70 per cent. of the patients are usefully employed. As the bulk of the inmates are either colliers or mill-hands, or persons trained up to manufacturing pursuits, much difficulty is experienced with our present appliances in devising occupation suitable to the capacity and congenial to the previous habits of the patients. As a rule, agricultural pursuits are not taken to naturally by those classes. Our population is almost entirely urban, bred to mechanical labour, and at all times, but particularly when insane, very averse to forming new habits. A skilled agricultural labourer is quite the exception, and of the 525 male inmates, there are not a dozen who have any knowledge of farming or gardening operations."

In many county asylums the reverse of this is the case, and the agricultural element is stronger than is actually required. Ordinary unskilled labour is so plentiful in an asylum that the trouble of doing this or that (without involving the use of material) need not be considered. Indeed, one of the difficulties in these institutions is to find occupation and employment for patients who know no trade.

In the workshop blocks the following rooms are in some (though not in all) cases required. Much depends on the locality, weaving sheds, for instance, being of little use in a coal or mining or agricultural district. In each case the requirements must be specially considered:—Tailor's room; room for garments awaiting repair (adjoining); shoemaker's room; leather room (adjoining); upholsterer's room; mattress-making room; bookbinder's room; weaving sheds; carpenter's shop; painter's shop; plumber's shop; mason's and bricklayer's shop; blacksmith's shop. In the laundry blocks the following rooms should be arranged:—Room for receiving and sorting linen; hoist; large wash-house; smaller wash-house for foul linen; drying closets; mangling room; ironing and folding room; drying room for wet blankets; room for drying horsehair; airing room; airing yard; despatching room; hoist. There should be a separate wash-house for officers' linen and house linen. All infectious linen should be passed through a disinfecting room, and should be washed in a separate wash-house; that attached to the infectious hospital would probably in most cases be used for the purpose.

The Brewery.—The brewery might adjoin either the laundry or the workshop block. If it adjoin the laundry buildings it should have a separate entrance, and should be kept quite distinct from them, so as to prevent any communication between the men employed in the brewery and the women working in the laundry block. If placed in this position the steam and steam power provided for the wash-house could be used in the brewery for any purpose that may be required. Attached to the brewhouse there should be a vat-room, and a malt store.

General Baths Block.—A very extensive use of baths is among the most important means of treatment. "For the majority of inmates a general bath-room, conveniently placed, will be found greatly to facilitate the bathing of the patients." This, however, will not remove the necessity of providing a single bath-room to each ward. The general bath-rooms should, of course, be on the ground floor, and should open out of the main corridor, so as to be easily accessible by all patients from the various blocks. It should be placed on the north side of the main corridor—say between the infirmary and epileptic blocks. It might have ten ordinary bath-rooms or cubicles, with dressing compartments adjoining, vapour and shower-bath-room, medicated bath-room, also containing hip, foot, and hand baths, towel-room, water-closet, lavatory, urinals, &c. It is desirable to have a full number of baths, so that the offensive practice of using the same water for more than one patient may not be excused on the ground of there being an insufficiency; and it is also of the utmost "importance that the taps, as well as the waste and supply pipes, should be of large size, so as to admit of the ready changes of water for each patient, and, further, that the supply and waste should be distinct."

Each ward should have a fixed day and a fixed hour for the bathing of its patients in the general bath-room. The patients would carry their clean linen to the baths, and their soiled linen, when taken off for the purpose of bathing, would be put into the soiled linen shoot attached to this block, and thence conveyed along the basement corridor to the laundry block. In this way the linen of the various wards could be kept quite distinct. The floor of the bath-room should be laid with some material that does not freely absorb moisture, such as smooth flags, and all bath-rooms should be kept well warmed.

The Porches.—The porches should be fitted with boot-lockers to a height of about 3ft., and above that height they should be prepared for the reception of flowering plants. The recesses over these porches on the first floor would be admirably adapted for reading purposes; and, from the amount of glass in their outside walls, they would add much to the cheerfulness and lightness of the corridors in which they occur, and would, at the same time, command an excellent view of the country to the south.

Rooms on Two Sides of Corridors.—Series of single rooms on both sides of long corridors should, for many reasons, be avoided. It is difficult, if not impossible, in such an arrangement to either ventilate or light the middle corridor, or ventilate the rooms themselves satisfactorily, except, perhaps, in the case of one-story buildings, and even there the loss of view, and the prison-like appearance of the corridors, are in themselves sufficient objections to such a plan. In cases where two or three single rooms only occur on both sides a corridor, near the large end window of a one-story building, or where a well-lighted staircase or day-room with a glazed partition comes opposite single rooms, there is, of course, little objection; and, therefore, where such an arrangement is found necessary to avoid a difficulty, it may be adopted.

Cubicles.—Wherever cubicles occur in any of the wards, they should be placed together on one side the ward, commencing near the door, in order that they may not obstruct the view of the beds in the open dormitory from the attendants' room, and also to avoid the objectionable appearance of a centre passage with intercepted window light on both sides, as would be the case if the cubicles were placed on both sides the ward. The partitions forming the cubicles should not be carried up to the ceiling, but only to a height of 8 or 9 feet.

Padded Rooms.—By making the padded rooms the same size as the single rooms they might (if thought necessary to abandon the use of them)

be devoted to the alternative purpose, and be fitted at any time to serve as sleeping-rooms.

There are several materials used for the purpose of covering the walls and floors of padded rooms.

In some cases sacking is used, in others india-rubber. It is best in all cases to so construct it that it can be easily taken off for cleaning, or otherwise the rooms become offensive, and, indeed, unbearable. Some lunatics are disgustingly filthy in their habits, and anyone who has seen a padded room which has just been occupied by a representative patient of this class, will at once comprehend how essential it is that it should be free from any nooks and corners that could harbour dirt, and that the flooring and wall, and even the ceiling itself, should be constructed or lined with a material that can be easily cleaned or renewed, such, for instance, as glazed tiles for the walls above the padding, and cement for the ceilings. The padding should extend well beyond the reach of the patient, and here of course, above all other places, extreme care should be taken not to introduce any constructive feature by which the patient would be enabled to inflict injury upon himself.

Staircases.—The stairs throughout should be constructed of stone, built round a closed well, which should form a large air-shaft (for the extraction of foul air) connected with the main air-trunk in the basement. They should be planned in short flights, and should be very accessible, and easy of ascent and descent. Every staircase should be well lighted and should be practically fireproof. They should be so arranged as not to be exposed in any ward.

In determining their width the possibility of their being required as a means of escape from fire should be considered, and the number of patients on the upper floors who would in a panic crowd down them should be calculated.

There should be no winders in any case. Handrails on both sides should be provided. Long straight flights should be avoided.

In determining the positions of staircases the convenience of the medical officers and attendants should be considered. An inconveniently placed or tiring flight of steps is often the cause of less frequent visits from the doctors to the upper-floor patients, particularly in three-story buildings.

Ventilating Flues (Vertical).—Foul air-shafts should be provided to each block of buildings, and should be connected with flues from every room. These air-shafts should be joined to the main foul-air trunks leading to the boilers at the foot of the main extraction-shaft. By these flues the foul air would be drawn from the whole of the rooms throughout the entire building. Other flues from the main drains, carried to the extraction-boilers, would draw off the foul gases from the sewers, so that they could never enter the buildings through water-closets, apparatuses, defective traps, or damaged piping.

Ventilating Shaft.—The ventilating shaft and smoke flue, with extraction boilers at the base, might be suggested in alternative positions. In one at the south of the administrative block; in a second to the east or west of the administrative block; and in a third in the workshop or laundry block. The laundry and workshop blocks form equally good positions for it, and offer certain special advantages. In each case it should be detached from the main building, so that any serious damage from a possible fire or explosion would be avoided. In either of the suggested positions it would not obstruct any view, but in each case it might form an ornamental feature. If placed in the position to the south of the administrative block, the boiler rooms should be sunk in the ground, and around the base of the ventilating shaft an ornamental pavilion or orchestra might be built. The music from this advanced central position in the south could be heard equally well on both male and female sides, and indeed over the whole site. From this pavilion the band could, whenever required, provide at meal times a musical entertainment for the patients assembled in the dining-hall.

Water Cisterns.—Cistern-towers should be provided to each of the main blocks for the storage of water, and additional cistern room should be provided in the large central tower in the administrative block. It is so imperatively necessary that a full and constant supply of water should be obtainable even in the driest seasons of the year, or at times when the town's supply may be temporarily cut off, or only intermittently given, that something more than a minimum allowance should be made for cistern room. Dr. Kirkbride says: "A very extensive use of baths is among the most important means of treatment, and the large number of water-closets that are indispensable in the wards, the great amount of washing that has to be done, as well as various other arrangements requiring a free use of water, and, above all, abundant means for extinguishing fire in case such an accident should occur, make it of the utmost importance that the supply should be permanent and of the most liberal kind." The daily consumption for all purposes will not be much, if any, less than 40 gallons per patient, and tanks to contain much more than this quantity should be provided in the towers of the building. The central tower might be treated ornamentally; but if the cost prove an objection to the introduction of the ornamental portions, this tower could be simplified and reduced in size, or, by making other provision elsewhere, it could be omitted altogether.

Water-Closet Blocks, &c.—The blocks of water-closets and bath-rooms should be separated from the wards by intercepting lobbies, having windows on each side, and also ventilating outlets in the ceiling, so that any tainted air coming from them would be cut off from the wards by the through current of air in the intercepting lobbies. The water-closet blocks should also contain soiled linen shoots, slop sinks, urinals (in the male blocks), water-taps, wash-basins, &c. Other wash-basins should also be placed in all the associated dormitories, in addition to those in the lavatory and bathroom blocks.

The bathroom blocks attached to the wards should contain baths, lavatory-basins, water-taps, filters, urinal-basins, &c. There should be in every case an intercepting lobby to the bath-room blocks, similar in size and purpose to that provided to the water-closet blocks.

The intercepting lobbies should not be of a less width than 5ft. Water-closets should be provided in the proportion of 1 for every 10 patients. The floors of water-closets and lavatories need not be of wood.

Slop Sinks.—"Near the water-closet should be a sink for washing various articles that it is not desirable to take to the bathroom, and for obtaining water for the necessary cleansing of the ward."

Foul Linen Shoots, or Soiled Clothes Hoppers.—"At least one of these should be provided for every two contiguous halls, and through which all the soiled clothes, bedding, &c., should be conveyed to the basement, preparatory to their being taken charge of by those whose duty it is to convey them to the washhouse.

Lifts, Dust-Shoots, Pipe-Recesses, Foul-Air Flues.—Lifts for various purposes, dust-shoots, foul-air flues, and pipe-recesses (easily accessible for repairs) should be provided in every block. They should extend from the top of the building to the basement, so that the necessity for carrying supplies of any kind up the staircases, or along the main corridors on the ground-floor, would be entirely obviated. This is an important point. In connection with the lifts there should be the usual provision for speaking tubes, call-bells, &c.

Flues for Piping should be "sufficiently large to give free access to them on all sides for inspection and repairs."

Recesses for Hydrant-Taps, Gas-Taps, &c.—Provision should be made for the rescue of the patients in case of fire. A fire-escape, fire engine, and other appliances should be kept on the asylum premises, ready for use at any time.

A corps of firemen, organised under the command of the engineer of the asylum, should be formed and regularly drilled, as at Brookwood. These firemen should not be attendants. Means of ready access to the taps and jet-pipes, without a hunting for keys, should be provided, such as a sheet of thick glass, which could be broken if a fire broke out.

Soil-Pipes and Drain-Traps.—In no case should any soil-pipe be carried within the walls of the building. Every soil-pipe should be disconnected from the drain. Pott's Patent Ventilating Trap, which has an open intercepting air chamber, between the bottom of the soil-pipe and the siphon trap at the mouth of the drain, is an excellent one for this purpose. Any sewer gas that may escape through the siphon trap would therefore pass into the intercepting chamber, and thence through the open grating into the outside air, instead of into the building.

Commissioners' Pamphlet on Drains.—The pamphlet issued by the Commissioners in Lunacy, entitled "Practical Suggestions in reference to Sewerage, Drainage, and Water Supply of Lunatic Asylums," and printed by Messrs. Eyre and Spottiswoode, contains a great deal of valuable information on the construction and form of sewers and drains, manholes, and ventilating shafts, sewage tanks and outlet works, sewage irrigation, earthenware pipes and brick sewers, fresh-water tanks, aqueducts, conduits, filter beds, supply pipes, cisterns, wells, hydrants for fire service, and on various other matters in connection with this part of the subject. This pamphlet also contains illustrations showing the form and mode of construction recommended. Indeed, the details are so complete that I need not here touch upon that portion of the question beyond referring you to the pamphlet itself, and recommending those who have not one to get one. The information it gives—although identified with asylum buildings—is equally applicable to other buildings, and as it is most desirable that every architect should make himself thoroughly acquainted with the important questions of drainage and water supply in all their practical details, architectural students will be well repaid for a careful perusal and study of Mr. Rawlinson's work.

Medical Superintendent's House, &c.—The residence for the medical superintendent should be entirely detached from the main buildings, or be merely connected by a corridor or covered way. It should not be situated at an inconvenient distance from the main buildings, or the efficient and satisfactory performance of the superintendent's duties would be interfered with, if not rendered impossible.

Residence for any length of time in an institution for the insane has a depressing tendency, and too frequently a mischievous effect on even healthy minds. The cares, anxieties, and responsibilities inseparable from the life of an asylum superintendent are sufficiently prostrating without having added to them the gloomy consciousness of being continually surrounded by mad people.

The house should be designed to meet the requirements of a large family, and should be suited to the tastes and wants of a professional gentleman. The plans should provide for the following rooms:—

Ground Floor.—Dining-room; drawing-room; breakfast-room; library; lavatory, and cloak-room and water-closet; kitchen; scullery; butler's pantry; cook's pantry; china-closet.

Basement Plan.—Meat-cellar; beer and wine cellars; coal-cellar; wash-cellar; general store cellar.

Chamber Plan.—Eight bedrooms (one of which should be large enough for alternative use as a billiard-room if required); dressing-rooms; box-room; housemaid's closet; bath-room; water-closet; cistern-room; store-closet.

It is desirable in this case, as in the other cases mentioned, to provide on the plans at the outset for the maximum requirements. To build a small house for an unmarried superintendent, who may at any time be replaced by one who is married and has a large or increasing family, would be to make an inconvenient mistake. The addition of rooms to keep pace with the additions to family should, even if carried out in a piecemeal fashion, be built in conformity to a complete and prearranged plan. Unless this is done, the additions that are made from time to time will be proved to be more inconvenient, more costly, and less satisfactory than they would have been if they had formed part of a complete original plan.

Chapel.—The chapel should be detached from the main buildings, and should be picturesquely treated. It should be easy of access, should have the usual character and arrangements of a church, and should be capable of comfortably accommodating at least three-fourths of the patients. There should be "no special or peculiar provision for the separation of the sexes," a centre aisle being all that is required. This would divide the congregation into two groups, the male on the one side and the female on the other. Two entrances should be provided, and near them two separate conveniences, including lavatory, &c., for the occasional use of the male and female patients during service hours. Where practicable a covered way connecting the main corridor with the chapel should be provided for the use of the patients in the wet season, or in extremely severe

weather. A small end gallery for the accommodation of the medical officers and friends, and for servants and others connected with the administrative buildings, and also one or two transept pews for the accommodation of attendants composing the choir, would form useful, and, if successfully treated, ornamental features in the chapel. For the attendants these transept sittings would be well situated, as they would command a full view of the patients in the body of the building. A good organ-chamber should be provided on the right side of the chancel, and a minister's vestry on the left. I do not say on the north and south, because it may be misleading in cases where the laws of orientation are not observed. The organ-chamber is an important feature, and should be of sufficient size to receive a good instrument. To most of the patients occasional organ recitals, in addition to the usual Sunday services, would prove sources of enjoyment, and would materially help to break up the depressing monotony of asylum life.

Convalescent Cottages should be wholly detached from the main building, and situated in a pleasant part of the grounds, having all necessary offices for distinct and separate working, as an ordinary house has. The size and accommodation should be in proportion to that of the asylum itself. The entire separation from the general body of patients, and the change in life is of the utmost benefit as a finishing process and completion of cure before the patient is sent out again into the world.

Hospitals for Infectious Diseases should be provided for every asylum. They should be entirely detached from the main buildings, and they should be distinctly self-working. They should have a dormitory, a few single bedrooms, associated dayroom and a few single dayrooms, a kitchen, scullery, and cellars (well ventilated) for stores, &c. In a block of outbuildings there should be a disinfecting-room, wash-house, drying-chamber, and laundry, and a store shed for coal and wood—the number and sizes of the various rooms to be, of course, proportioned according to the number of patients which the asylum accommodates. The cubical space allowed for each patient should not be less than 1,500ft.

Toolhouse.—The door to the toolhouse should have a good lock, and there should be no means of access except through the door.

The Icehouses.—As there are so many uses for ice in a building of this kind throughout the year, but particularly in the summer months, an icehouse is indispensable. It should be placed in a convenient position near the administrative block, and within a few yards of one of the entrances to the main corridor.

The Dead-House, Dissecting-Room, and Hearse-House.—These buildings should be lighted from the roof, so that the interior cannot be overlooked from any surrounding buildings or grounds. The entrance to the dead-house should be screened by a shrubbery planted by the side of the winding approach to the doorway. These buildings should be entirely detached, and should be situated in an obscure part of the grounds, to the north of the main corridor. They should be provided with all conveniences, and should be fitted up in the best manner for the purpose. The dissecting-room, or *post-mortem* room, should be placed between the dead-house and the hearse-house, and should have a door communicating with each room. Thus planned, the dead would be brought from the main building and placed in the dead-house; thence, at the proper time, they would be passed into the *post-mortem* room; and finally, at the hour appointed for burial, the bodies would be deposited in the hearse. By attaching the hearse-house to the dead-house block, an advantage is secured in having the hearse always ready for use without its being first driven through the grounds in sight of the patients, on whom its appearance might have a depressing effect. The bodies should be removed from the main buildings to the dead-house by night, and a small room for each sex should be provided in the main buildings for their temporary reception during the day.

Visitors' Stables and Coach-house.—The stables and coach-house for the use of visitors might be attached to the workshop block, though they should be kept quite distinct, and have a separate approach and separate external entrance; or they might be arranged for in the farm-buildings if (as may be found in some cases) this latter position is more convenient. There should be a harness-room adjoining the stable, sufficiently large to serve as a waiting-room for the men-servants in charge of the conveyances. The size of these buildings will depend on the special requirements of each case, and cannot therefore be determined until those requirements are ascertained. Stable and coach-house accommodation will also have to be provided for the horse and carriage of the medical superintendent, and, in addition to this, a similar provision will in some cases be required for horses and carriages appropriated to the use of the patients. Carriage exercise is in many cases a valuable aid to recovery, and is always much appreciated by the invalids and infirm.

Lodges and Entrance Gates.—Each lodge should have a parlour, kitchen, scullery, and small pantry, coalshed, water-closet, and three bedrooms. It is, however, open to consideration in certain cases whether a single story building, containing living-room, scullery, small pantry, coalshed, water-closet, and one bedroom, would not be sufficient. This will of course depend on who is to occupy the lodge. If a married attendant, the larger plan would be required; if a single convalescent, then the smaller plan would be sufficient.

Enclosures "should be of a permanent character, about 10 feet high, and so located that they will not be conspicuous even if they are at all visible from the building. Although the first cost of a wall will be about double that of a fence of the proper kind, still its durability and greater efficiency in every respect will make it cheaper in the end."

If the country is too level to admit of the walls being built in hollows, "the same end may be attained by placing the wall in the centre of a line of excavation of sufficient depth to prevent its having an unpleasant appearance, and yet be entirely effective. The amount of land thus enclosed should never be less than thirty acres, while forty or even fifty acres will be a more desirable amount. High walls around small enclosures, and in full view from the building, are even less desirable than a simple neat railing, which would neither keep determined visitors out nor active patients in. The presence and watchfulness of intelligent attendants must still be the grand reliance to prevent the escape of patients, and I regard any arrangement that does away with the necessity of constant vigilance undesirable about a hospital for the insane."

Cost.—It has been truly said that "no outlay can be too large that produces for the service of the public and the ratepayers an agency capable of resisting the encroachments of insanity and rescuing bread-winners from its toils."

The Best Built Hospitals are the Cheapest in the end.—"Everyone concerned in providing accommodation for the insane may rely upon the fact being established by all experience that the best kind of hospitals—not only best built, but with the most perfect arrangements and fixtures of every kind, and managed in the most liberal and enlightened manner—are sure to be the most economical in the end (for true economy consists, not only in avoiding all waste and extravagance, but also in doing thoroughly whatever is undertaken), will fulfil most completely the objects for which they are erected, and ultimately give most satisfaction to every enlightened community."

Before concluding, I may say that I am indebted to Drs. Kirkbridge and Mortimer Granville for several extracts from their works (which are well worth perusal), and I have also embodied in my paper the suggestions and instructions of the Commissioners in Lunacy, so far as they apply to the points I have touched on.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

At a special general meeting of members only, held on Monday evening, the 8th March, 1880, Mr. John Whichcord, F.S.A., President, in the chair, the minutes of the special general meeting, held 10th March, 1879, were read and signed by the chairman as correct.

The President announced, with reference to the award of the Royal Gold Medal, that no name had been substituted by the Institute (see By-law LXXVI) for that of the gentleman nominated by the council for submission to her Majesty the Queen; whereupon, in accordance with precedent, it was resolved to humbly submit for her Majesty's gracious sanction that the Royal Gold Medal for the year 1880 be presented to John Loughborough Pearson, A.R.A., Member of Council.

The Secretary announced that he had received notice from Mr. Charles H. Cooke, F.S.A., Fellow, that at a future meeting he would ask a question relative to the award of the Pugin Travelling Studentship: "Whether the decision rests with the council alone, without confirmation by the general body?"

The reports of the Council on the adjudication of medals and prizes, 1879-80, and on the subjects for medals and prizes to be competed for during the session 1880-81 (both issued to members on the 4th inst.), were submitted to the consideration of the meeting.

MEDALS AND PRIZES.—1879-80.

The Soane Medallion.—List of Competitors.

No.	No.
1. "Esse quam videri."	10. "Why not?"
2. "Art."	11. "Labor Omnia Vincit."
3. "Candida."	12. "Ernst ist das Leben heiter ist die Kunst."
4. "1880 (7 strainers)."	13. "A circle."
5. "Senza fretta, senz' indugio."	14. "Detur Digniori."
6. "Sphinx."	15. "Venture."
7. "Mine."	16. "Clytie."
8. "Non cuivis contingit adire Corinthum."	17. "As you like it."
9. "1880 (5 strainers)."	18. "Arx Artis."

Resolved: That the Soane Medallion and (subject to the usual conditions) £50 be awarded to the author of the design (No. 11) bearing the motto "Labor omnia vincit." The name and address of the successful candidate were found to be—No. 11. Edward Harnor, 8, John-street, Adelphi, W.C. Resolved: That a Medal of Merit be awarded to the author of the design (No. 13) bearing the device of a circle. The name and address of this gentleman were found to be—No. 13. Charles E. Sayer, 17, Soho-square, W. Resolved: That a Certificate of Honour be awarded to the author of the design (No. 10) bearing the motto "Why not?" and a Certificate of Honour to the author of the design (No. 12) bearing the motto "Ernst ist das Leben heiter ist die Kunst." The names and addresses of these gentlemen were found to be—No. 10. Sydenham W. Richards, Tyncoed House, Whitchurch, Cardiff; No. 12. Frank T. Baggally, Holme Lee, Beckenham.

The Tite Prize.—List of Competitors.

No.	No.
1. "Saint Kentigern."	4. "Valhalla."
2. "Hope."	5. "Mors ultima linea rerum est."
3. "Spero."	

Resolved: That the Tite Prize be awarded to the author of the design (No. 2) bearing the motto "Hope." The name and address of the successful candidate were found to be—No. 2. Leonard Brisbane Broun, Associate, 9, Abercorn-place, N.W.

The Grissell Medal.—List of Competitors.

No.	No.
1. "Spes."	3. "πρωτος."
2. "Nil desperandum."	

Resolved: That the Grissell Medal be awarded to the author of the design (No. 1) bearing the motto "Spes." The name and address of the successful candidate were found to be—No. 1. Jasper Wager, 15, Whitehall-place, S.W.

The Institute Medal and Five Guineas: Drawings.—List of Competitors.

No.	No.
1. "Studiose diligenterque."	3. "Paulatim."
2. "Hilda."	4. "Labor Omnia vincit."

Resolved: That the Institute Silver Medal (Drawings) and Five Guineas be awarded to the author of the drawings (No. 1) bearing the motto "Studiose diligenterque." The name and address of the successful candidate were found to be—No. 1. W. Niven, 31, Princes-square, Bayswater, W. Resolved: That a Certificate of Honour be awarded to the author of the drawings (No. 2) bearing the motto "Hilda"; a Certificate of Honour to the author of the drawings (No. 3) bearing the motto "Paulatim;" and a Certificate of Honour to the author of the drawings (No. 4) bearing the motto "Labor omnia vincit." The names and addresses of these gentlemen were found to be—No. 2. Arthur P. Gunston, Herne-hill, Tunbridge-wells; No. 3. Herbert Goodall, Graeme's Dyke, Harrow-weald; No. 4. R. Douglas Sandilands, 111, Bath-street, Glasgow.

The Institute Medal and Ten Guineas: Essays.—List of Competitors.

No.	No.
1. "New Babylon."	3. "Tudor."
2. "A cœur vaillant rien d'impossible."	

Resolved: That the Institute Silver Medal (Essays) and Ten Guineas be awarded to the author of the essay (No. 1) bearing the motto "New Babylon." The name and address of the successful candidate were found to be—No. 1. George H. Blagrove, 84, Southampton-row, W.C. Resolved: That a Certificate of Honour be awarded to the author of the essay (No. 3) bearing the motto "Tudor." The name and address of this gentleman were found to be—No. 3. T. R. Hooper, Redhill, Surrey. Resolved: That the author of the essay (No. 2) bearing the motto "A cœur vaillant rien d'impossible" be commended. The name and address of this gentleman were found to be—No. 2. Laurence Sayer, 15, Great College-street, Westminster, S.W.

MEDALS AND PRIZES.—1880-81.

The report of the Council containing the subjects for medals and prizes to be competed for during the Session 1880-81, under the different heads, having been submitted to the meeting,

was, with a few slight amendments and corrections, adopted.

A list of the subjects for the medals and prizes, 1880-81, will be published on Thursday, the 25th inst., price threepence, or by post four penny stamps.

Architectural Competitions.—Having reference to the notice given by Mr. Thomas Porter, Fellow, that he would move a resolution requesting the Council to take into consideration the subject of architectural competitions, and appoint a committee which should report thereon, Mr. Porter stated that he had, by permission of the Council, amended the terms of his proposed resolution, and that he would ask leave of the meeting to move as follows:—

That a Committee of the Royal Institute of British Architects be appointed to take into consideration the subject of architectural competitions, that shall, in concert with other London and Provincial societies, suggest certain regulations for the conduct of architectural competitions, and report to the Council the result of their action.

After a discussion in which Messrs. C. F. Hayward, Fellow, H. Dawson, Fellow, Wyatt Papworth, Fellow, C. Fowler, Fellow, Arthur Cates, Member of Council, Professor Kerr, Fellow, E. C. Robins, Fellow, O. Hansard, Member of Council, and the President took part, the resolution was carried nem. con., and a committee appointed with power to select their own chairman and secretary.

Election of Vice President.—In pursuance of the notice according to the terms of by-laws XXXIII. and LXXI. issued on the 2nd inst., announcing that the council had nominated Ewan Christian, Member of Council, to fill the vacancy caused by the decease of Edward Middleton Barry, R.A., vice-president, it was resolved that Mr. Ewan Christian, nominated by the Council in accordance with the terms of By-law XXVII., be chosen to complete the number of Vice-Presidents.

ARCHITECTURAL COMPETITIONS AND THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

MR. GEORGE EDMUND STREET, R.A., F.R.I.B.A., has consented to present a memorial to the council of the Royal Institute of British Architects, praying them to take into consideration the present unsatisfactory method of conducting public competitions, and to devise a scheme by which architects may agree not to compete unless a professional adjudicator is appointed. A provisional committee was appointed some weeks back with the object of calling the attention of the profession to the much needed reform, and the ready response made to the circular then issued privately, emboldens them now to take another step, and to enlist the signatures of architects to this memorial. It is obvious, however, that reform can only be ensured by a large majority of architects joining in the endeavour to accomplish it, so that the movement may gain strength by unanimity of opinion; and it is hoped by the promoters of the memorial that every one interested in this matter will, whether he is in the habit of competing or not, sign the memorial, and endeavour also to obtain other signatures. Copies of the memorial, and other information, may be obtained of Mr. Cole A. Adams, hon. sec. (pro. tem.), 11, Holden-terrace, Grosvenor-gardens, S.W., to whom all communications should be addressed. One hundred and twenty architects have already signed the memorial. A committee has been appointed by the Institute to consider the whole subject of competitions, but the accompanying memorial is intended to urge the one point only, of the professional adjudicator, and the adherence of members of the profession to this principle cannot but be an expression of the need that is felt for reform.

THE MERCHANT TAYLORS' COMPANY'S NEW PREMISES.

THE Merchant Taylor's Company have added considerably to their buildings in Cornhill, although from the position of the premises, hemmed in by the block of houses between two courts, nothing can be seen of them from the thoroughfare. Last Saturday, the Architectural Association paid a visit (one of the fortnightly series of out-door gatherings) to the new buildings, which have been erected from the designs of Mr. E. I'Anson, of Lawrence Pountney Hill, by Mr. Geo. Shaw, of Westminster, contractor.

The Merchant Taylors were anciently called "Taylors and Linen Armourers," and the company was incorporated by Edward II., A.D. 1466. It was Henry VII. who re-incorporated them in 1503, under their present title. The company ranks many royal and noble persons among its members. The hall has the repute of being the largest of the City halls. It is an oblong apartment, about 80ft. long, 40ft. wide, and 40ft. high to the ceiling. It was rebuilt after the Great Fire, like many of the other old halls, and has long been noted for the political banquets given within its walls, the company being the leading Tory company in the City.

The new buildings form two sides of a quadrangle, which still retains the name of a "garden," in spite of its limited area and court-like appearance. The old hall, a building of Late Perpendicular character, still occupies one side, and the new apartments comprise a library, a court-room, committee-room with chambers over, and are connected with the hall by a corridor. The new wings contain three stories, besides a basement. The court-room forms an important wing placed north and south. It is about 40ft. by 25ft., at the side of which is a committee-room of smaller size. A large bay window, with mullions, transoms, and cusped heads, lights the court-room, besides two side-windows, all facing the garden. We notice that the architect has principally relied for effect and relief upon the breadth of his wall surfaces of Spinkswell York ashlar, tooled on the face, together with the mullioned windows, separated between the ground and first-floor stories by a deep band of carved diaper-work or quatrefoils in two rows. The latter feature affords a rich contrast with the plain stonework. The upper story, chiefly obtained in the roof, has a row of dormers, and the roof of high pitch is covered with light green slates of a very pleasing tint. The chimney-stacks are made conspicuous features, and are carried up to a considerable height square in plan, relieved by angle-beads and cappings of plain mouldings. Internally, the work is not advanced sufficiently to enable us to judge of the appearance; we are informed, however, that no expense will be spared to render the court-room a handsome apartment, and that the walls will be wainscotted with linen panelling, and enriched by carving, while the ceiling is intended to be decorated in a style worthy of the company.

The other block, which projects at right angles to the court-room wing, is still more piquant in its design. In one corner is a circular-ended lobby projection which forms a turret above, and is pierced by four-light cusped windows. The library and assembly-room form the principal apartments of this block; the former is lighted by a wide bay window with mullions, and above is a large panel carved with the coat of arms of the company. There is also on the ground-floor a luncheon-room, whose external treatment in White Lion-court is made a telling feature. Its steep-pitched hipped roof of green slates, the moulded cornice, and the large four-mullion window with the pointed arches, and the doorway at side having a traceried head of Decorated design, make an agreeable and artistic termination to the narrow *cul de sa* of this court. Above and behind the luncheon-room, which is of one story, the gabled wall of the new buildings is seen faced with white enamelled bricks, and its stone mullion windows, gable and finial have a bright clean look. Abutting on Sun-court is a re-entering angle of the building forming an entrance. This is of red brick, with stone mullioned windows, and other dressings. Above the doorway is a carved panel of the arms of the company, having two camels supporting a shield, on the top of which is a crest, a lamb, and star, while the shield is carved with two cloaks, and a tent, and the arms are surrounded with some spirited foliage in relief. The first floor of both blocks is planned as apartments for the guests of the company, as dormitories, dressing-rooms, &c., while the top floor is similarly appropriated. The cost of the building was estimated to exceed £20,000. We may mention that the works have been well carried out, and that Mr. Hawke is the foreman, and Mr. Bavin clerk of works under the architect.

The banqueting-hall is approached by a corridor, which forms the north side of the garden; the latter is pierced by windows of Late Gothic design with traceried heads filled with painted glass, representing civic and other festivities of the company. We understand these were inserted some years ago when the alterations and restorations were made to the old buildings under Mr. I'Anson. The great hall is adorned with wainscotting, and lighted by a row of flat-pointed headed windows filled with stained glass. The ceiling is flat, richly divided into panels by painted and gilded beams, and the ends of the hall are adorned with woodwork of Renaissance design, consisting at one end of Ionic pilasters highly enriched by gilding. The other, or dais end, has a similar screen of pilasters, and the carving is bold, and, with the gilding and colour, imparts a sumptuous appearance to the hall.

NEW THEATRES.

THE Theatre Royal, situate in Hope-stand, Cowcaddens, Glasgow, which was totally destroyed by fire in February, 1879, is now being rebuilt, from the designs of Mr. C. J. Phipps, and will be opened the latter end of the present year. The contractors are:—Stevenson and Son, for the masonry and brickwork; Ross and Son, for the carpenters' and joiners' work; Morrison and Son, for the slating; Bremmer, for the plastering; Alexander Rae, for the plumbing; McGregor, Gilmore, and Co., for the wrought-iron work; and Stevens for the cast-iron work, all of Glasgow. Messrs. Jackson and Sons, of London, do the ornamental plaster-work.

The Assembly Rooms, situate in Abbey-road, Torquay, are being rebuilt, as a permanent and first-class theatre, by Messrs. J. and C. Watson, of Torquay, from Mr. Phipps' designs, and will be opened about the 12th April.

The Princess Theatre, Oxford-street, is to be pulled down and entirely rebuilt during the ensuing summer, and new entrances provided in Oxford-street, Winsley-street, and Castle-street. Mr. Phipps is now preparing the plans.

The proprietor of the Theatre Royal, at Dublin, which was destroyed on February 9th, has commissioned Mr. Phipps to prepare plans for the rebuilding. The theatre stands on a site 240ft. by 134ft., and is isolated entirely on three sides.

A new theatre is about to be erected at Liverpool, from the designs of Messrs. M'Govern and Solaini, of that town. The façade, which is 72ft. in width, will be of Gothic design, treated freely and in a manner suggestive of the character and purpose of the building. A tower carried up over the principal entrance will form a prominent feature in the composition. The material to be employed is Anglesea stone. The principal, or middle, entrance will open into a promenade vestibule, 35ft. in length, occupying the space usually misappropriated to third-rate shops. Opposite to the entrance will ascend the grand staircase, leading past the ladies' cloak-room and a handsomely-appointed foyer and buffet, to the dress-circle, orchestra stalls, and private boxes. A corridor surrounds the dress-circle, divided from it by an ornamental partition of sufficient height to prevent draughts, while affording a view of the stage to those who prefer promenading during the performance. The lounge, or foyer, opening on to the corridor through a triplet of arches, will also command a view of the stage. The auditorium will contain three tiers of galleries rising above the pit, and will accommodate, in all, about 2,400 persons.

Mr. Ruskin's museum at Sheffield has become so crowded with art treasures, and the number of students visiting it from Sheffield and elsewhere has so increased, that a public subscription has been started to defray the cost of adding a wing to the building. The subscription has been opened by working men, about 20 of whom have contributed 1s. each. Mr. Ruskin has written to thank them, and says that if any man has a shilling to spare, and thinks the object a good one, he will be glad to receive it.

A stone pulpit has been erected in St. Thomas's Church, Chester. It is of Early English style, Decorated, made of Runcorn stone, with "Frosterly" (Durham) polished marble columns and shafts round it. The floor is of old English oak, taken from the cathedral during the recent restoration. The pulpit is from a drawing by Mr. J. Oldrid Scott, of London, and the work has been carried out by Mr. Haswell, of the Kaleyards, Chester, who, under the direction of the late Sir Gilbert Scott, carried out most of the stonework connected with the restoration of Chester Cathedral.

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ILLUSTRATIONS.

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OUR LITHOGRAPHIC ILLUSTRATIONS

MANSARD ROOFS.

See article on p. 322.

ANCIENT PROCESSIONAL CROSS.

This curious old cross was discovered in the possession of a carpenter at Market Rasen, Lincolnshire, by Mr. W. H. Barrett, carver, of Louth, who at present owns it. It is of copper or copper alloy, and retains much of the ancient gilding which once covered it. The cross, of the Greek pattern, is fastened into the upper part of the socket by the latter being divided down the centre, and the cross brazed or soldered into the slit. The two curious projecting arms below the cross are soldered into a double projecting lug, cast on each side of the socket. They have been broken in several places, and roughly riveted together; just under the cross, and at the bottom of the socket, are ornamental projecting bands of cable pattern. The lower band is much worn, some of the projecting parts quite through. The face of the cross is occupied with engravings representing scenes from the life of Christ; at the top the Crucifixion; centre, the Nativity; left hand, the Transfiguration; right, the Temptation (?) These two latter are engraved much deeper than the others, as is also the band of ornament under the Crucifixion, and the figure in the last is covered with fine etching. Note the expression of sleep in the faces of the Apostles in the Transfiguration, and the curious shape of the cross and the target-shaped mark on its base in the Crucifixion. On the back are two inscriptions, the purport of which has puzzled all the linguists who have seen them. They are supposed to be Syriac or Abyssinian. Those in the illustration are careful fac-simile copies of the originals, as are also the pictorial subjects.

John J. Cresswell.

OLD CHIMNEY PIECE, THISTLETON HALL, SUFFOLK.

We have no description of this sketch to give. The details are, indeed, sufficiently shown in the illustration, which has been sent to us by Mr. Brightwen Binyon, of Ipswich.

PROPOSED NEW HALL AND SCHOOLS, LEICESTER.

Our illustrations represent the designs selected by the Committee, in accordance with the recommendation of Mr. T. Roger Smith's report, a copy of which was recently published in these columns. The building, which is to be erected in a fast-increasing district of the town, consists of a large hall slightly raised above the level of the adjacent roadways, with galleries for choir and congregation, and a commodious and well-lighted lecture-room on a lower story. In rear of the main apartments are vestries, school, and class-rooms, a church parlour, and the usual accommodation required in buildings of this class. It is also intended at a future date to erect a large lecture-hall in connection with the proposed building. The whole of the external work, and the interior of the main hall, will be carried out in red, pressed bricks, relieved with moulded jambs, strings, and cornices, and terra-cotta enrichments. The high conical roof, from the elevated position of the site, will form a conspicuous object from many points of view. The windows of the main hall will be filled with tinted glass in lead lights. The tender of Mr. Charles Bass, builder, of Albion-street, Leicester, for £4,971, has been accepted, and the work will be begun forthwith. Messrs. Goddard and Paget, of Leicester, are the architects.

THE ELEPHANT'S HEAD COFFEE HOUSE, EAST GRINSTEAD.

This house, recently opened, has been erected in the hope of promoting the comfort and well-being of working men in the neighbourhood, by Mrs. Oswald Smith, of Hammerwood, on freehold ground, purchased with this object; and, although situated a few hundred yards off from the main street, is well seen at various points of view in passing from the railway station into the town, owing to its prominent situation. The site slopes sharply from the road; the kitchen offices are, therefore, placed in the lower story of the house, which is thus level with the garden at the back, and consists of kitchen, 16ft. by 16ft.; scullery, 16ft. by 12ft.; larder, 10ft. by 8ft.; store room, 8ft. by 6ft.; spacious coal-cellar and minor conveniences. On the ground-floor above, entered at the street level, is a bar, 16ft. by 16ft., properly fitted up with counter, cabinet seats, &c.; lift, and speaking-tubes from kitchen; coffee-room, 19ft. by 16ft., with bay window in addition, and fitted with seats and table; manager's private room, and lavatory arrangements. The first-floor is occupied respectively by two reading-rooms, 16ft. 7in. by 16ft., and 19ft. by 16ft. (with bay windows), which can be converted into one for public meetings; also a small writing-room and lavatory arrangements, with linen-closets. On the top floor are manager's bedroom, servant's bedroom, and four lodging-rooms for single men, divided by partitions 7ft. high, or what is known as the cubicle principle; also bath-room, fitted up with hot and cold water; housemaid's closet, and w.c. The elevations, as shown in the drawing, are built with good red brick up to the top story, which is formed with flat red facing tiles, the bay windows and dormer being half-timber and plaster work, and the main gables in plaster work in raised panels. The cost of this work has been, exclusive of the site, £1,267 11s. 9d. The work has been executed by Mr. John Godly, builder, of East Grinstead, from the plans and directions of Mr. Wm. Milford Teulon, architect, of 18, Upper Woburn-place, W.C. Especial attention has been given to the ventilation of the entire house by means of Hill and Hey's ventilators, that the various effluvia, which are often very unpleasant, may not be allowed to hang about but be carried off continuously.

OLD HOUSE AT OXFORD.

In reference to the sketch of an old house in the High-street, Oxford, I am sorry at not being able to supply any particulars of interest. Neither from books nor from personal inquiries can I find that any history attaches to the house. From a careful survey of the front, it appears to have been an addition to a yet older building, and a date of 1607 discovered scratched on one of the window quarries would point to about the time of its erection. Beyond this, all seems lost in obscurity.

H. W. Moore.

CHURCH OF ST. ALBAN, LEEDS.

This church, lately completed, is unique in its way, standing upon an unusually difficult site, having a fall of 22ft. from east to west. A lecture-room, occupying the whole area of the church except the sanctuary, is obtained upon the lowest street level, the church being approached from the same level by a narthex with steps, as well as by two entrances from the higher street. The church floor is solid, carried upon piers by iron girders and concrete. Sittings are provided for 500 adults. The works were executed by Mr. Dalton, and Messrs Moody Brothers, both of Leeds, under the superintendence of the architect, Mr. J. T. Walford, of 10, Southampton-street, Strand, at a total cost of about £4,400.

ROTHERHAM CHURCH FONT AND COVER.

We learn with satisfaction that there is every probability that the ancient font and cover, the top of which has been commented upon and regretted by some of our correspondents, will be replaced in Rotherham Church.

It is difficult to ascertain exactly when or by whom they were removed. It was, at any rate, some time since, and they have been traced to the neighbouring church of Greasborough, the vicar of which parish has courteously consented to their restoration to Rotherham Church. The font is said to be of black oak, although opinions differ as to whether it be of the date or later than the magnificent black oak carved pulpit of Rotherham Church.

The cover, which is stated to be Jacobean, is spoken of as being of extremely beautiful design, although Sir Gilbert Scott, who restored Rotherham Church some years ago, is said to have considered it out of harmony with the restored church. Whether or not he was answerable for its removal, or only for its non-recovery and restitution to its old place, it is not now necessary to question, the more as the present discussion will apparently lead to the righting of any wrong that has been done. It is obvious that the existing font in Rotherham Church, being of poor modern character and coverless, neither the generous would-be donors of the proposed sumptuous font and cover recently illustrated in our journal, nor the architect, Mr. Seddon, to whom that design was due, were in any degree responsible for what has justly raised the remonstrances to which we have referred, and we cannot but view with satisfaction the anticipated results, which seem, and we trust will prove, to be creditable to all parties concerned.

CHIPS.

The first section of a system of tramways is now being laid in Ipswich. The experimental line, which is chiefly single, will extend from the railway station to the Cornhill, the centre of the town. The bedding is of concrete, on which granite sets will be laid, to a 3ft. 6in. guage between, and 18in. outside the rails, which are of iron, with a 1¼in. groove. Mr. P. Bruff, of Ipswich, is the engineer; Messrs. Spaight, of Leeds, have taken the contract, and Mr. Corringham is their foreman. The rails are being rolled by a Belgian firm, the fishplates, &c., being supplied by Ransomes and Rapier, of Ipswich. Other lines to the western and eastern suburbs are sanctioned, and will follow; but the connection of the east and west lines has not yet been sanctioned, owing to the narrowness of the main streets of Ipswich, and some local opposition. A fresh proposition for a double line through St. Matthew's-street (which is but 17ft. 3in. wide in places) has been made by the promoters, and a Board of Trade inquiry was held before Major-General Hutchinson, R.E., the inspector, on Tuesday, touching the feasibility of this scheme for a connective line, as to the desirability of which a largely-attended town's meeting unanimously pronounced on the previous night.

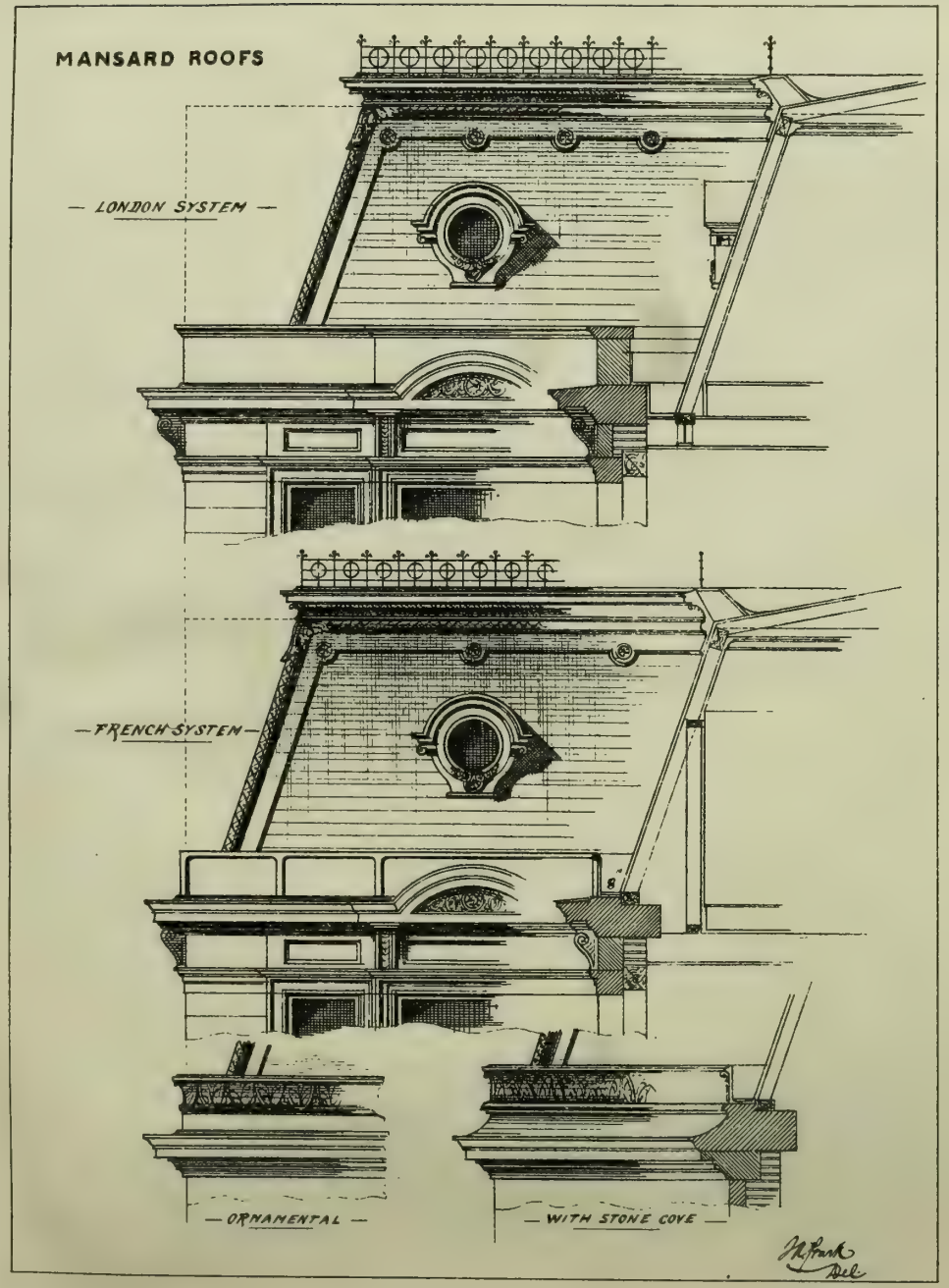
The foundation-stone of the new Fruit and Vegetable Market for the City of London—the site of which is between Farringdon-street and Charterhouse-street—will be laid on Wednesday, the 17th inst. The area of the new market is 60,000ft., and the cost of the land with the buildings to be erected will be £300,000. The designs have been prepared by the City architect, Mr. Horace Jones.

At a special meeting, last week, of the governors of the West Norfolk and Lynn Hospital it was unanimously resolved to improve the general arrangement of the Hospital, and to built new accident wards, nurses' rooms, &c., in accordance with the plans submitted by Messrs. Adams and Son, architects, King's Lynn.

A company has been started entitled "The Seaford Estate, Limited," to acquire 36 acres of land in front of the present town of Seaford, and with a frontage to the sea of over 3,000ft. It is proposed to build a sea-wall and esplanade, with several roads in the rear. The engineer is Mr. W. Forbes.

Mr. Arthur Lewis, assistant-surveyor of Hove, has been appointed surveyor to the Aldrington estate, a rapidly-rising district to the west of Hove, Brighton.





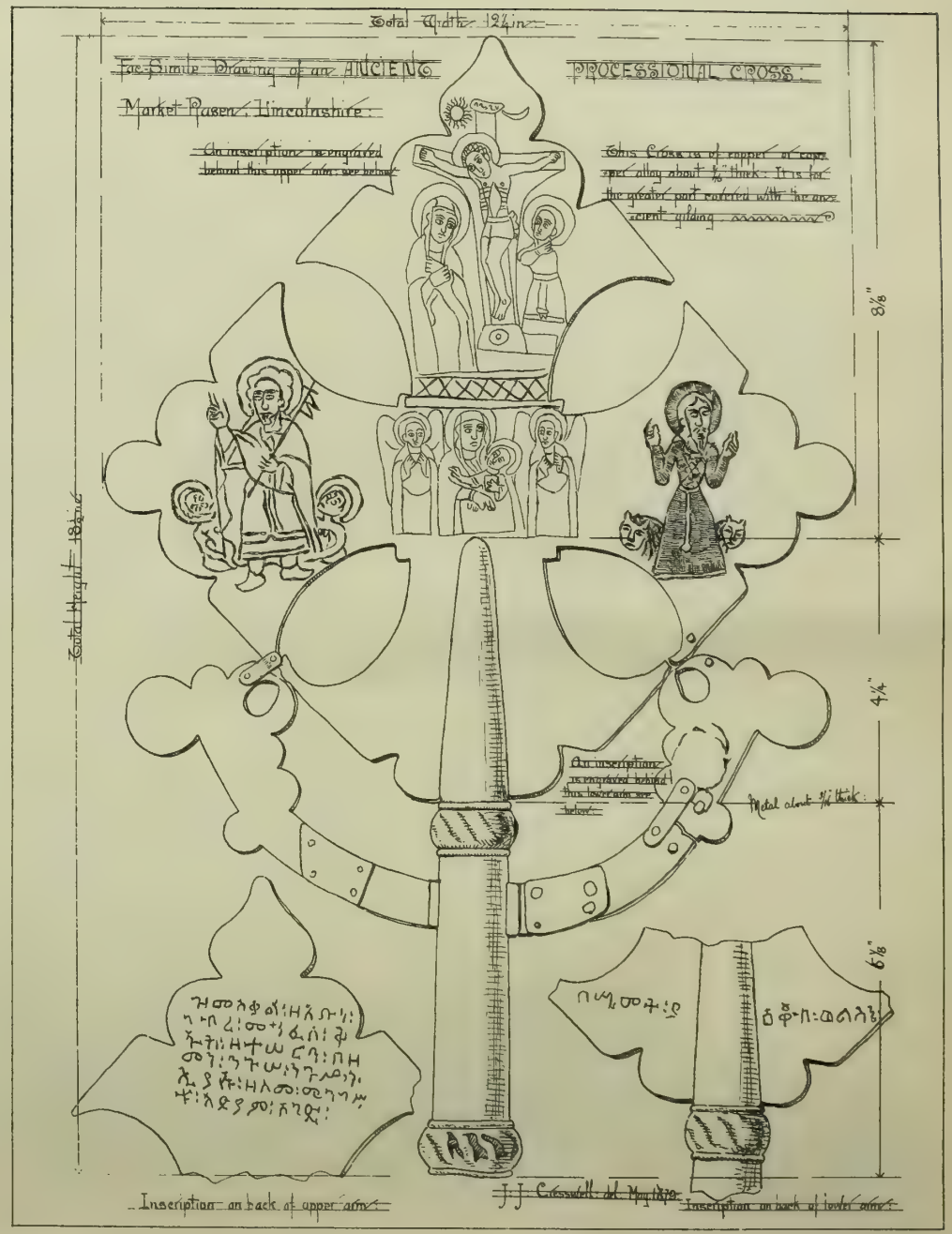
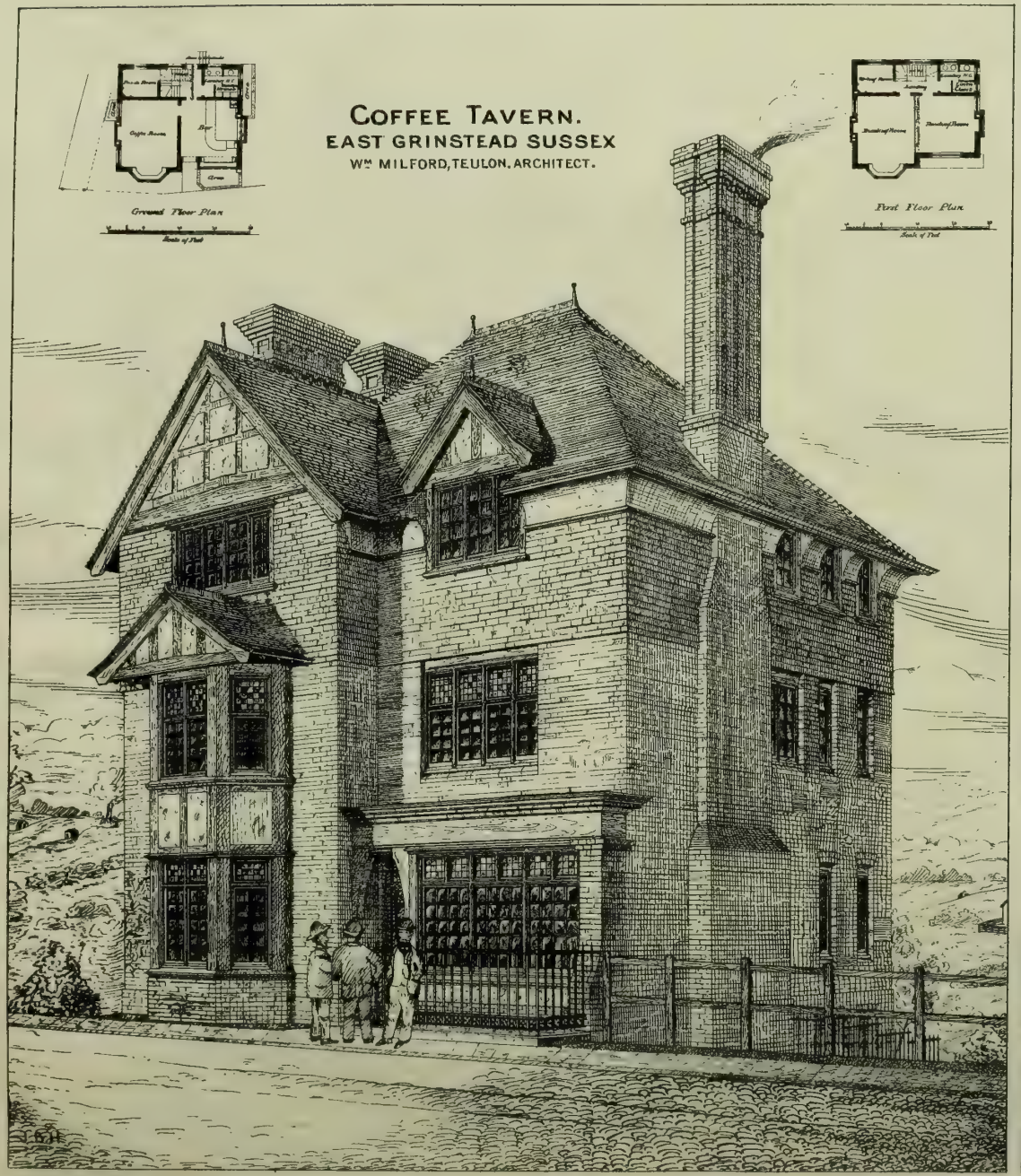


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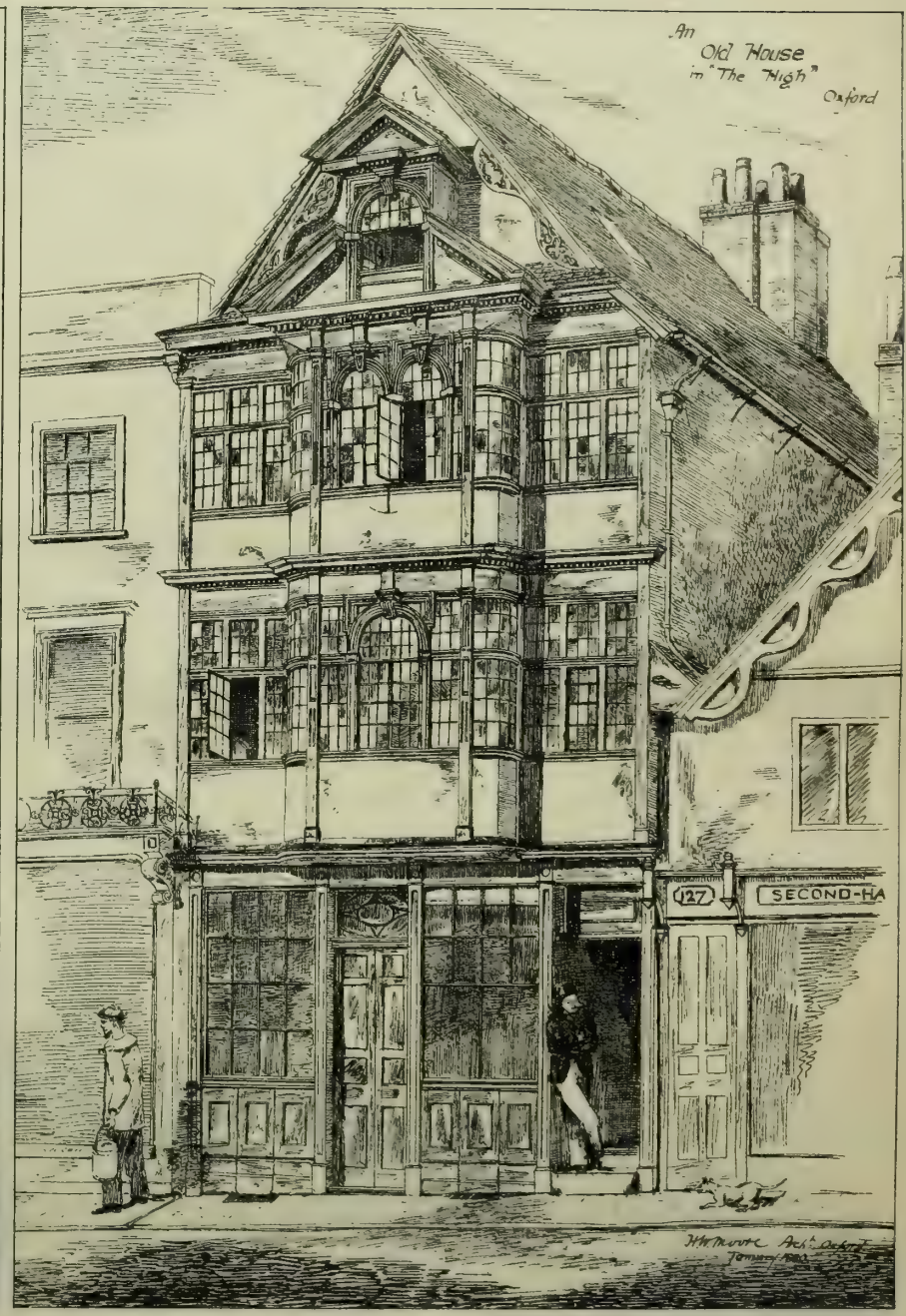
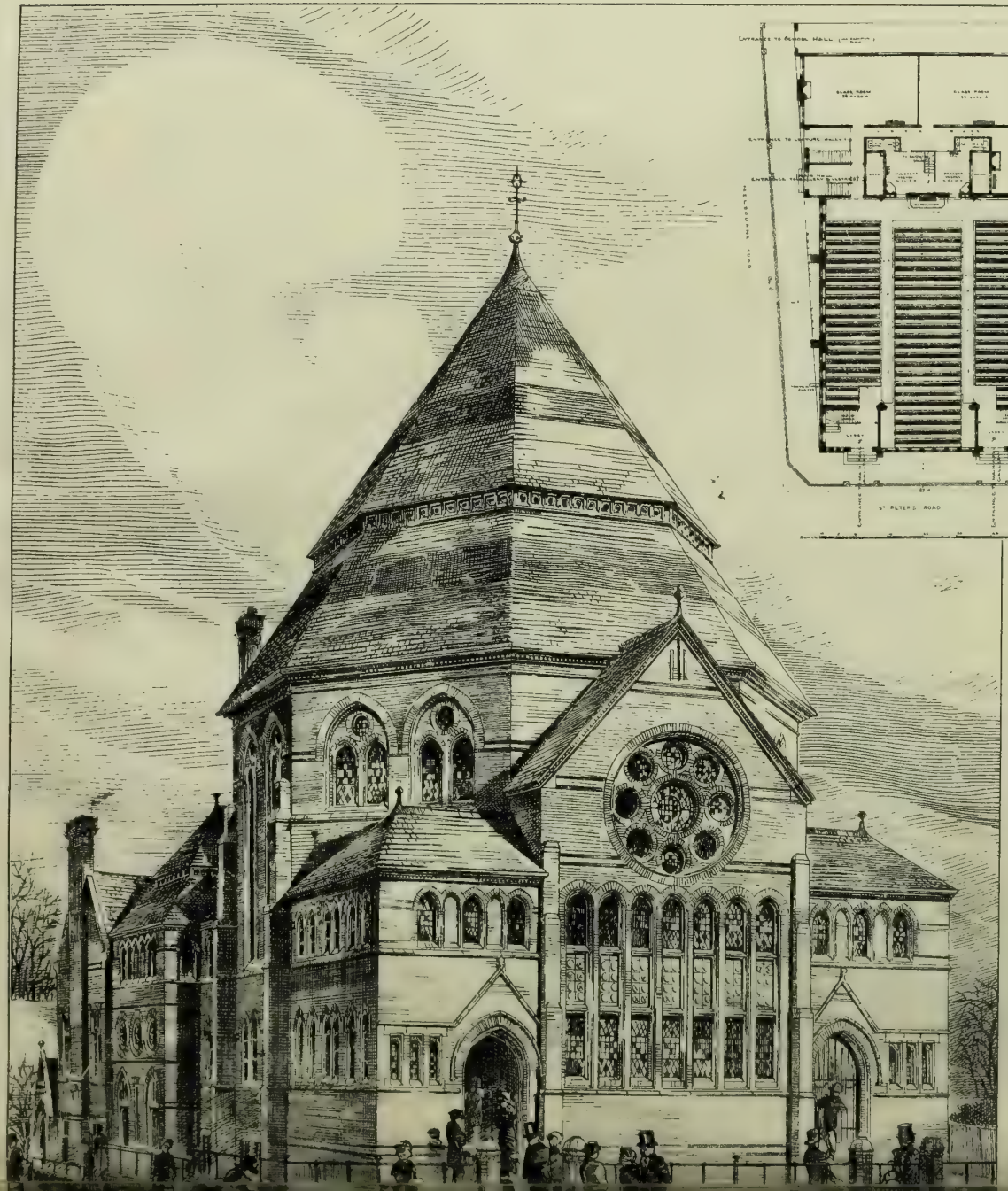
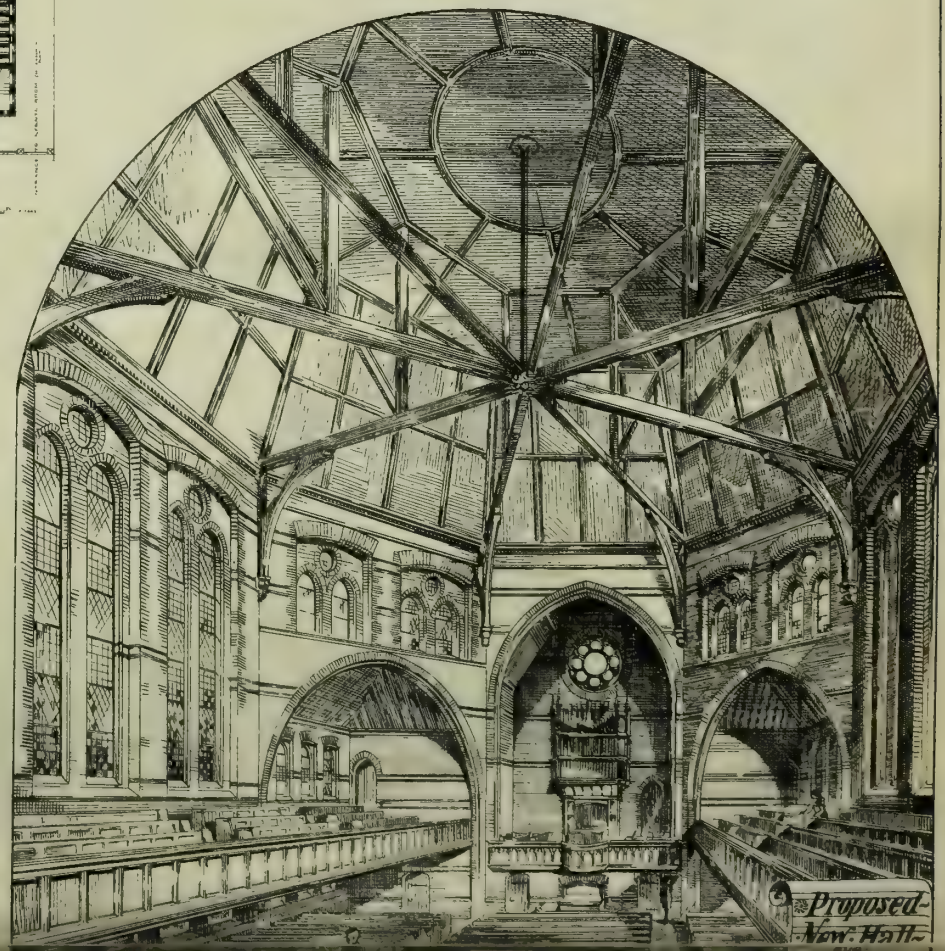
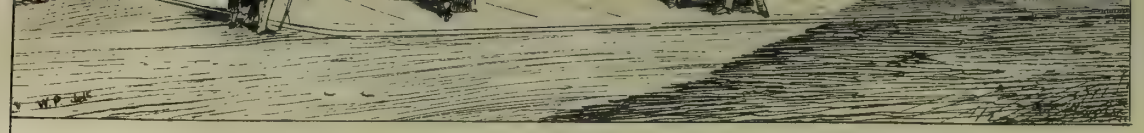


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NEW HALL AND SCHOOLS,
S. PETER'S ROAD,
LEICESTER.



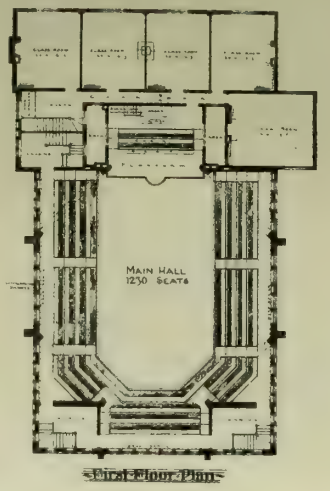




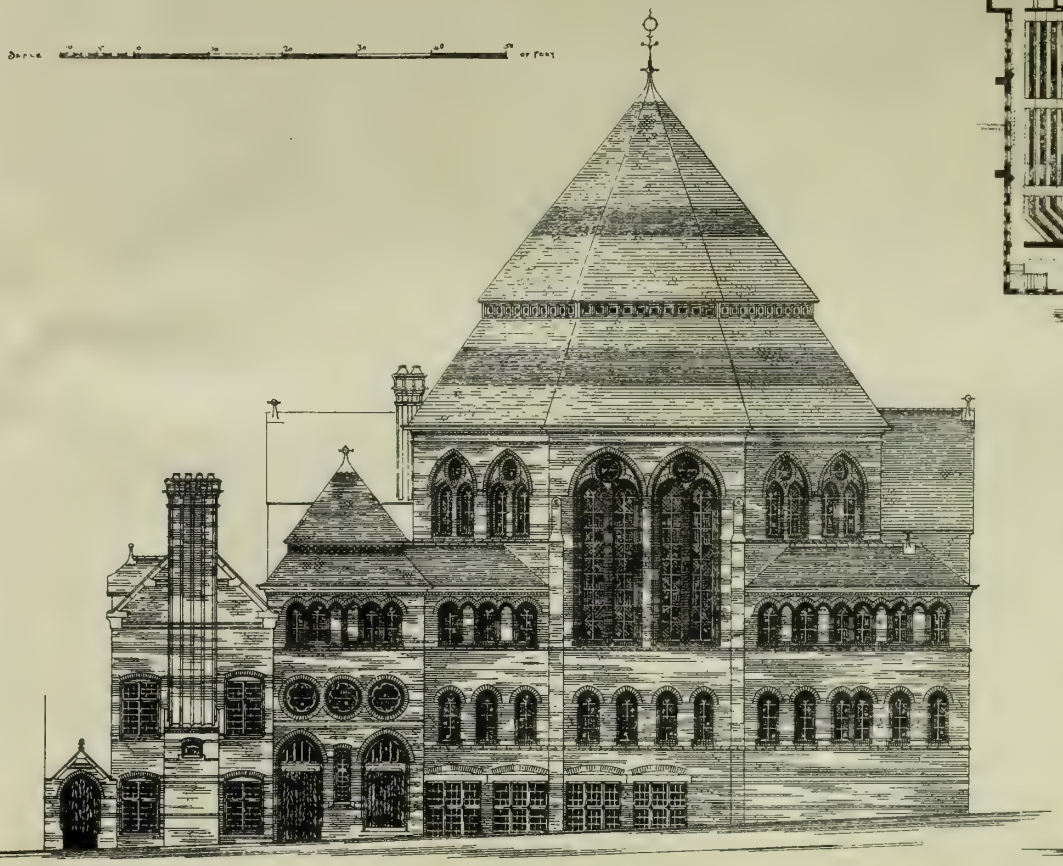


THE SELECTED DESIGN.

GODDARD AND PAGET.
ARCHITECTS.



First Floor Plan

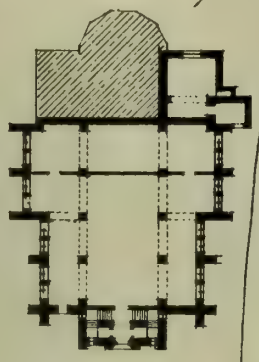


Elevation Melbourne Road

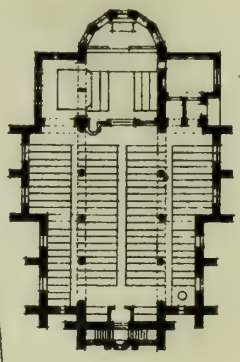
Longitudinal Section

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Lecture Room under Church.



Ground Plan.





Church of St Alban Leeds.

J.T. Walford Architect to Southampton St Strand.

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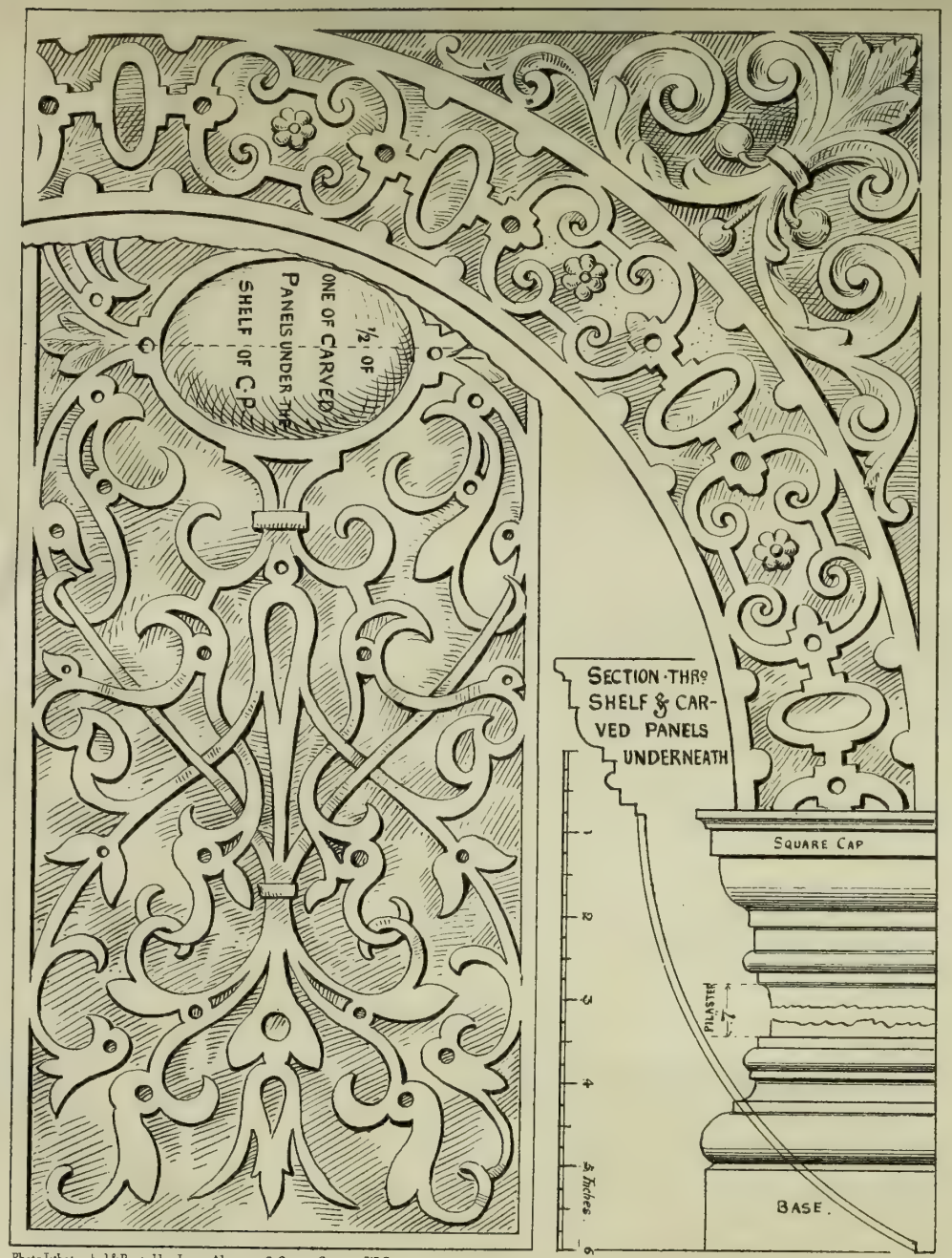
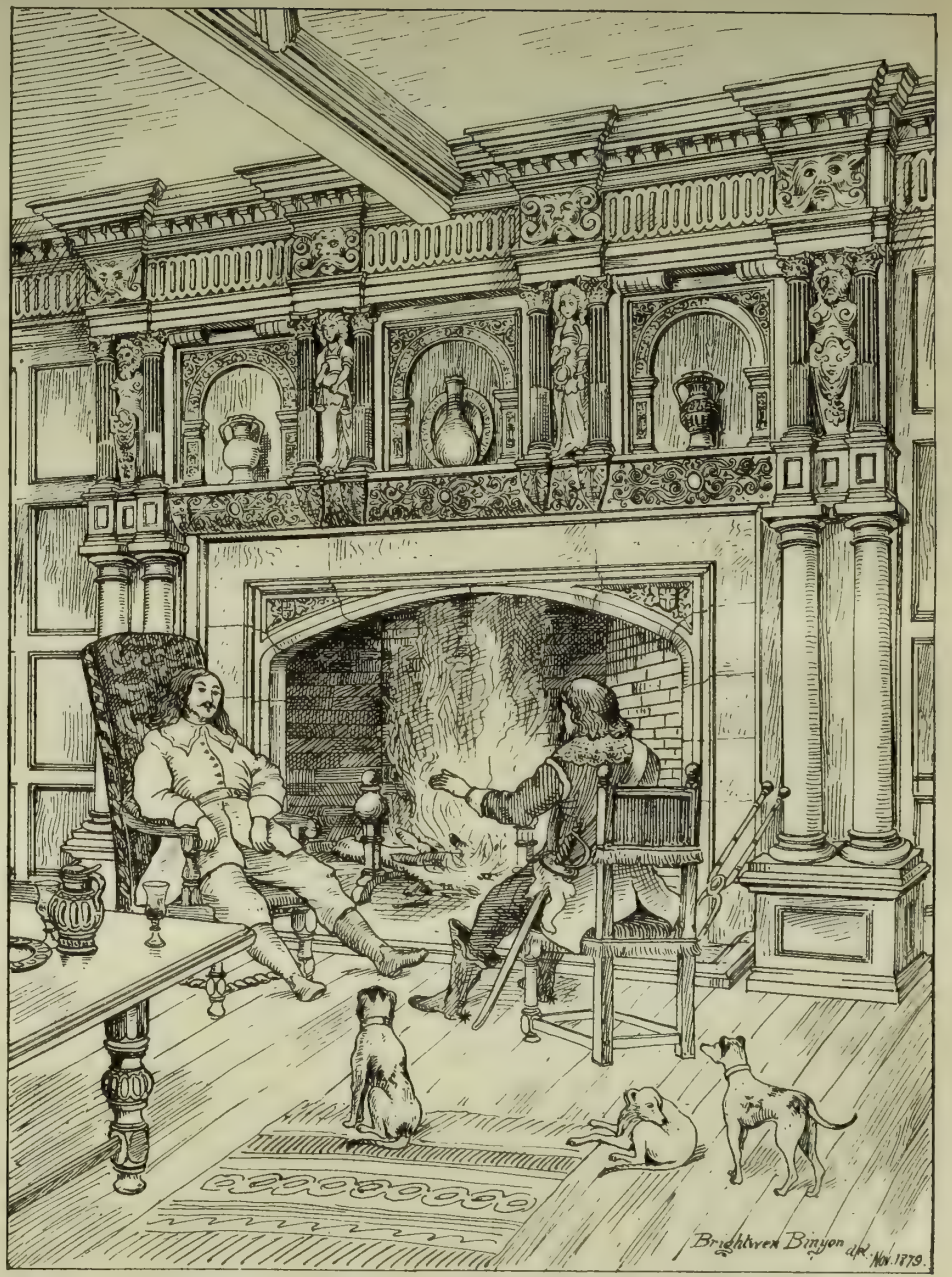


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OLD : CHIMNEY : PIECE : THISTLETON : HALL : SUFFOLK

ARCHITECTURAL METAL-WORK.*

By T. W. Tonks.

THE very position of a nation is held to be shown by how many thousand miles of iron rails it has laid down in comparison with the square mileage of its area; it is tested by how many millions of tons of iron it can produce annually, or by how many it can consume in its manufactures. The very rise or fall of a nation's prosperity is now gauged by the rise or fall of its production or consumption of iron, or by both taken together, and the rise or fall of many an Empire would be of less moment to the world at large than a great rise or fall in the value of iron per ton.

It was not to be expected that the architect would long remain unaffected by this potent factor in modern civilisation. In the middle ages, iron had become recognised for quaint locks and quainter keys, for bolts and bars, for beautifully-wrought hinges and rails. Then for elaborate gates, verandahs, furniture, and much subsidiary work; but it seems to have been reserved for the present century to apply iron in the main construction of a building. Huge girders, iron beams, and supporting columns are now the rule in business architecture, and when we see the enormous weight of successive stories piled upon such slender pillars as we constantly meet in modern buildings we are tempted to echo Mr. Ruskin's fears and warnings as to the probable fate of such erections. The adventurous spirit of nineteenth-century architecture has found in iron a fitting instrument for carrying out its wildest fancies. The Devonshire Conservatory, the Palace of Iron and Glass of 1851, the steeple of the Cathedral of Vienna, and the present Crystal Palace at Sydenham were successive achievements in this direction. Then the old stone bridge that spanned the river, with its many and picturesque arches, has given way to the marvellous Suspension Bridge, hanging almost like a fairy film in mid-air, as with the high-level Bridge at Newcastle-on-Tyne, and the Avon Bridge at Clifton. The exigencies of railway enterprise have given us many diverse instances, such as the Crumlin Viaduct and the Tubular Bridge over the Menai Straits. But, alas, in the unhappy instance of the Tay Bridge, near Dundee, we seem to have reached the limit of that adventurous architecture and engineering in iron, against which Mr. Ruskin so loudly and persistently declaims.

The dangers of corrosion and oxidation may to a certain extent be guarded against in iron construction; but there are always hidden risks arising from flaws or faults in casting, &c., which remain to be considered. It is very possible that as building construction, even in the question of the picturesque or beautiful, the single slender iron column as a support in the interiors of buildings is far inferior and but little less costly than a clustered column would be. In the early spring of last year I visited the Cathedral of Salisbury, that matchless example of the pure unmixed Gothic of England, and was struck immediately by the hint which the clustered columns of the interior gave to the architect in iron. The dark polished shafts of Purbeck marble, clustered round the lighter-coloured freestone columns, suggested iron in a moment by a curious association of ideas. The effect is stable, yet in the last degree graceful, and it seemed impossible to resist the conclusion that a similar cluster of iron columns, the centre one bolder than the rest, and not necessarily cylindrical, would be but little m ore costly than the single shaft. The extra cost would be more than repaid, I should opine, by the additional stability, and the relief to the eye and the mind would be enormous. Instead of the painful sense of inadequacy which the ordinary iron column conveys, the artistic sense would be satisfied by the feeling of security and delight. This plan is, I am aware, adopted in some Gothic edifices with excellent effect, but I am pleading for its more general application.

One of the uses of iron in construction, the need for which I most deeply deplore, is that of tie-rods to keep together the upper walls of some churches or public buildings of any size. In the old days, when stone was the main agent in construction, and churches were built to last, the walls were sufficiently strong to stand of themselves, and not only so, but were equal to resist the storm without, and to sustain the weight of the superincumbent arch without any adventitious assistance. But now a church is built cheaply by contract, and on the conditions that it is to be as large, as convenient, and as richly decorated as may be at the smallest possible cost. The question is, therefore, how thin the walls can be made with safety. Instead of the rich mullioned windows in simple, yet sweet, stone-carved foliations at border and head of column, you have the shallow plastered arch, the weak brick divisions, the painted iron column, and simulated Gothic capital in iron casting; but, last of all, and to crown the degradation, we have the iron tie-rods across the base of the arch of the roof at intervals as you walk down the nave, and you feel that the commercial spirit has injuriously acted upon our modern ecclesiastical architecture. If congregations would consult reality rather than show, and would content themselves with more modest structures which, from foundation to roof-crest, should be thorough and lasting, the architect would have a fairer chance, and the edifice would reflect more sincerely that thoroughness and stability of character which it is the object of religion to build up.

There is little doubt that the great development in the art of the worker in metals in the middle ages arose from the warlike necessities of the times. Not only were the weapons of warfare fashioned with the nicest regard to the services they were intended to perform, but as a man clad in a suit of armour could safely contend against many of the dangers to which he was exposed in the field, this requisite of war brought all the skill and taste of the metal-worker into constant exercise. Thus all that the craftsman could devise in the way of adaptation, and all that the artist could suggest in beauty of form or ornament of surface was brought to bear on the helmet and the coat of mail, on the sword and the firelock. An educated art-workman was thus created, and when he had done his best for the soldier, the priest was not slow in pressing him into the service of the Church. Thus we get the elaborate and beautiful locks, the door-hinges of the cathedral, the screens, gates, and rails which form so remarkable a feature of our ancient ecclesiastical edifices. It is not too much to say that this art is still among us. I hardly know a more beautiful specimen of Early English style metal-work than the brass screen which has recently been executed and placed in Salisbury Cathedral by Skidmore, of Coventry. But it is unquestionably true that in proportion to the population and to the means of production of the present century, the art metal-work of the middle ages was far more abundant, more correct in treatment, more delicate in expression, more elaborate and thoughtful in detail than the metal-work of modern times. There is in South Kensington Museum a chair in silver repoussée, a royal chair in more senses than one. In addition to the beautiful proportion of its various parts and tender propriety of its lines, it is divided into compartments of surface by rich and suggestive ornament. Each compartment, of which there are a great number, contains a bas-relief. The bas-reliefs, all charmingly executed in repoussée, depict a genealogy, commencing with Adam and Eve in the Garden of Eden, going through a large portion of the history of the Bible, and lastly branching off into some fabulous pedigree connecting all that preceded with the history of the country and of the king in whose reign the princely seat was fashioned. You may probably agree that there is much redundant effort, an excess of luxury, and some undue flattery in all this. It is not likely that an order for such a Chair of State would be given by any potentate in Europe to-day, nor is it desirable that there should be. Yet this is an instance, an extreme one if you will, but an instance of the great perfection to which the art of the metal-worker had attained in an age otherwise dark, and in many respects lacking the knowledge and opportunity now possessed by the civilised world. The excellence of hand and eye which had then been obtained by the worker in metals was, however, in unison with, and walked hand-in-hand with the architecture of the time. The style of the Chair of State was the style of the hall of the palace in which it was a central ornament. As you entered the Cathedral and noted the exquisite tracery of the lock, you saw that it had much in common with the tracery of the windows and of the roof. Every touch of the worker in metals was, in point of fact, in harmony with the building for which his work has designed, and this consideration brings me to the central part of my subject.

It is my misfortune to pass nearly every day on my way to business a hideous mass of bricks and mortar put together on strictly commercial principles. I had said bricks and mortar, but I should have said wide columns of bricks and mortar supported on narrow square-moulded columns of cast iron, having between them successive rows of glass-covered apertures dignified with the name of windows. I must premise that in one or two of the apertures in the lower row, doors were inserted, and when I have said there is a roof, I believe I have sufficiently described a piece of utilitarianism which illustrates the full and complete avoidance of every principle of art. This may be another extreme instance, and the Chair of State of the middle ages on the one hand—the cast-iron columns of this midland erection of the year of grace 1880 may be taken as the opposite poles in metal-work. It is a sad confession that the contrast is not in favour of the present day; and this directs us to the singular tendency in this respect of modern architectural progress. Now the architect, as a necessary part of his education, must be somewhat of an engineer. His knowledge of iron must be important and varied. He must understand the supporting power of an iron column as compared with that of stone, brick, wood or other material. He must gauge the relative capacities of endurance and resistance of iron, and its cost in each case as compared with other means construction. The utilitarian element must be studied carefully by him, and every new principle or mode of metal construction economically applied, or he will be in danger of being passed in the race for success by men perhaps otherwise of far less capacity. All this the modern architect must do, all this he will do, in spite of the denunciations of art-critics. Though Mr. Ruskin may inveigh against this feature of the iron age, and though we may own with regret the justice of many of his positions upon this subject, yet all this will not advance the question much. The architect is, after all, like every other professional man, the servant of the public, and though he may within certain limits guide and help the public in the way of taste, yet the public will always determine for him that very important question, the limit of expenditure upon a given building. And if the public is keen upon any points affecting the architect, it is upon the economical construction of a building. To obtain the best accommodation for the lowest price, to have as little wasted space as possible, to carry the greatest weight at the smallest cost, and to have as much light and as much window-frontage as the land will allow;—these are the needs of many clients, who, though ignorant or careless of all else, must be satisfied upon these points. The architect must meet these demands. He is helpless to refuse the conditions offered him, because if one architect does so refuse, there are a dozen others who will gladly comply with them. What, then, can he do? In the answer to this question lies, I conceive, the measure of the influence which the architect is able to exert upon his time.

I have said that the architect may, within certain limits, guide and help the public in the way of taste. He can do so in the first instance, by complying with the demands of the public, but, nevertheless, in all his work giving a bearing in the direction of true art. When Haydon, the painter, set up his theory, no doubt a correct one, that a great historical art was altogether wanting in this country, and then, in pursuance of his theory, set to work painting such pictures of proportions to which no buyers could be induced to respond, we know that he made a serious, a fatal mistake. But when the late E. M. Ward, R.A. (whose end, alas! was equally sad, though probably from very different causes) painted historical pictures with a finish and of a size suited to the dainty dining-rooms or galleries of the British merchant and manufacturer, his success was at once assured. The lesson should not be lost upon the British architect. Without a Quixotic tilting at all the windmills of phantasy which a non-professional critic can fairly indulge in, the designer of a public or private building, if he has the correct aim in view, and if he has a genuine love of his art, can carry out the wish of his patron or

* Read before the Birmingham Architectural Association, February 24.

client, yet always with a determination to make the edifice better, truer, and purer in style than his uninformed proprietor could have expected.

The old Italian conception of the architect was that he was a "Grande Maestro," a complete supervisor as well as designer of a building, and thus that he must have complete control of the construction from beginning to end. In the days when artists like Leonardo da Vinci and Michel Angelo were architects, this title was no empty name, and while the outlines of a building were traced by their decisive pencils, many of the details, and notably more of the decorations, were finished by their own hands. It is not, of course, to be expected that this could be the case in these modern days. The complexity of life is so vast and intricate, the division of labour is so complete, that a man can only attempt to know and understand one thing well. But the one thing that the architect should know well is the way in which the conception or idea of a building should be carried out even to its veriest details. If the architect realises the spirit of his calling, he should not be satisfied when he has supervised the erection of the mere shell of a building. If he leaves the decoration of the interior to others, who can say but that the mere decorator will lose altogether the essential beauty of the style in a crowd of inharmonious details? I may say, in passing, that I consider the effect of the new Council Chamber in Birmingham is seriously injured from this very cause. If, again, the architect leaves the decision as to all the minor ornamental metal-work to others, the same result will probably ensue. This will be the more unfortunate, as with the necessity now existing for plain, simple, economical construction, the only special opportunities the architect has after the general form and proportion of the front elevation has been decided, consist in the ornamental metal-work, and small decorative features. The grill ornament upon the summit of the roof-line, the spouting, ridges, locks, hinges, palisades, and gates are often the only saving clauses he can be allowed to expend his taste and knowledge of style upon, after the huge block of commercial buildings has given its additional mass of shadow to the crowded thoroughfare. Here, therefore, at least art may blossom, and if the architect is indeed the "grande maestro" he will not be satisfied until some at least of the plainness and simplicity of the modern fabric is warmed into beauty by the sympathetic touches of his ornamental metal-work. What is thus too often left to chance or caprice will become to him an important vehicle for conveying that sentiment of taste and fitness which every true architect will desire to reflect in his work. Gutters and spouting, which are now either concealed or left in their naked ugliness of line, as necessary blots upon the building, or as nuisances that cannot otherwise be got rid of, would be turned to true artistic purpose, and made to assist and beautify the effect of the edifice to which they are attached. In the same way, the manufacture of locks and hinges, instead of having become mere specimens of mechanical utility, holding their own with resolute economy of construction against American competition, might again become a fine art. There is no room to doubt that if the modern architect turned his attention earnestly to this subject, we might have the great art-period of the lockmaker of the middle ages restored.

In saying this, I do not mean to infer that such art does not exist now. I believe it does exist, and we have all evidence indeed that when any specially beautiful work of this character is required, and when a heavy price can be paid for it, such work, equal, nay perhaps superior in some respects, to the fine metal-work of the middle ages can be produced. But these are essentially products of luxury, so much out of proportion to the relative cost of such examples in past times, and so much beyond the economical needs of ordinary building construction, that they can hardly be expected to become general. The difference between these old metal-workers and the present is that the former had a real pride in and love for his art, that he worked on true principles with some knowledge and taste, and that whether by his own sense of fitness, or by the design of the architect we cannot now always determine, but by some cause or other his productions always harmonised with the buildings to which they were attached, and assisted in the unity of the leading idea of the style. This appears to have been the rule with the ordinary metal-worker of the middle ages; with us moderns it is the exception. We know there are men, and great art-manufacturers who fully answer to this description; but what of the mass of workmen? Are they not a reckless crowd of Cyclops kind, with one eye only to their work, and that fixed upon it with a view only as to what wages it will bring? The mere mechanical requirements which have been deemed essential have been satisfied in this manufacture, and as little else is asked for by public or by architect, nothing else is given. But there is every reason to believe that, if the professional educated class who are expected to guide the taste of the public in the matter of building construction in Great Britain—if this class will only rise to the occasion and assert its right to superintend and improve these details—a great change will take place. The needs of art-education, both for masters and workmen, are now fully recognised, and though many blunders are being made in the steps taken to remedy this state of things, all these efforts are in favour of the architect, who knows what he wants, and who desires to have metal-work to harmonise with his designs. A general demand for art in architectural metal-work will certainly in time bring about an adequate supply. What is more—an educated metal-worker will in a certain period be built up, and those beautiful specimens of art-work, which are now the luxuries of private palaces or public buildings, will become the natural and frequent adornments of even ordinary streets. What is now so costly will be brought within reasonable limits of price, not because the workman is reduced to wages just above starvation level, but because his educated hand and eye enable the average artisan to execute with pleasure and profit what he now cannot conceive or execute at at all. This is, to my mind, one of the most important considerations which should weigh with the architect in taking the subject up, and it is one which should encourage him to persevere in asserting his right and privilege, to make the metal-work of his buildings the delicate finishing touches which shall emphasise and vitalise the principle of design he has embodied.

It is a good feature of the Bethnal-green Museum that the authorities of South Kensington have gathered together a large number of specimens of architectural metal-work, and have arranged them so that they can be there studied with advantage. The next thing which is desirable is that every great manufacture centre for metal-work should have its branch exhibition, either supported by important loans from South Kensington, or, still better, by grants of specimens of the kind specially suited to the trades of the locality. The first principles of fitness of style will then be learned by the ordinary worker in metals; and then, if the architect keeps the important end in view, the true idea and practice of finish will follow. The malleability, the pliability of metal, the exquisite delicacy to which it can be wrought, all adapt it to the purpose of the architect who desires to relieve the heavy masses of his edifice with the tenderest touches of beauty. Mr. Ruskin, in one of his books (I forget which, for the moment), describes a front of Italian verandah, in hammered iron, in the centre of which a bouquet of flowers was wrought with such grace and sweetness that he avers he has seen nothing comparable to it in modern work. The old gates of Hampton Court, designed and wrought in the 17th century by Shaw, of Nottingham, and now a portion of them at Bethnal-Green Museum, are studies in the much-discussed style of Queen Anne.

MANSARD ROOFS.—THE FRENCH ROOF IN LONDON.

[WITH ILLUSTRATIONS.]

An examination of the majority of French roofs in London will leave upon the experienced beholder the impression of imperfection. These roofs look like French roofs, without altogether being it. It will therefore be useful to consider the æsthetic character of this kind of roof to deduce therefrom the right manner of treatment, and to disclose where London roofs are at fault. The character of the French roof is twofold: it is a roof, and it is a façade. (We speak, of course, only of the upright and visible sides.) The æsthetic character of this portion as a continuation and crowning feature of the façade is so eminent that it is in fact the origin of the entire conception We do not intend here to enter upon a history of this roof; but however far back the first attempts might be traced, this much is certain—that the architectural feature in question had not reached perfection until it had completely assumed that character of façade which constitutes its chief æsthetic merit. For the sake of obtaining clearness on the main point at issue, we will grant that all the other points conducing to the correct appearance of this roof be understood. That cornices, corner rolls, œil-de-bœufs, crestings, slating, &c., be treated with that richness, style, and taste which will give them the character of façade necessary, and we can at once proceed to the most important question: the position of the roof in regard to the façade. This position will in all cases stamp a roof as either a success or a failure; for that the roof, to appear as part of the façade, should as nearly as possible continue on the line of that façade must be self-evident. When, therefore, it is the practice, as in London, to set the base-line of the French roof a few feet back of the line of front to allow of thick walls and space for gutter; when, in addition, it is the practice to start the roof (necessarily so under above circumstances) in the level of the last floor, cornices and parapets of façade rising for several feet above that level; the æsthetic effect of the roof is impaired, and an imperfect feature is the result. The London practice might be excused in the case of very high roofs on buildings standing upon an open space, allowing of a free view; but in all ordinary cases the practice should be abandoned as giving an unsatisfactory appearance.

In all narrow streets the roofs are almost completely lost, barely the crestings visible, and in the case of corner buildings, roofs constructed as above have a box-like, set-on appearance; the want of connection is clearly demonstrated, and in very bad instances even painful to the eye.

To obviate the loss of the roof-surface as much as possible, the line of inclination has gradually been changed from a pleasing angle to almost a perpendicular, the consequence being additional ugliness. Inquiring into the reasons for adopting or maintaining the criticised position given to the majority of French roofs in London; we shall find them insufficient both from the practical and the artistic point of view; from the latter, indeed, none at all are deserving of our attention.

From the former it is often urged that an independent lead gutter is not strong enough for our climate, that it will not stand, cannot be fastened securely, that it needs a stone parapet to give hold and protection to it. These are arguments rather invented to defend a weak case, than the outcome of real experience; for real experience there is none in London in regard to the independent lead gutter. What the parapet has to do with the gutter it is difficult to see; no masses of snow are to be held back, for no masses of snow can accumulate on the steep inclines of the roof. The flat upper roof being in most cases, as it should be, independent, with its own gutters and down-pipes, there is indeed very little water coming to the lower gutter of the inclined portion. A better reason for keeping the roof in the building instead of on the building, is to bring its weight and thrust upon an iron or wooden girder stretched between partition walls in the level of the last floor.

Certainly it must be admitted that if no precautions are taken a great thrust might be exercised upon the wall by placing the roof directly upon it; but this difficulty is easily overcome, and is almost absent if the top roof can be so constructed as to be carried by cross walls or girders, on columns, or a combination of both. In short, the whole question seems to have its origin mostly in a well-known trait of human nature which with us seems to delight to exhibit itself specially in regard to building-constructions. We cling so fondly and so tenaciously to practices once established and sanctioned that to urge a departure seems like a want of reverence.

Whoever may have been the original perpetrator of the outrage upon the French roof; we will hold him excused for many reasons. The hot haste and precipitation with which Classic architecture has been taken to favour again by many architects of late years—unprepared as the Gothic revival has made and left them—is the cause of most of the misunderstanding and misappliance of Classic features, profiles, and

ornamentations to which we are witness. But this condition will, of course, not last for ever, and the day is not distant when magnificent and original works in Classic language may again be expected from English artists.

Architectural books must be held to account for much of our present imperfection in Classic work; elevations are given, but rarely sections, and the text is more descriptive than analytical. But the relative position of features in regard to the perpendicular line is very important. We will now proceed to examine the practice of the French architects. Recognising with true artistic feeling the façade character of the French roof, they invariably set it forward, and directly upon the wall. This process has led to the abolition of the parapet for want of space, and to the adaptation of an independent lead gutter fastened to the roof, and to the stonework of the cornice. Being in most cases a necessity, this gutter has most creditably been turned into a virtue by being made a neat, and in many cases a very ornamental and attractive, feature. The roof obtains now, apart from its proper position, additional character by having all its essential features visible and co-operative in regard to material and design—a logical and pleasing conception. The attached illustrations show the two systems of building the French roof in regard to position and gutter-work, and we venture to hope that our remarks will be made convincing by them. The line drawings do, of course, not render the pleasing contrast of the lead gutter, generally painted dark with a little bright relief, or even gold when ornamented, with the yellow or grey stone of the cornice; but if tastefully treated, the French roof can be made one of the prettiest features of modern buildings. The gutter is executed variously in France; it is fastened to the woodwork of the roof, as with us, and from there the lead is generally bent to the required shape in one piece; the end is rolled up towards the outside, and into this roll the face-piece proper is fastened, making the face two thicknesses strong. The face-piece is tucked into a groove cut in the cornice, and a further piece of lead is soldered on near the bottom, and allowed to cover the whole top of the stone, as is often done in London. The upright joints are marked with a little roll mitred into the top roll, which gives additional steadiness, and cuts the gutter into a series of panels as per illustration; iron straps across the gutter are equally employed. The ornamentations are often stamped in the face-piece, or they are in zinc soldered on. All fears as to the solidity of this manner of working should be dispelled, for it results in as perfect and watertight a job as desirable. There is in fact no part of French building-industry that can claim greater perfection and correctness in the execution than "la plomberie." In regard to the thrust on the wall, the section shows one method of reducing thrust to perpendicular pressure. Other modes for timber construction might be devised; but in many cases where the top roof rests on cross walls, the weight and thrust of the inclining portions may be safely left to an 18in. wall, without any further provision. In elaborate iron roofs the rafters are frequently cast to a shape so as to reduce thrust to vertical pressure. Some of the finest roofs in Paris and New York are designed on that principle. A slight point might be raised in regard to the parapet, which by its weight assists to hold together the cornice-construction. By using a little more massive stones, and with more bed than usual, the difficulty will be overcome, especially as the pressure of the roof helps to solidify the cornice. A good construction, which has merits of design as well, is obtained by the addition of a finish-cove to the cornice, in which case the joint may be most properly made at the bottom of the cima. The termination of the cove can be profiled with a few members, or with a simple round, which will afford a fastening to the lead, and, æsthetically, a desirable base-line to the lead gutter. In the cost, there is not likely to be a great difference between the two systems of construction; if there is one, it will probably be in favour of the French way.

Joseph A. Stark,
Elève de l'Ecole des Beaux Arts, à Paris,
and pupil of Prof. Semper, of Vienna.

London, 1st December, 1879.

The foundation-stone of a new Masonic hall at Canterbury was laid on the 4th inst. Mr. J. G. Hall, of Canterbury, is the architect.

WROUGHT-IRON BRIDGEWORK.

(*Continued from page* 189.)

THE next important thing to having the bridge well designed and properly proportioned in every part, is to ascertain if the iron of which it has to be made is of the proper quality. By this we do not mean that we must see if it will bear a high tensile strain, for this is a mistake which is made in many specifications, and which also satisfies many engineers. We must take advantage of the valuable lessons taught in the results obtained by Mr. Kirkaldy, in his most exhaustive and carefully conducted experiments on the strength of iron and other materials. We often see specified as the only required test of the quality of the iron, that it shall withstand a strain of say twenty-two tons on the square inch without fracture; but Mr. Kirkaldy has shown that the breaking does not indicate the quality of the iron, as a high breaking strain may possibly be due to the iron being of a superior quality, dense, fine, and moderately soft; or it may simply be due to its being very hard and unyielding. On the other hand, he showed that a low breaking strain may be due to the iron being of a common quality, of a loose and coarse texture; or it may be that the iron is of a good quality, close and fine, but at the same time extremely soft. From these results it is very evident we cannot trust to the ultimate breaking strain as a test of the quality of the iron, and there must be some other important qualifications which must be noticed and considered in conjunction with it. This qualification is the ductility of the iron, and in all tests the reduction of area of the original section, or the elongation of the bar after the load has been applied should be carefully noted.

Now for a bridge we neither require very hard iron, which might be safe under a statical load, but which most probably would give way with the smallest vibration, nor do we require a very soft iron; so it is advisable that we should specify the iron to stand first a certain strain which must be in excess of the greatest possible working load, say twelve tons to the square inch, without any permanent set, and afterwards an alternate breaking strain of say twenty-two tons to the square inch, and to stretch say 12 per cent. By the introduction of the first clause we exclude the very soft iron, and by specifying an ultimate elongation we ensure to a certain extent the necessary softness. From the following table, which is copied from one of Mr. Kirkaldy's reports, it will be seen that the different descriptions of iron have widely different breaking strains; so it is always necessary to specify for each class of iron, the strain at which the stretching is to commence, its ultimate breaking strain and elongation:—

Number of samples tested.	Description of iron.	Average breaking load.
188	Rolled bar	25·75 tons.
72	Angle iron	24·50 ,,
167	Plates—along fibre	22·65 ,,
160	Plates—across fibre	20·60 ,,

Engineers of course vary as to the amount of breaking strain which they consider necessary, many being much more lenient than others; but we consider the following as very fair and sufficient tests:—

"All plates must bear a tensile strain in the direction of the fibre, of twelve tons to the square inch, without receiving any permanent set; and to withstand a strain of twenty-one tons to the square inch, and stretch as much as 8 per cent. before fracture.

"All angle and tee bars to bear a tensile strain of twelve tons to the square inch without any permanent set, and to withstand a strain of twenty-two tons to the square inch, and stretch as much as 10 per cent. before fracture.

"All flat bars used as tension bars to bear a tensile strain of twelve tons to the square inch without any permanent set, and a strain of twenty-four tons to the square inch, and stretch as much as 12 per cent. before fracture."

It is occasionally specified that the plate iron shall also bear a tensile strain of say eighteen tons to the square inch *across the fibre;* but this, we think, is an unnecessary qualification to specify. We know that the iron must bear a less strain across than along the direction of the fibre, and it is quite sufficient for us if the iron stands satisfactorily the latter tests; and it is of no consequence to us what it will bear across the fibre, as it will never, or ought not to be, subjected to such a strain in any structure, although we unfortunately see it happening in the shell plates of a badly designed boiler, and more especially in vertical donkey boilers.

Great care should be taken in the preparation of the test bars, all tool marks should be carefully filed out, and the centre of the section to be tested must be in an exact line with the centres of the pins which attach it to the machine; otherwise cross strains will come into action, and the result will be a lower breaking strain than the iron will really bear, had the test bar been accurately prepared.

The texture of the iron can be beautifully shown by washing the surface with dilute hydrochloric acid, when the metallic fibres are at once made very conspicuous and easy of examination. We are very apt to be misled as to the quality of the iron by the appearance of the fracture after it has been broken; for if the specimen be nicked all round with a chisel, and afterwards broken across the anvil with the hammer, the appearance of the fracture is invariably granular or crystallised; but if the specimen be bent and broken slowly, without nicking, the fracture will be fibrous.

It should be stated in all specifications that the tests of the iron are to be carried out by some well-known recognised authority, as Mr. Kirkaldy for instance; their perfect accuracy may then be depended upon. There are, of course, many other splendid testing machines at different works, and also men quite competent to make most accurate tests; but there are also other machines we have seen which are supposed to be accurate which should be certainly marked "doubtful." To show another reason why an independent authority should be employed to make the tests, we will mention a case which came under our notice about three years ago. A firm of engineers and contractors obtained a large order for some foreign bridges; the iron was ordered, came in, and the bars to be tested were selected by the inspector, and cut to the required shape. Upon making the tests, most splendid results were obtained, as some of the plate iron stood a test of twenty-two and a-half to twenty-three tons per square inch before fracture. Upon examining the broken bars, the inspector could hardly reconcile the very high breaking weights with the apparently dirty appearance of the fracture, and upon examining the testing apparatus—an ordinary compound lever machine—he found that the knife edges were out of position. The machine was put right, and fresh tests made, when it was found that this beautiful iron broke with strains of sixteen and seventeen tons to the square inch. The foreman declared it was quite accidental, but a very suspicious circumstance connected with the case was the fact of the foreman being the agent, in an indirect manner, for the makers of the plates. It must not be thought for a moment that we impute any dishonest motives to either the principals of the contractors, or of the iron masters, for it was evidently a matter to trouble the conscience of the foreman only, if he had one.

The following is another piece of sharp practice we remember once hearing of: A large quantity of rails was being rolled for some railway company, under the immediate supervision of their inspector, who had occasionally to test the quality of the iron, under rather a strict specification; and to make sure that the bars he picked out were the ones tested, a length was cut off as it left the rolls, allowed to cool for a time, and then plunged into a trough of cold water, taken out and after receiving the identation of his stamp, was sent off to be tested, the tests generally fulfilling to the letter the requirements of the specification. Strange to say, that after the inspector left the yard, a length of rail, *very* like the piece he had cut off, was generally fished up from the bottom of the trough, and thrown upon the scrap heap!

It is very necessary that persons appointed as inspectors of bridge-work should be experienced, practical men—men who have passed through the shops, and who, besides being competent judges of good work, are alive to all these little tricks. It is also necessary that an inspector should be a man of good judgment, as he often has to exercise a little discretion about matters which can hardly be specified or shown on the drawings. It is here that a young inspector, either through inexperience, or being afraid of

not following the strict letter of his instructions, often causes great inconvenience and annoyance by not allowing some trivial thing which a more experienced man would not for a moment hesitate to do; or he may enforce conditions which perhaps are vaguely limited at in the specification, but which were certainly never intended to be so rigidly enforced.

Many specifications seem to be very imposing documents, and are no doubt thought to be wondrously clever. They are certainly very voluminous, but there is a great deal in many of them which might very easily be left out, and which would make them far more intelligible if it had been. A specification cannot be too concise; all superfluous phrases and impossible conditions should be omitted, and nothing inserted but what really gives necessary information as to the details of the structure, and the conditions of its construction and erection; great care, however, should be taken that every information is given in the specification, or on the working drawings which accompany it, as anything omitted, or not clearly shown, causes a great deal of inconvenience and delay, and very often the unnecessary use of a large amount of bad language.

Before concluding our paper, we may mention a word or two about the testing of girders. Small girders are often tested by placing two of them back to back, fixing a hydraulic ram in the centre between them, and applying half the testing distributed load. This plan is obviously an unfair one, for if we work out the stresses under the two different condition of the load being distributed and applied at the centre, we find that the web at the centre with a central test load receives a far greater strain than it would do if the load were distributed; and the web at the ends for similar reasons, is subjected to a less strain than it should be.

To obtain the deflections of the girders under the different loads, and the permanent set, the common practice is to drive stakes into the ground at certain intervals along the outside of the bottom boom, and then square off the deflections at the different points. This is a good plan, and perhaps sufficiently accurate; but we think it is not so neat or convenient as the method of fixing a strong wire at one end of the bridge at a convenient height, and allowing the other end of the wire with a heavy weight attached to pass over a pulley fixed to the other end of the bridge. In this plan care must be taken that the wire is perfectly clear of everything, and before squaring it on to the bridge, before applying the loads, it should be "struck" two or three times, just as we strike a chalk line, and allowed to assume its natural form. The great advantage of this method is that the deflection can be taken at any point, at any time, without having to deduct the settling of the foundations as is necessary when stakes are used.

W.

ROADS AND THEIR REPAIR.

SURVEYORS differ considerably with regard to the most economical plan of road-repair, and many of our metropolitan surburban roadways show at this time of the year very unfortunate results of want of method. It is a common practice to loosen the surface of a road before putting on new material, the object of which is to make the new materials unite more readily with the old surface. This plan has been strongly objected to by many experienced authorities. Sir H. Parnell, for instance, condemns the practice as wasteful and destructive to the old coating of thin roads, and it would be of some use to ascertain the results of repairs made on this principle. It is quite certain that roads are often spoilt by this method, and for thin roads it is best to lay the new material in damp weather, simply loosening the margins of the patches to hasten the setting of the stones. The distribution of the traffic when roads are under repair is also of great moment, and in London this has to be attended to with as much care as the traffic permits of. The chief thing to avoid is the formation of ruts upon the same track, almost an impossibility in some towns, especially in busy thoroughfares. A good binding material that will materially aid in the consolidation of loose and displaced stones is the fine stuff taken from the side channels, and a sprinkling of this over the loose patches of new material will be found sufficient. In many of the suburban roadways a large expenditure in repairs is entailed by the want of systematic examination of the roads at stated intervals. We see a road completely cut up by ruts before it is taken in hand, the consequence being it is almost impossible to repair it. It should be the rule to fill up the wheel tracks and holes as soon as the road is in a moistened state, so that the new material may be gradually worked in before the winter commences. To commence repairs in the winter, as we have constantly observed in roadways under the management of district boards, is to postpone the consolidation of a road, for directly the frosts set in all coherence is destroyed, and the material is unmanageable. So important a roadway as that over Waterloo-bridge has recently been subjected to the operation of spreading new material, with a result that ought to have been foreseen. The frost has retarded its completion, and the stones are still loose and scattered. In France the system of repairing is different to our own. Minute and careful examination of the roads is made from time to time, the dust and mud are removed and a clean surface maintained, and all ruts and depressions are filled by small patches, under the belief that the more perfect and finer the surface is kept, the shock from vehicles and, consequently, the wear of road, is lessened. The material for repair is broken fine and applied in small patches. In the *Annales des Ponts et Chaussées* an account is given of the method. The surface of the spot to be repaired is picked up, after being carefully outlined, and the loosened materials are raked out and divided into coarse, middling, and small. The coarse material is put back with new materials, so as to cover the spot entirely. The surface is then rammed lightly, and the middling-sized materials spread over and rammed, and then covered with small stuff and detritus, and again rammed. We are told by competent authorities that this system of careful inspection and cleaning and patching in small quantities with fine material has been carried out with good results. It may not be possible to adopt the same method in our large towns, where thick coats can be economically laid by the aid of rolling, but we cannot but enforce the advantage of more labour in attending to the surfaces of our roads, in removing the mud, which forms so large a proportion of the road ingredients, in wet weather, and in thus taking away the soft material which is readily acted upon by wet and frost. The disgraceful condition of the roads in many parts of London is attributable to the want of careful sweeping and timely repairs, which might be done by organised labour, properly directed, with a certain saving to the ratepayers. The roads are now allowed to get into an almost impassable condition, they are then attacked by gangs of men and covered with new material, the traffic is diverted or stopped, while the public are made the victims.

LARGE TUNNEL SHAFTS.*

MR. J. H. WATSON BUCK, M. Inst. C.E. the resident engineer of the London and North-Western Railway, a gentleman well known for his work on "Oblique Bridges," and his practical experience in tunnel construction, has lately brought out a useful work on the above subject. It is one branch of the subject which does not appear to have been discussed in the ordinary treatises on stone-cutting, probably from the fact that it required a more than ordinary knowledge of descriptive geometry to be brought to bear upon it. Mr. Buck's essay will enable the practical engineer or mason to work every stone in the base of a large shaft by the assistance of templates above ground. The author sets out with a consideration of the geometrical principles involved in the construction of shafts, and describes the process by which points may be obtained in the curve representing the development of one quarter of the soffit of the circular opening. In Chapter II. the author shows how to obtain the development of the same opening and the direction of the joints by means of calculation, and he proceeds to show the application of the formulæ to an example. To facilitate the operation, the author collects the formulæ in a tabular form, which will be found of service. The developments of the intrados and extrados, showing the joints of the courses, are given by calculation; after which the methods of working the backs of the voussoirs; their faces (which latter, of course, coincide with the carved surface of the interior of the shaft); the top beds, skewbacks, &c., are given in detail. Many of the methods given are of extreme practical value to the mason, and the observations on the form of arch, the rules for ordering the stone, and the construction of the templates will be found of considerable use in the solution of this rather complex problem of constructive masonry. The plates given at the end amply illustrate the methods, and the examples are drawn to a large scale, so that anyone with ordinary knowledge of geometry can master the subject. We commend the book to the engineering profession, and to all who have to build similar shafts.

* The Construction of Large Tunnel Shafts. By J. H. Watson Buck, M. Inst. C.E. London: Crosby Lockwood and Co.

NEEDLEWORK.*

THIS is the title of another little manual on art, published in Macmillan and Co.'s series. The authoress, Elizabeth Glaister, writes chiefly for those who desire to learn and practise good decorative needlework at home, and the practical part of the art is chiefly treated of. It is shown that art needlework should have a decorative purpose, that arrangement, design, and colour should become the ruling principles in good work. Miss Glaister's little book is to assist in this work, and to inspire a taste for decorative needlework among ladies. The introduction gives some useful hints. The study of old work is recommended to the beginner, and the book is studded with diagrams of a suggestive kind, if they are sometimes wanting in spirit and vigour. The student is told to study heraldry, illuminated manuscripts with embroideries and borders represented, metal-work, pottery, &c., for patterns for embroidery, but not to implicitly copy what he sees. The remarks on the representation of ivy leaves are sensible, and the author strongly enforces the need of conventionalising nature, not copying "so very naturally." The early Flemish and Italian paintings are pointed to as supplying a rich assortment of materials for design. The passage on what constitutes a good pattern, indicates thorough discernment in art, and we quite approve of the remark "that the productions of our own day will probably be censured for a too-great naturalism. We have more science than culture; our technical skill is greater than our knowledge of art, and we pay more regard to the life-like representation of an object than to its proper decorative use." Chapter III. furnishes the reader with general practical advice, after which follow directions for working curtains, screens, chimney-piece hangings, piano-fronts, table-cloths, chair-coverings, quilts, and coverlets, and other decorative furniture. As regards colour, the student cannot go wrong if he takes the author's advice to use harmonies in shades of one colour. We cannot admire all the designs given; some are too naturalesque in treatment, as in the curtain with dado, Fig. 10, and the design for screen, Fig. 20; but the general directions are excellent, and the manual is pleasingly written.

* Needlework. By Elizabeth Glaister. London: Macmillan and Co.

BOOKS RECEIVED.

Spon's Architects', Builders', and Contractors' Pocket Book for 1880 (London: E. and F. N. Spon) has now seen seven annual editions, each more complete and compendious than the last.——*Proceedings of the Association of Municipal and Sanitary Engineers and Surveyors*, Vol. V. (London: E. and F. N. Spon) embraces the transactions of the Society named for the years 1878-79.——*Sewage Disposal. Intermittent Downward Filtration, Per Se*, by J. Bailey Denton, M.I.C.E. (London: E. and F. N. Spon), is a second edition of Mr. Bailey Denton's well-known and most useful pamphlet. The practice of intermittent filtration, as adopted and recommended by the author, having survived the passing prejudice created by erroneous statements, the author takes the present opportunity of announcing that he purposes shortly to publish a full description, with the precise cost, of several important works carried out by him, in which intermittent filtration has formed the principal feature, in the hope of completely re-

moving any adverse influence those erroneous statements may have had.——*Our Water Supply* (London: W. Trounce) is a reprint of an instructive discussion for and against the fitness of Thames and river water for domestic use, which appeared last year in the *Surrey Comet*.——*View of the Proposed Forth Bridge* (Edinburgh: J. Bartholomew; London: Geo. Philip and Son) has been carefully prepared, with the consent and approval of Sir Thomas Bouch, from his large elevation and working plans, and has been adapted to the actual position which the bridge will occupy in the landscape, the artist having had pointed out to him upon the ground the exact situation of the structure. The total length of the bridge is one mile and a-half; the length of the two great spans is 1,600ft., or about one-third of a mile each; the height of the bridge above high water is 150ft.; the height of the towers 600ft., and the total weight of the chains 6,000 tons.——*Bevis's Builders' Price-Book* (London: Bevis and Co. and B. T. Batsford) is issued for the third time, revised to date, and with some useful matter added. The youngest of the price-books, it has speedily earned for itself a creditable position.——*The Antiquary* (London: E. Stock) certainly keeps up well. We notice in the March number, Part I., "Notes on some Northern Minsters," by our old friend and contributor the Rev. Mackenzie E. C. Walcott, B.D.——*The Secret of a Good Memory*, by Dr. J. Mortimer Granville (London: D. Bogue), is an interesting little book. Our own experience is—of course, always excepting cases of actual bodily or mental weakness—that forgetful people are simply too lazy to remember; and we have not much hope of their improvement from efforts made by authors and others on their behalf.——*Examples of Works of Art in South Kensington Museum* (London: Sampson Low and Co.) is Part I. of what should, and we trust will be, a most useful work. It is also very cheap, and if accuracy is maintained in describing the objects illustrated, will be sure of support.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Edinburgh Architectural Association.—A meeting of this Association took place last week, when a paper upon the design and application of stained glass was contributed by Mr. Alex. Ballantine, wherein he described the details and colouring practised by the artists of the Middle Ages, and the appropriate relation of windows produced at that period to interior architectural effect. Mr. Ballantine advocated a study of ancient examples in order to acquire skill in blending light silvery shades of glass with pieces of full-toned colour, which together produced richness with harmonious admission of light. He noted how church architecture in Scotland had gradually resumed designs belonging to ante-Reformation periods, and adopted elaborately ornamented stone tracery, while it had for a long time to contend with prejudices against the adoption of painted glass. The first yielding was only to the extent of designs strictly of an ornamental kind, and numerous windows were filled with kaleidoscopic and unmeaning combinations of vivid colours. The first introduction of Scriptural illustrations in Presbyterian churches occurred in 1857, in Greyfriars' Church, under the late Dr. Robert Lee, and so rapidly had his example been followed that religious or denominational objections were now seldom offered. Mr. Ballantine explained practically the various modes of execution, and also the character of glass design applicable to domestic decoration, recommending the application of a rich crystalline texture with the colour throughout the substance of the glass, in preference to enamel or the uniform vivid colours of modern sheet glass.

Exeter Diocesan Architectural Society—The annual meeting of this society was held on Thursday week. After the reading of the report, and the transaction of the usual business, Mr. E. Ashworth read a lengthy and interesting paper upon "Romanesque Churches," illustrated by means of a large number of drawings and photographs. Mr. Ashworth pointed to some of the noblest examples of Norman work in this country, amongst them the Cathedrals and Abbeys of Durham, Winchester, St. Alban's, Tewkesbury, Gloucester, and Norwich, which were shown to have had their arcades and features derived from the early Lombard examples of the 6th century. The Romanesque churches on the Rhine were described as combining the Lombard features with the central low dome of the Greek church. The churches of St. Gereon, St. Ursula, the Apostles, St. Maria, &c., at Cologne, were illustrated with a notice of its far-famed *Dom*, to be completed as to its western spires in September, 1880. Remarks were also made on the churches of Bonn and Coblentz.

Royal Archæological Institute. — The monthly meeting of the Archæological Institute was held on the 4th inst. A paper read by Mr. Matthew H. Bloxam, of Rugby, was devoted to an explanation of two monumental effigies, one of them of a very unusual type, in Lutterworth Church, Leicestershire, and was accompanied by a series of photographs illustrative of the memorials themselves. Among the other objects exhibited were two figures in terra-cotta, found in an urn, with iron nails, in the neighbourhood of Bury St. Edmunds. These were exhibited and explained by Mr. E. M. Dewing. The Rev. R. Drummond Rawnsley also exhibited a bronze tip of a staff, socketed, from Egypt. Mr. R. B. Utting exhibited a small steel casket, of curious workmanship, of the eighteenth century; and Mr. R. Ready a silver-mounted snuffbox made from the wood of the Royal oak at Boscobel, bearing on its lid an oval medallion of King Charles I., while on the back is engraved a representation of the celebrated oak-tree, with Charles II. in its branches and a body of troopers in search after him below.

COMPETITIONS.

Lancing.—Six sets of drawings were sent in for competition for the proposed new church at South Lancing. These drawings were examined on Friday last by Mr. J. Oldrid Scott. On his recommendation, the Building Committee have selected the designs prepared by Messrs. Hanson and Walker, 5, York-buildings, London, and Priory Gate-terrace, Dover. The drawings sent in by Mr. Horace Bradfield, pupil and assistant to Mr. J. P. St. Aubyn, of Lambe-buildings, Temple, were highly commended by the arbitrator, and to Mr. Bradfield a premium of £10 was awarded. To Messrs. Scott and Hyde, architects, Regency-square, Brighton, a premium of £7 was awarded. The estimated cost of first block of buildings, consisting of a nave, and containing accommodation for 250 persons, amounts, with incidental expenses, to about £1,300.

Sheffield.—The Sheffield Church Extension Society are about to build a new church in Langsett-road, and, some time ago, they invited architects to send in plans. These plans, which number thirteen, were on Monday exhibited in the Church Institute. The building to be erected must seat from 600 to 700 adults. The designs were required to be complete without tower or spire, the total cost, including all internal fittings (excepting the site, warming, lighting, and architect's commission), and also including all boundary fences and gates, not to exceed £3,500. In three instances, two sets of plans have been sent in by one architect; one set indicating an erection in brick, and the other in stone. Those competing are Messrs. Flockton and Gibbs, Mr. J. D. Webster (two sets), Mr. J. B. Mitchell-Withers (two), Mr. S. L. Swann (two), Messrs. Wilson and Masters, Messrs. Garlick and Garlick, Mr. Martin Carr, Mr. B. H. Wightman, Mr. J. Morton, and Mr. G. W. Wilson.

The Birmingham new Free Library.—Alderman Heaton has given notice that, on the consideration of the report of the Free Library Committee, at the next meeting of the Town Council, he will move, "That the plans now submitted be referred back to the committee, with instructions to have designs prepared by more than one firm of architects, in order that the Council may have several plans to select from;" also, "That any committee requiring the services of architects for the preparation of plans and estimates be required to ask for designs by advertisement or otherwise from suitable parties, from which the committee may select the plans they consider best suited for their purpose, and submit not less than two to the Council for approval."

Building Intelligence.

Richmond.—The Castle Hotel, Richmond, is now undergoing extensive alterations, prior to opening under new management on May 1st. The works, which comprise a new coffee-room, with new kitchen and service-rooms, new bath-rooms, lavatories, &c., are being carried out by Messrs. Patman and Fotheringham, of Theobald-road, builders, Messrs. E. Clements and Co., of Great Russell-street, engineer, and Mr. E. Bell, painter and decorator, from the designs of Mr. C. J. Phipps, F.S.A.

Hammersmith.—The new church of St. Simon, Rockley-road, West Kensington Park (near Shepherd's Bush Green) was consecrated on the 28th ult., by the Lord Bishop of London, and there was a large congregation. The church consists of a nave, with north and south aisles and clerestory windows, and an hexagonal tower, and, when completed, will be surmounted by a spire, rising to the height of 120ft.: but for want of funds it has been found impossible to complete the same, as also the building of chancel. The church is faced with brick, inside and out, the middle of walls being filled in with Portland cement concrete. The dressings are of Bath stone. The style is Gothic. The nave is 90ft. long by 60ft. wide, inclusive of both aisles. The roofs are open, and of Baltic fir, and covered with Broseley tiles, the height to ridge of nave being 56ft. The north and south aisles are divided from nave by five arches, supported on columns of Corngrit stone, with carved capitals and bases. The church has also a fine chancel arch. The rings of arches are of red brick. The windows are glazed with cathedral glass in quarries of various tints. The church will seat 800 persons, one-half of seats being free. Mr. A. W. Blomfield is the architect, Mr. Sawyer the contractor, and the work was superintended by Mr. J. Vaughan, clerk of works.

We have received the 15th edition of the Illustrated Catalogue of Messrs. J. Weeks and Co., horticultural builders and engineers, of King's-road, Chelsea. One of the most important features which this firm has introduced is their improved form of cast-iron and slate foundations, which, it appears, they have adapted to horticultural buildings, with a considerable saving of cost and space. One of the illustrations shows a sectional view of a vinery constructed in this manner. The wood and glass framework rests upon a series of cast-iron standards, one below each upright, and these standards are let into the ground about 2ft. 6in., and have a foot-plate resting on concrete, and a small top flange. The latter is secured by screws to the wood-plate of the framed lights. The spaces below the lights and between the iron standards are filled in with pierced slate slabs, forming a series of ventilators. The illustrations show many conservatories that have been actually erected, some of a most elaborate and costly description, and others of the modest character of greenhouses. Both wood and iron are adopted by Messrs. Weeks in their buildings. Much has certainly to be done, as we have repeatedly said, to make conservatories something better than tacked-on lean-to's, and while, in this respect, we cannot say that the designs before us exhibit the best models for imitation, we find, in a few of them, indications of a desire to make the conservatory an architectural part of the house to which it is attached. Thus, we note Figs. 8 and 9, the view of conservatory built for S. Page, Esq., at Child's Hill, Wood Green; another, in a so-called Queen Anne style, attached to a mansion. Figs. 11, 16, 18, and 19, 22, and 23, are all suggestive of suitable designs for Gothic and Italian houses. On the other hand, the winter garden given in Fig. 1, the conservatory designed for Colonel Colt, and some others, seem to aim at something beyond the requirements of plant-houses; they look like imitations of Crystal Palaces on a small scale, and the ornamentation is pompous and affected. Several plates, showing large forcing establishments, are given, and a few designs for vineries and peach-houses will be found illustrated near the end of book. Some internal views of lean-to and "shortback" roof forcing-houses will also be found of use, and the patent duplex, upright, tubular boiler, is illustrated in detail.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

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Cheques and Post-office Orders to be made payable to J. Passmore Edwards.

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N.B.—Cases and vols. must be ordered through a bookseller or newsagent, as the regulations of the Post-office prevent them from being sent by post.

Received.—S. T.—P. P. and Co.—W. and J. R. F.—A. R.

A Builder, Stockport. (Is the matter finally settled? It would seem not, from the newspaper cuttings you inclose. If not, your comments would be out of place. If it is so settled, write us again *briefly*, and we will insert your letter.)

"BUILDING NEWS" DESIGNING CLUB.

Drawings Received.—Sub Rosa, Chimney Pot, Heart and Arrow, Wasp, North, Vanity Fair, Fleur de Lis, Merlin, Toledo, T Square, Mot, Honey Dew, Ora et Labora, No. 90 (gable copied from Merston Rectory), Edwin, Alfred, Franktonhook, Ogmore, Hornet, Excelsior, Presto, Pupil J., Mustapha, Clansman (2), Burswell, Attempt, Sagitta, Null Bien San Pien, Lancaster, Pendennis, Motto J. L., Quod, T. W. in lozenge, XL., Leopilton, Gemshorn, A. U. C. in triangle, Our Praises are our Wages, Juvenis, W. in W., Binny, Wasp, Fidessa, Black and White, B in three circles.

Received.—Herbert D. Pritchett, A. Joseland.

Correspondence.

THE CARDIFF FREE LIBRARY COMPETITION.

To the Editor of the Building News.

Sir,—In your issue of the 5th inst., we observe a letter signed "L. and G.," having reference to the competition for free library, museum, &c., at Cardiff, complaining that a second and a considerably modified set of instructions was issued by the committee, and supplied only to *some* of the competitors. If this is true, it is a very important thing, and forms a serious charge against the committee.

It occurs to us, however, that the explanation may be found in the fact that many architects, ourselves amongst the number, wrote to the committee asking certain questions which suggested themselves on a perusal of the instructions. After waiting some little time, we had forwarded to us a lithographed sheet containing answers to many questions that had been asked, our own among the rest. Can this list of replies be the same as the "amended" instructions complained of? It may be; but if so, it considerably reduces the charge against the committee, although we cannot excuse them for not furnishing these replies to *all* the competitors, instead of only to those who had asked for further information.—We are, &c.,

Two More Competitors.

Sir,—The whole of the proceedings in connection with the selection of the designs in the above competition are manifestly so unsatisfactory as to call forth indignant comments from all honourable competitors.

In the first place, as "L. and G." pointed out in your issue of the 5th inst., the Cardiff Corporation supplied amended instructions to some of the competitors, whilst others were allowed to work in the dark. This, however, is not the only grievance which distant competitors have to complain of. It is stated that the corporation has already discarded all designs other than those bearing the mottoes "Reference," "Thoughtful," and "A Local Effort"; all of which designs are "efforts" of local architects. So far from being a genuine competition, to be decided on the merits of the designs submitted, this so-called competition has become a contest between the influence of the friends of the several local competitors who are on the committee appointed for selecting the prize designs. Nor is this all; for not only have the authors of two of the three designs above referred to taken no trouble to conceal their identity, but have put themselves to no little pains in the other direction. It is generally known, in and about Cardiff, that the design marked "Reference" emanates from the office of a local triumvirate who have, before this, made themselves pretty conspicuous in other local competitions. With respect to this design, it has been alleged, in correspondence published in the *Western Mail*, that not only is this design not the best, but that much better plans have already been discarded by the committee; that it does not comply with the conditions; that it bristles with defects; and that its only chance of success is implied to proceed from local influence.

It was suggested that some well-qualified, disinterested architect should be called in, to report upon the designs submitted; but the Cardiff Corporation has not adopted the suggestion. A committee of twelve members of the corporation has been appointed to select the prize designs; the result being that, out of the entire 107 designs submitted, three *local* designs have alone been chosen, from which the two premiated designs are to be selected. Now, Sir, I ask, considering that there are not more than twenty architects practising in Cardiff, is it at all likely that no one out of the 107 designs sent in, except the three *local* efforts before referred to, could be found worthy of ultimate consideration?

In the hope that some action may be taken by the profession, as a body, to prevent the perpetration of a great injustice, I beg that you will insert this letter in your next issue.—I am &c., Fiat Justitia Ruat Cœlum.

Cardiff, March 9, 1880.

[We reprint the correspondence referred to from the *Western Mail* of March 9. We trust the Cardiff Corporation are not going to add another to the long list of unfairly-managed competitions. We have waited anxiously for an opportunity of criticising the designs, and if the Corporation really intend to deal impartially by the very large number of competitors who have responded to their invitation, they will not hesitate to afford us the right we claim on behalf of the profession.—Ed B. N.]

(by a professional correspondent.)

A firm of architects, in a letter to the Building News of Saturday last, writes as follows:—"Subsequent to the issue of particulars furnished by the committee to competitors, it was found necessary by the committee to amend the instructions in a very grave item, and several Cardiff architects, aware of the alteration, prepared second plans in accordance with the same. Personally, we did not receive any notification of this departure from the original instructions, and trust the committee will consider the great expense and trouble to which the competitors have been put, and award the premiums in such a manner as to do justice to those architects who, like ourselves, have apparently been working 'in the dark.'"

Now, it is obvious the conditions of the competition have either been altered or they have not. If the conditions have been altered I submit that every individual architect competing should have been apprised of the alterations, or, failing that, the designs submitted should be adjudicated upon in compliance with the conditions and instructions first issued, or competitors in the position of "L. and G." will have reasonable grounds of compl.int against the committee.

Some time ago the desirability of calling in the assistance of some well-known disinterested architect to report upon the designs submitted was suggested in your columns. The Cardiff Corporation, however, have thought fit to make their own selection, and I learn that they have already reduced the competitors for the prizes to three, by discarding all the designs except those bearing the mottoes "Reference," "Thoughtful," and "A Local Effort." On the merits of the two last-named designs I will at present say nothing, but with regard to the design marked "Reference" I should like to point out some of its most prominent defects before the final decision of the corporation has been arrived at.

In the first place, the authors of this design have made structural stability and general fitness in their street elevations entirely subservient to the placing of two gigantic oriel windows in the Working-street façade, and a third in Trinity-street. I am of opinion, and I believe my opinion will be supported by all sensible persons, that it is not necessary to project beyond the line of frontage to provide a north and south view in Trinity-street for students in the laboratory; much less is it desirable to incur so much outlay in the Working-street front in the construction of overhanging water-closets; these offices are much more suitable when designed in a less ostentatious form. The plans bearing this motto present a perfect maze of curved lines. The whole working of the library passes through a passage only 4½ft. wide. A long wall is shown on the second floor, carried by a girder, one end of which rests over an opening, thus illustrating the fact that the authors of this design have not mastered one of the first principles of construction, viz., that pier should be over pier and void over void. The stairs in every instance are composed of "winders," unpleasant to ascend and dangerous to descend: this, of itself, should be sufficient to prevent the adoption of this design, notwithstanding the specious manner the authors have of saying that circular stairs are cheaper than straight, a fallacy which any working mason would scout. In their letterpress descriptions the authors quote four pages from the Regulations of the Science and Art Department, South Kensington, the concluding paragraph being as follows:—"The laboratory would be best placed either under a separate roof from the other classrooms or in the top story of a building," and yet the authors of "Reference" place their laboratory on the first floor, in the room lighted by the costly and elaborate oriel window, which an explosion of gas would most undoubtedly project into the street. I could point out many more defects in this design, which I greatly deplore, because the elevations and perspective views are so artistically drawn that an uncritical observer would be led to expect accompanying excellence of planning. I will, however, for the present be content by affirming that amongst those designs already discarded by the committee there are better plans than those of "Reference," and the corporation will do well to again compare them before arriving at their final decision. The corporation have a duty to perform which I heartily trust they will do irrespective of local influence. I should be sorry for one moment to impute unworthy motives to the committee which has been entrusted with the selection of the designs, but I must say that it seems strange that two out of the three selected designs, viz., those marked "Reference" and "A Local Effort," should be the productions of local architects. I will take an early opportunity of commenting upon the other designs, and, in conclusion, I beg to state that I am not a competitor, and have no interest whatever in the selection of any design, except that, having the interest of the free library at heart, my only hope is that the best designs may win. Further, I shall have no objection to your publishing my name and address after the selection has been made; but for the present I prefer you to withhold it.

TO THE EDITOR.

Sir,—I learn from reading a letter which appeared in the Building News of last week that many of the architects competing have not been supplied with the amended instructions.

This in itself is a grave offence against the etiquette of competition. If amended instructions had to be issued it would have been only just that all should have received a notification of the intended departure.

The first particulars issued were vague and far too general, placing architects entirely on their own resources for the necessities of the proposed scheme, and when, doubtless, many had finished the arrangement of their building, by a side wind only heard that more definite instructions were to be obtained, on receiving them found they had the tedious and unthankful task of remodelling their whole design.

It appears most of the local architects obtained these amended particulars, and perhaps that would account for the eight selected designs being from their number. However this may be, it is definitely rumoured that three local gentlemen—whose names one hears, despite the plans being under motto—stand alone at the present moment in the competition.

One, under the motto, "Reference," will, if obtaining either the first or second premium, provoke considerable adverse criticism. It is seen by the lithographed plans distributed under that motto to the councillors, that the author or authors throw aside the instructions in more than one instance, notably in lighting parts of the plan where they state no light is to be obtained, the accommodation provided in the lending library being about 18,000 volumes less than the required number, and again violating them by placing the main cornice of the principal façade 14ft. higher than the height given. I hope by drawing attention to these points that the committee will see the advisability of selecting a design, in the first place complying with the instructions, and one that will provide ourselves with no material for attributing other than good motives in their selection. Many eminent and most talented architects have competed, and it is certain in their interest, and indeed in the interest of the whole

competitors, the leading professional journals will provide a comprehensive critique on the designs submitted. As a ratepayer I never saw the necessity of advertising so widely for designs, feeling confident that the local talent was more than sufficient. But seeing that it is most probable in the 107 designs submitted that some stranger should have a place, the side remarks I have quoted lead one to suppose that merit, to a certain extent, has been thrown aside, and that interest is strongly at work. However, I hope these rumours have no foundation, and to prevent their taking a firmer hold upon the public mind, it would be well, I think, Sir, to adopt a suggestion made through your valuable medium, of obtaining the services of a qualified referee, in the person of Mr. Waterhouse. I can say for many of the competitors, they would gladly subscribe the expense incurred.

In conclusion, I trust that the flood of light which will be thrown upon the competition when the plans are exhibited will, for the honour of the councillors, and benefit of the town, reveal no fault in judgment, and no cause for regret in their decision.—I am, &c.,

RESPICE FINEM.

HARBOUR WORKS PAST v. PRESENT.

SIR,—Having had my attention drawn to an article in your paper of the 20th February upon "Harbour Works Past v. Present," in which the breakwater at Holyhead has been especially referred to in a manner calculated to reflect discredit upon the memory of those engineers who from the first were connected with it, and also to mislead the minds of many of your readers who are unacquainted with the substantial nature of the great work alluded to, I must beg you to allow me, on behalf of my father, the late Mr. George Clarisse Dobson, space to correct some of the statements made therein.

In the first place, I would observe that the writer of your article appears to have entirely forgotten, while comparing the Holyhead breakwater with the Irish work now being carried out, that the former was commenced in 1847, or nearly 33 years ago, when the construction of breakwaters of any magnitude in this country was comparatively in its infancy. Instead of it being, then, a "simple problem" for the engineer of that day to settle as to what was the best mode of procedure to be adopted at Holyhead, it was a very difficult problem, and one upon which the opinions of several engineers were taken, and it is quite evident that had a vertical wall then been decided upon of concrete blocks of 350 tons each, as used at the Liffey, no breakwater ever would have existed at Holyhead, on account of the immense outlay that would have been required.

The breakwater at Holyhead, including the rubble-mound, railways, superstructure, and head, cost as nearly as possible £164 per lineal foot; while at Dover, where a vertical wall was adopted, in order to afford a landing-place for steamers on both sides of it, the cost per lineal foot amounted to about £345, thereby clearly showing the wisdom of the late Mr. Rendel's decision, to build the superstructure of the Holyhead breakwater upon a rubble mound; seeing, too, that within so short a distance from the site of the work, such ample material was at hand in the Holyhead mountain. Moreover, your correspondent seems to have overlooked the circumstance, that the depth at the head at high water is 74ft., and that the seas are of exceptional violence, facts in themselves which would considerably add to the cost of a vertical wall of concrete blocks.

With regard to the plan of the breakwater being zigzag, this subject with engineers is nearly threadbare; in no way was it attributable to those who designed the work. The original intention was to build a breakwater 5,360ft. in length, but as the rubble mound advanced, the harbour was so filled with shipping seeking shelter that the Lords of the Admiralty decided to lengthen it by another 2,500ft. This could only be done in a north-easterly direction; hence arose the bend, giving the zigzag form.

Reference is also made to the vibration of the breakwater, borne witness to by the lighthouse-keepers; to this I would add, that long before the lighthouse was ever built, during strong gales when heavy seas struck the breakwater, I have myself often experienced the same vibration, but such a circumstance is common to works exposed to excessive strains, and does not affect the stability of the structure, as all acquainted with sea-works well know.

If the foregoing does not satisfy your readers that the engineer-in-chief designed for Holyhead a breakwater best suited for the locality, I would refer them to the very lucid and accurate description given of this great work, in a paper to which drawings are appended, read before the "Institution of Civil Engineers," on Feb. 1, 1876, by Mr. Harrison Hayter, M.I.C.E., who has been associated with the work for more than a quarter of a century.

So much for the "past," and now I would say a few words on the "present." It was never thought that a structure of this magnitude would be maintained free of cost; and in the paper referred to, this subject is clearly ventilated.

Up to the present time, nothing more in the shape of maintenance has taken place than was originally anticipated. Chain most certainly has been fixed, to stop the run round the head of a certain amount of small deposit; but when the writer of your article implies that this deposit is travelling round in an alarming manner, it will be as well for me to assure him that it is found from the periodical soundings taken, by those who now have the charge of this work, and are constantly watching it, that comparatively little travelling of the deposit has taken place, considering the length seaward of the mound.

With reference to the "ominous-looking group of concrete blocks," now at the head of the breakwater, these have not been placed there with the absurd idea of an expected breach—no breach being anticipated—they are to aid in performing the work which the chain is doing, and will shortly be sufficiently hardened to allow of their being put into the sea.

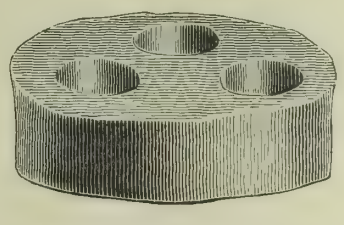
In conclusion, to quiet the minds of any who may have read your paper, I would remind them that those who now have the supervision of this great national work have a care for their own engineering reputation, as well as that of this country, and are not therefore likely to allow us to deplore the annihilation of such a gigantic structure.—I am, &c.,

JAS. M. DOBSON.

55, Winchester-terrace, Oakley-street, Chelsea, S.W.

A STOUP AT LLANTHONY ABBEY.

SIR,—In September last, I saw, lying in the nave of the fine ruined abbey church at Llanthony in Monmouth, a circular stoup with three hollowed cups. The stone was about a foot in diameter and six or eight inches thick. The



three cups were supposed to indicate invocation of the Trinity; but the instance given by Mr. T. Romilly Allen in your issue of March 5 would seem to show that the number of cups is probably arbitrary.—I am, &c.,

March 7. C. R. HOMER.

THE DESPOTISM OF THE CHARITY COMMISSIONERS.

SIR,—It is not known so generally as it ought to be that when tenders are submitted in public competition for property under the control of the above body, that they hawk the highest tender and tout for a higher bid; so that when a tender is accepted by a body of trustees or a vestry, the party tendering topmost must not make merry, or he will be sent to the commissioners' Siberia, if anyone can be found, after his terms have been made public, to give half-a-crown more for the property.—I am, &c., EXPERIENTIA.

COMBINATION OF STYLE.

SIR,—In Northern Europe, Gothic is now pretty generally recognised as the style in which church-building finds its most natural expression, and probably our best architects would allow that, as has been often pointed out in your columns, the proper sphere for the exercise of their originality is the adaptation of that style to the requirements of modern congregations, and not the invention of new features, such as tracery, capitals, and the like, of which we possess very many most beautiful examples. The loss of so-called inharmonious features suffered through ruthless restoration cannot be repaired. But might not our new churches be made less bald and more instructive by the use of a carefully-graduated combination of the three Pointed styles, even admitting Norman features when funds would allow us to do so? For, no doubt, this combination would be more costly than the but too common use of brick and Bath stone with wearisomely-repeated thirteenth-century (?) detail. But, surely, to endure for awhile the discomfort of a temporary church were better than to "run-up" a House of God whereof man must feel ashamed!

As an example of what is suggested, let us picture a large town church. The western tower might be Norman; belfry-stage, Transition; nave and aisles, Early English; transepts, Geometrical Decorated. The Later Decorated would enrich the chancel, and Perpendicular could be used in vestries and organ-chamber. The styles would grow out of each other without fear of confusion, and the charge of forgery could not be incurred, since the dates of modern buildings will be easily verified. I must not trespass further on your space than to add that such combination would seem to be more legitimate and less whimsical than, for instance, the certainly quaint mixture of Classic with Gothic features to be seen in Mr. Norman Shaw's church on the Bedford Park Estate.—I am, &c.,

Leamington, March 5. C. R. HOMER.

CRESSET STONES.

SIR,—As Mr. Allen has appealed to me, I must in courtesy reply, although, unless my memory deceives me, I gave the authority now asked for when this matter was last discussed in your paper. The stones and their use are fully described in the book known as "The Rites of Durham Abbey," written in the reign of Elizabeth by one who had formerly been a monk of that house. I quote from Mr. Raine's edition for the Surtees Society. On p. 19 of that edition, the writer tells us that outside the west door of the choir, and on the south side of it, there was "a foure-squared stonn . . . . whereon did stand a foure-squared stone above that, which had twelve cressets wrought in that stone which was filled with tallow, and everye night one of them was lighted when the day was gone and did burn to give light," &c. On p. 72, he describes two other such stones, each also of twelve cressets, and placed one at either end of the dorter. This method of lighting seems to have been common in religious houses, and stones with cressets varying in number from sixteen downwards have been found in various places. Several are figured in the third volume of the *Transactions* of the Cumberland and Westmoreland Archæological Society, and one from St. Cross, near Winchester, is engraved as a *piscina* in the 5th volume of Britton's "Architectural Antiquities." This last has its base complete. Sometimes a single cresset is found in a small niche in a wall, with a flue above to carry off the smoke. There is one such in the church at Dorchester, Oxon, and several amongst the monastic buildings at Westminster Abbey. There is a wood-cut of one of these in a paper on the Westminster buildings which I contributed to the *Archæological Journal*, I think in 1876.

The curiosity of the Lewanwick example is that it remains apparently *in situ* and in a parish-church.—I am, &c.,

J. T. MICKLETHWAITE.

6, Delahay-street, S.W., March 5.

A new vicarage has just been completed at Norbury, near Stockport, for the vicar of St. Thomas's, Norbury, the cost of the same being defrayed by a sum contributed by the parishioners, and augmented in the usual way by a grant from the Ecclesiastical Commissioners. The site of one acre of valuable building land was given by Mr. W. J. Legh, M.P., the patron of the living. The architect for the works is Mr. C. W. Johnson, of Buxton and Whaley Bridge, and the builders are Messrs. S. Howard and Co., of Hazel Grove and Poynton, Cheshire.

The workmen employed in the building department of Messrs. S. Howard and Co., had their annual supper on Saturday evening, at the Rising Sun inn, Norbury, when upwards of seventy were entertained. The members of the firm, Messrs. S. Howard and M. Agar, were present, with some friends, and the evening was spent in a most agreeable manner.

Intercommunication.

QUESTIONS.

[6063.]—**Granite.**—Will Mr. Harry Hems or Mr. Thomas H. Flynn please say which he thinks is the best granite for building and monumental work, or give me any information on the strength and weight of same?—MASON.

[6064.]—**Architects and Local Authorities.**—I shall feel obliged if any of your readers can advise me on the undermentioned case:—A. is an architect and surveyor in a rising country district, in which a local board has been formed, and to which authority he is appointed surveyor, but carrying on his own practice as usual. Many of the streets and sewers are unmade, or only partially made, and the board decide to serve notices on the property-owners to do the necessary works. B. is an owner to a large extent, and is advised by his solicitor to allow the board to execute the works for him, giving their authority to do so, he finding the money, and paying the contractor on the certificate of A., the surveyor to the board, who also prepares plans, &c., and superintends the works, B. employing no surveyor. Is not B. liable to pay to A. a certain percentage; and, if so, to what amount; and, failing B., is not the board liable to A.? Any remarks will be read with interest by—VENTILATOR.

[6065.]—**Chimney-Shaft.**—Will some of your readers kindly give their experience as to the limits that a chimney-shaft may, with safety, be deflected by the wind? The shaft in question is about 60ft. high and 6ft. square, measured half-way up.—COUNTY SURVEYOR.

[6066.]—**Scales on Tiles.**—I have had some walls lined with glazed tiles by an eminent firm of tile manufacturers. A considerable number of the tiles will have to be taken out and replaced by others, as great patches, or "scabs," have come out of them, in some cases as large as 2in. in diameter. The walls were built in the autumn of 1878, and a rendering-coat of Portland cement, as a ground for the tiles, applied in May, 1879; the tiles themselves were bedded in Keene's cement, and the whole completed in June. The makers say the fault is to be attributed to the severe frosts on newly-constructed walls; but, surely, six months after completion should have been sufficient time to have prevented this? Can any correspondent tell me if this is really the cause of failure, as it is a serious item, and one of considerable importance where a large amount of wall-surface has to be finished with glazed tiles of an expensive character?—T. P.

[6067.]—**House Agency and Valuers.**—Will some one kindly advise me of a good book on the above, suitable for a guide to one entering into the business, and oblige?—DOMUS.

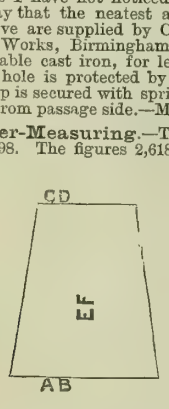
[6068.]—**Brasswork Lacquered, Cleaning.**—What is best to be done with brass hinges and espagnolettes which have become partly corroded in consequence of having been fixed in a large public hall before the plaster had dried?—R.

[6069.]—**Ormolu Cleaning.**—How can I clean ormolu without injuring it?—R.

REPLIES.

[6016.]—**Vision Hole and Ration Trap for Cell Doors.**—As I have not noticed an answer to the above, I beg to say that the neatest and most practical forms of the above are supplied by C. Smith and Sons, Deritend Bridge Works, Birmingham. They are constructed of malleable cast iron, for letting into framed door. The vision hole is protected by flap and fine wire gauze, and the trap is secured with spring and lock, with key to open only from passage side.—M. A.

[6030.]—**Timber-Measuring.**—There is an error in my reply on p. 298. The figures 2,618, in the fifth line,



should be ·2618. See accompanying cut in connection with answer there given.—B., Lincoln.

[6030.]—**Timber-Measuring.**—Dr. Gregory recommends the following rules given by Mr. Andrews:—Let L denote the length of the tree in feet and decimals, and G the mean girth in inches.

Rule 1, making no allowance for bark.—$\frac{L\,G^2}{2,304}$ = cubic feet, customary; and $\frac{L\,G^2}{1,807}$ = cubic feet, true content.

Rule 2, allowing $\frac{1}{12}$th for bark.—$\frac{L\,G^2}{3,009}$ = cubic feet, customary; $\frac{L\,G^2}{2,360}$ = cubic feet, true content.

Rule 3, allowing 1-10th for bark.—$\frac{L\,G^2}{2,845}$ = cubic feet, customary; $\frac{L\,G^2}{2,231}$ = cubic feet, true content.

Rule 4, allowing 1-12th for bark.—$\frac{L\,G^2}{2,742}$ = cubic feet, customary; $\frac{L\,G^2}{2,150}$ = cubic feet, true content.

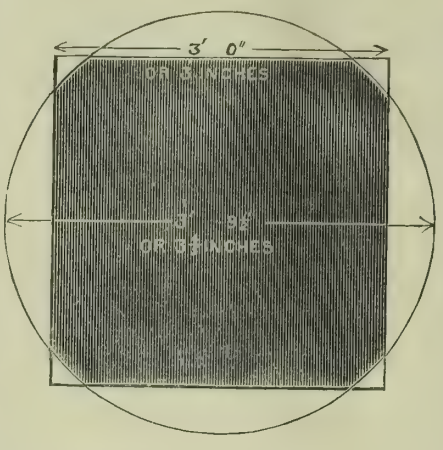
By rule 1, suppose a tree, girt 60in., and length 40ft.:—

$\frac{40 \times 60^2}{2,304}$ = 62½ cubic feet, customary;

$\frac{40 \times 60^2}{1,807}$ = 79¾ cubic feet, true content.

But why cavil over this? The old rule of girding with string, taking one-fourth of the girth and squaring it, is invariably practised by timber merchants, and, in my opinion, is not likely to be abolished. When it is required to find the accurate content of an irregular tree, not reducible to any figure of which we have already treated in this journal, I shall propose that we take the tree under our arm and roll it into a fish-pond, measure the content of the water in the pond while the tree is in, take out the tree and measure the content of water again, subtract the latter measurement from the first, shoulder the tree home, and we shall be perfectly satisfied with the content of the tree, and also know how much to allow for bark and waste.—WILLIAM JACKSON.

[6030.]—**Timber-Measuring.**—Those of your readers who have followed the recent replies on the above in your "Intercommunication" column (and especially those who did not realise William Phelps' difficulty in the first instance) may be interested in the following "graphic" method of illustrating "Hoppus'" error:—"Hoppus" treats the circumference as if it were the sum of the sides of a square, with a result illustrated by the accompanying diagram, which any reader can easily reproduce for himself in the following manner:—



Describe a circle having a diameter of 3 4-5in.; the circumference will be 12in. Now construct a square, having 3in. sides, so that the intersection of its diagonals coincides with the centre of the circle. Then the sum of the sides of the square is equal in length to the circumference of the circle. Let the figure represent a transverse section of the tree in W. Phelps' original query (12ft. girt); then, the scale being 1in. to a foot, it will be seen that a square bank of timber of 3ft. side can be cut from the tree, except that it will have chamfered edges of 5¾in. To set against the loss of these, the buyer would have four good slabs leaving a balance to pay for sawing. Hence "Hoppus'" method, though theoretically inaccurate, is, practically, far from being an unfair one, either to the buyer or the seller. Let me, however, recommend William Phelps to give up "Hoppus" and use the "slide rule."—C. RIGG, Cardiff.

[6047.]—**Heating Conservatory.**—The top of return-pipe should be about three-quarters of the height of H.—T.

[6048.]—**Wall and Gable.**—"Beardmore" asks if he can be compelled to erect a wall against A.'s external wall, and "H. T. B." gives it as an opinion that B. must erect a wall or purchase a part of A.'s wall, thus making it into a party-wall, and furthermore states that the district surveyor is the authority who shall make him do it. Now in Part 1, rule 27, of the Building Act it says: "Every building shall be separated by external or party-walls from any adjoining building." It does not say anything as to the ownership of the walls, and I take it that B.'s building will be enclosed according to the wording of the Act, and provided the wall is there it is not the district surveyor's duty to find out who the wall belongs to. Clearly B.'s building is inclosed as much without making a party-wall of A.'s now external wall, as it would be were he to buy half of the wall. There is a case on record where C. had a house and D. built against C.'s external wall, but in this case making use of the wall for joists, &c. The district surveyor was appealed to to compel D. to build his own wall. The district surveyor said it was not in his power to do that, as "there was the wall, and that was sufficient for the Building Act." The only thing C. could do would be to bring an action against D. for trespass. This, I think, is a clear proof that, provided B. does not trespass on A.'s property, he need not buy a moiety of A.'s wall, and that the requirements of the Building Act are met, and that no matter to whom the walls, belong there they are, and that is all that is required by the Act when it says "Every building shall be inclosed with walls of brick, stone, &c." Will a "District Surveyor" or "G. H. G." kindly give us an opinion on this matter?—C. M.

[6057.]—**Brewery Building and Well-Sinking.**—I would recommend "Investor" to inspect some breweries. The construction of them depends entirely on the system they are worked on; and if he would pay a visit to Burton-on-Trent, he would find all that he wants, and he will not find two alike belonging to different owners in that town. Each have their pet schemes, which depend upon the brewers engaged. Of course, every one has the best, so that it is not much use consulting a brewer, unless he is to have the working of it when trade is started. I have seen more than one instance where the whole arrangement inside has been altered from the original design, also the machinery taken out and other substituted, through the opinions of the brewer or manager; so my advice is, to judge of one yourself, then instruct some one to carry it out. The well-sinking is as varied in principle as the brewing. At some places I know, you can go down as many feet as you wish without any support to the sides, and within one mile of the same place you are compelled to have a curb before you get 10ft. down; so, if you are sinking 200ft., and the soil is loose, such as gravel and sand, commence with a cast-iron cylinder, made in sections, with flanges for bolting each piece to the next one, and if it is necessary (which it usually is) to exclude all surface-water, have them cast with strips on, for caulking the joints. Some people will say, Don't have any iron in your well: an old piece of prejudice which has been exploded by using iron mashing-machinery, iron boilers, &c., for hot water, without injuring the quality of the beers. If "Investor" will send his address to me, through the office of the BUILDING NEWS, I can, perhaps, give him more particulars of the information he requires.—B. S.

[6060.]—**Stable Floors.**—In answer to "Quid's" inquiry, I should like to say that I am, at the present moment, pulling up stable-floorings laid with both the things he names, viz., white Suffolks on edge, and Portland cement concrete, and am relaying them partly with the St. Pancras Iron Work Company's patent bricks, made of Buckley clay, and partly in adamantine clinkers. The former are the best for use in the standings, on account of their special shape facilitating drainage, and the material seems to me as good as it is possible to have. I send you a couple of the bricks for your inspection.—STABLE FITTER.

[They are splendid bricks for such purposes. We happen to know that the St. Pancras Iron Works Co. have supplied them for use in the Queen's stables, and have received the commendations of the Royal surveyor.—ED. B. N.]

[6060.]—**Stable Floors.**—I have used concrete for these for years with great success. Foundation 1ft. deep, of rough lime concrete, then 4in. of Portland cement concrete, made with stone chippings from a stone-crusher.—E.C.

[6060.]—**Stable Floors.**—I think "Quid" would do well to substitute terra-metallic paving for his stable floors, such as is manufactured in Staffordshire, or at Edwards' works at Pen-y-bont, Ruabon. They would be more impervious to moisture, and will wear for ever, without the risk of peeling, which often occurs to a Portland cement surface. Besides this, channel and sink bricks are made to work with the different patterns.—LINCOLN.

WATER SUPPLY AND SANITARY MATTERS.

STOURPORT.—Stourport has just provided itself with a public water supply, and the ceremony of turning on the water took place on Saturday. The works have been economically carried out, the cost averaging 15s. per head upon the population: while the Home Secretary's scheme for the metropolis is equivalent to a cost of £8 per head. Mr. T. D. Baker is the engineer of the works. Mr. G. Law, of Kidderminster, was the contractor, and Mr. Gifford, clerk of the works.

LEGAL INTELLIGENCE.

METROPOLITAN BUILDING ACT, 1855.—On Friday last at Marlborough-street Police-court, before Mr. J. S. Mansfield, Mr. William Webster, builder and contractor, of 8, St. Martin's-place, Trafalgar-square, was summoned by Mr. Robert Kerr, district surveyor of St. James's, Westminster, for that he did erect a chimney-shaft to a height exceeding six times the least width thereof, measured from the highest adjoining roof, contrary to the provisions of the Metropolitan Building Act. Mr. Kerr, the complainant, said this case had been adjourned from time to time for four months. There was no dispute between himself and Mr. Webster as to the facts. The case had reference to the construction of a very lofty chimney of peculiar construction, which was erected at the Criterion restaurant in Piccadilly. The law was that a chimney-stack should not exceed in height six times the narrowest dimensions in plan unless properly supported. The chimney-stack in question went 38ft. above the roof. It was on a cruciform plan, and the narrowest width was 3ft. 10in., so that *primâ facie*, it was 13ft. too high. The case had been adjourned to allow Mr. Webster to apply to the Metropolitan Board, but he had never done so. Mr. Verity, the architect of the Criterion, addressing the magistrate, said that Mr. Webster, the defendant, who was the contractor, had completed his work and had left the premises, Mr. Kerr had affected surprise that application had not been made to the Metropolitan Board, but he (Mr. Verity) contended that it was not the duty of the builder or architect to do so. The Criterion was a public building, and Mr. Kerr had no right to bring them to that court. If Mr. Kerr was not satisfied with the chimney, it was his place to try the matter before the Metropolitan Board, according to the by-laws. Mr. Kerr: If Mr. Verity takes that ground, I shall object to his being heard, because he is the gentleman who puts himself in the way of this being settled. Mr. Verity: I admit that. Mr. Kerr: Then I say openly that it is to be regretted that you should do so. Mr. Verity: I don't mind what you say. Mr. Kerr: Well, I do say it; you might have come to my office. (To the magistrate): It is plain that Mr. Verity, by his own acknowledgment, was aware of the adjournments, and that he has failed to make the application to the Metropolitan Board intentionally. Mr. Verity: I admit it all. I do not intend to apply to the Metropolitan Board. It

is not a case for the police-court at all. You will find it is expressly barred by the Act. Mr. Kerr: Section 30 states that every public building, including the walls, roofs, galleries, and staircases, shall be constructed in such a manner as shall be approved by the district surveyor. I have never understood that to mean that I have power to allow a chimney to stand 40ft. above the roof, if I choose to do so, or that I am to take the responsibility of such a thing. I don't believe the Metropolitan Board would entertain this as a difference of opinion as to the construction of a public building. It is a chimney-shaft, and the Board would call on me to put the law in operation, which is, that the shaft should be cut down to six times its narrowest point. Mr. Verity: I dispute the height of the chimney, to start with. I am ready to fight the case on its merits. Mr. Kerr: you always are. Mr. Verity: Precisely so. I don't like to be sat upon. Mr. Kerr: I don't want to sit upon you. I have no wish to have the chimney pulled down. Mr. Verity: It is strong enough to stand by itself. It is not a single chimney, but a stack. Will you go to the Metropolitan Board? Mr. Kerr: No, I don't believe they would entertain it. Will you agree to go before the Board if the magistrate adjourns the case for that purpose? Mr. Verity: I say the case ought never to have been brought here. It is entirely out of your jurisdiction. Mr. Kerr: The intention, as the magistrate will see by clause 30 of the Act, is to protect the people inside a public building, and not to govern such a thing as the height of a chimney-shaft. Mr. Verity: Mr. Knox, when he sat in the chair in this court, expressly told Mr. Kerr he had no right to come here in the case of the Criterion, and Mr. Kerr had to go to the Board. Mr. Mansfield (to Mr. Verity): According to your own showing, if people are to be protected who are inside a public building the Legislature would remember that an extraordinary chimney at the top of a building which was likely to fall on to the heads of people inside would be dangerous, and that would be included in structural arrangements. Mr. Kerr: The intention is held to be that the ordinary regulation should be carried out, and something else, at the discretion of the district surveyor, which, if disputed between the surveyor and the builder, should be decided by the Metropolitan Board. I am not going for anything beyond the ordinary regulations. Supposing I called for a floor in a public building to be constructed in a peculiar way, that would be a different thing; but here it is a case of a chimney being too high. Mr. Verity: If your contention is correct, what is the meaning of the words at the end of clause 30: "In case of disagreement, to be determined by the Metropolitan Board"? Mr. Kerr: We shall be barred in regard to time on that, now. Mr. Verity: No; we will not raise any technical objection to bar you. Mr. Kerr: Will you go to the Board? Mr. Verity: No; I will not go. According to the by-laws, the person making the disagreement is to take it before the Board. Mr. Kerr: Will you come if I take it? Mr. Verity: Yes. That is what you ought to have done in the first instance, instead of bringing us here from time to time. Mr. Kerr: My clerk reminds me that the case has already been mentioned to the Board, and that they refused to entertain it. Mr. Verity: Then you must have gone to the Board behind my back. You don't tell me what you are doing; but you always complain of people not coming to you. Mr. Kerr: Certainly; you ought to come. Mr. Verity: But I do not intend to. It was ultimately agreed to adjourn the case for a month, to give Mr. Kerr an opportunity of seeking the arbitrament of the Metropolitan Board.

Our Office Table.

Mr. Black, the Secretary of the forthcoming Building Exhibition, to be held in April, at the Agricultural Hall, informs us that the protection of the Board of Trade has been obtained for designs and inventions unprotected, and the space already let is more than 4,000 square feet. The patronage of the Prince of Wales, and of the Lord Mayor and Sheriffs, is confidently expected.

M. Geo. A. Marsden, of Cobridge, Stoke-on-Trent, has sent for our inspection several specimens of his patent interlocking tiles, of which we have a very good opinion. They are perfectly secure and damp-proof when fixed, which, in many instances, ordinary tiles are not, and the appearance of the joint is much improved. The interlocking joint is made by a sort of rim sunk on the four sides of the tile, appearing on the surface on two sides, and on the other two at the back, in such a manner that one tile laps over the other, and yet a perfectly level surface is preserved. It is evidently necessary that the interlocking tiles should be very accurately made, but we see Messrs. Mintons are the sole makers for the patentee, so that nothing more need be said on that score.

We had intended, in the present number, to examine at length the very remarkable Bill introduced last week, by the Home Secretary, for dealing with the Water Supply of the Metropolis, but Fate, and Lord Beaconsfield, have spared us the trouble. Apart from all party politics, the measure was a thoroughly bad one, and it is a gratifying fact that the common-sense of the country quickly saw it, and that party ties did not prevent the expression of an adverse opinion. We do, indeed, want pure water, and more of it, very badly, in London; but the most visionary scheme yet propounded for accomplishing this most desirable object seems sober and commonplace in comparison with the extraordinary financial arrangement contemplated by Mr. Cross. We trust the lesson has not been thrown away, and that, whichever party is returned to power, we shall have no more proposals of a like character brought forward.

"Schmittotypie" is the not very euphonious name of a new and apparently very valuable process of copying letters, &c., which will commend itself to those who are not satisfied with the capabilities of the present well-known "copygraphs." It is really a zincographic process, for we write with a special ink on any kind of paper, dry the ink and then place it face down on a sheet of prepared zinc. The ink is transferred, and we have a printing surface from which a number of copies can be taken by rolling the plate up with special ink, and taking impressions on any kind of paper merely by rubbing the hand over it or by using a roller supplied with the apparatus. The new invention is brought out for the proprietors of the Chromograph by Mr. Otto Lelm, 36, Farringdon-street, E.C.

Messrs. Reynolds and Co., of New Compton-street, Soho, have patented a very useful and ornamental application of metallic ribbon to the manufacture of window-blinds. The effect is somewhat similar to that of the well-known cane blinds, but much better. The ribbon, in its configuration forms a series of geometrical patterns, practically unlimited in extent. The work can be bronzed, nickel-plated, gilt, or enamelled to any colour. We like the enamelled ones best; some we saw in blue and cane-colour, fitted in ebonised frames, were very quiet, and would harmonise well with the prevailing styles of furniture. The blinds are strong, the material being really indestructible, and we shall be surprised if the makers do not find other and kindred uses for it.

The *Photographisches Wochenblatt* mentions that a Herr Chr. Spangenberger has patented in Germany a paint composed of pulverised iron and linseed-oil varnish. It is intended for painting damp walls, kettles, outer walls, or, in short, any place or vessel exposed to the action of the open air, and to the weather. Should the article to be painted be exposed to frequent changes of temperature, linseed-oil varnish and amber varnish should both be mixed with the paint intended for the first two coats, without the addition of any artificial drying medium. The first coat should be applied rather thin, the second a little thicker, and the last in a rather fluid state. It is not necessary to free iron from rust, grease, &c., by means of acid before applying the paint, as a superficial cleaning is sufficient. The paint is equally adapted as a weather-proof coating for iron, wood, and stone.

The usual fortnightly meeting of the Liverpool Engineering Society was held on Wednesday, the 10th inst. Mr. E. M. Touzeau, Survey Member of the Sanitary Institution of Great Britain, read a paper entitled "Subsoil Waters and their Drainage." The author, having briefly alluded to the effect of subsoil drainage upon the volume and flow of rivers, and the various works in which a knowledge of its principles is required, proceeded to consider the subject in its relation to health and comfort of town populations. The necessity was urged of subsoil drainage being undertaken as part of every sewage scheme, and further, its extension to such places as are at present sewered without attention having been given to the drainage of the soil. The largely-increased discharge of sewers, owing to subsoil water, was alluded to, and the advisability of relieving them of this duty was urged. In its effect upon town populations the increased temperature of the ground, especially to the poor, and the improvement in ground air from the removal of polluted water, was pointed out. If works of this description were more generally carried out, it was remarked that much of the water now flowing off the surface into the sewers might be carried off by the land drains, to the easement of the sewers. Attention was then directed to the causes of wetness in land and the various ways by which the water might be removed, also the necessity for regulating the depths and spacing of the drains apart, according to the pervious or non-pervious nature of the ground in which the drains were laid. Cases were mentioned where, through want of attention to the direction of flow in subsoil waters, the pipes intercepted but little of the water, which in cases of this kind flowed between the pipes instead of into them. From instances such as these, of want of attention, it was requisite that the requirements of each district or portion of a district should be studied before works for the drainage of the subsoil were carried out.

The Soane Medallion of the Royal Institute of British Architects for 1881, and, subject to the usual conditions, the sum of £50 will be awarded to the author of the best design for a county court for a provincial town of 30,000 inhabitants; also the Tite prize, value £30, for the internal covered area of a Royal Exchange, to include galleries, all of which will be lighted from the internal area, and at one end a handsome staircase; and the Grissell medal for a steeple in any style of architecture. The silver medal of the Institute with five guineas will be awarded for the best illustrations, drawn from actual measurement (with dimensions figured both on the drawings showing the general arrangements and on the details) of any important building—Classical or Mediæval—in the United Kingdom or abroad, hitherto unpublished in that manner. The council suggest the following subject as being worthy of illustration:—A town or country house erected between A.D 1600 and 1750. Any of the following buildings may, however, be taken if more convenient to the competitor:—Kelso or Dunblane Abbey; Cashel Cathedral, or any monastic building; St. David's Cathedral; Entrance Gateway, Middle Temple-lane; Steeple of St. Magnus the Martyr, London-bridge; Steeple of Newark; Long Melford Church; North-east transept of Beverley Minster; old buildings of the Museum, Maidstone. The silver medal of the Institute with ten guineas will be awarded to the author of the best essay on "The Steeples and Towers Designed by Sir Christopher Wren." Further particulars may be obtained of the secretary.

The thirty-first annual general meeting of the Architects' Benevolent Society was held on Wednesday, the 10th March, 1880, Thomas Henry Wyatt, President, in the chair. The annual report of the council was read and adopted, and the principal officers for the ensuing official year were elected in the following order:—President, Thomas Henry Wyatt, F.S.A.; Trustees, Professor Donaldson, George Edmund Street, R.A., and Charles Barry, F.S.A.; Council, Horace Jones, David Mocatta, F.S.A., Alfred Waterhouse, A.R.A., John S. Phené, LL.D., J. Macvicar Anderson, Ewan Christian, Professor T. H. Lewis, F.S.A., A. W. Blomfield, M.A., J. P. St. Aubyn, W. A. Boulnois, John Whichcord, F.S.A., Henry Currey, Arthur Cates, J. H. Good, H. L. Florence; Treasurer, George J. J. Mair, F.S.A.; Honorary Secretary, William Henry White.

CHIPS.

A new Primitive Methodist chapel at Keighley was opened last week. The building has been erected from designs by Messrs. Kirk and Sons, of Dewsbury, and will accommodate about 1,000 persons. The cost has been about £3,300.

On Thursday-week was commenced an attempt to remove from the churchyard of Buckland, a yew tree, said to be 1,000 years old, which, with the earth to be taken with it, weighs about 50 tons. The object is to give space for the enlargement of the church, it being hoped that the vitality of the tree will not be endangered.

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MEETINGS FOR THE ENSUING WEEK.

Monday.—Institution of Surveyors. Discussion on "The Present Depression in English Agriculture." 8 p.m.

Tuesday.—Institution of Civil Engineers. Discussion on "The Purification of Gas." 8 p.m.
Society of Arts. Paper on "Transport and Trading Centres for Eastern Equatorial Africa." By Capt. C.E. Foot, R.N. 8 p.m.

Wednesday.—Society of Arts. Paper on "The Art of the Silversmith." By W. Herbert Singer. 8 p.m.
British Archæological Association. Papers on "Certain Grants of Land in Mercia," by T. Morgan, F.S.A., and on "The Name of Shakespeare," by Dr. Douglas Lithgow. 8 p.m.

Thursday.—Civil and Mechanical Engineers' Society. "A Railway to India." By B. Haughton. 7 p.m.

Friday.—Royal Institution. Professor Tyndall. 9 p.m.
Association of Municipal and Sanitary Engineers and Surveyors. District Meeting at Dewsbury. 11.30 a.m.

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TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender—it adds to the value of the information.

Ashford.—For the erection of two houses in the Canterbury-road. Messrs. F. and J. Plowman, Hastings, architects:—

Lambert	£1,131 0 0
Fowler	998 0 0
Sacre	940 0 0
Howland, Bros.	890 0 0
Knock, Ashford (accepted)	790 0 0

Ashford.—For alterations and additions to house, Canterbury-road. Messrs. F. and J. Plowman, Hastings, architects:—

Sacre, Hastings (accepted)	£95 10 0

Brighton.—For hospital for sick children, Brighton. Mr. Thos. Lainson, F.R.I.B.A., architect. The buildings will consist of a south wing and an administrative block, and will provide 75 beds:—

Buckler	£12,065 0 0
Longley	11,467 0 0
Beale	11,245 0 0
Auscombe	11,040 0 0
Barnes	10,600 0 0
Jones and Co.	10,166 0 0
Lockyer	9,766 0 0
Kirk and Randall	9,740 0 0
Cheesman and Co. (accepted)	9,560 0 0

(Architect's estimate, £9,675.)

Brixton.—For annexation of premises, No. 1 and 2, Exchange-buildings, Brixton-road, for Mr. A. Phelps Mr. J. W. Stevens, architect:—

Maxwell, Bros.	£376 0 0
Pack, Bros. (accepted)	348 0 0
Holliday	333 0 0

Burton.—For additions to the schools at Victoria-road, Burton, for the Burton-on-Trent District School Board. Messrs. Giles and Brookhouse, architects:—

De Ville (accepted)	£749 0 0

Burton.—For additions to Wellington-street Schools, for the Burton-on-Trent District School Board. Messrs. Giles and Brookhouse, architects. Quantities supplied:—

Wileman, C. (accepted)	£422 0 0

Burton-on-Trent.—For the erection of girls' school, Grange-street, for the Burton-on-Trent School Board. Messrs. Giles and Brookhouse, architects. Quantities supplied:—

Shelton, Hinckley	£2,050 0 0
Hodges and Wildman, Burton	1,825 0 0
Thompson, E., Derby	1,810 0 0
Hunter, Burton	1,774 0 0
Maddocks, Burton	1,769 0 0
De Ville, Burton	1,762 0 0
Mason, H., Burton	1,740 0 0
Wileman, C., Burton	1,699 0 0
Chamberlain, Burton	1,698 0 0
Wood, J., Derby	1,650 0 0

Forest Gate.—For building St. James's Church, Forest Gate:—

Staines	£5,784 0 0
Award	5,777 0 0
Grimwood and Sons	5,698 0 0
Haines	5,600 0 0
Wood	5,589 0 0
North	5,500 0 0
Holland	5,237 0 0
Shurmur	5,196 0 0
Everitt and Son	5,195 0 0
Jones	5,180 0 0
Sheffield and Prebble	5,173 0 0
Gregor	4,759 0 0
Castle	4,545 0 0

Harwich.—For new infectious diseases hospital, for the Town Council of Harwich:—

Jarrold (accepted)	£1,327 3 0

Kensington.—For additions, alterations, and repairs to "The Goat" publichouse, No. 3, High-street, Kensington. Messrs. Isaacs and Florence, architects. Mr. E. L. Riddett, surveyor:—

Not including fittings:—

Patman and Fotheringham	£1,473 0 0
Lamble	1,458 0 0
Hockley	1,388 0 0
Cock	1,365 0 0
Taylor	1,357 0 0
Langmead and Way	1,250 0 0
Stimpson and Son	1,213 0 0

Leicester.—For hall, lecture-room, and other buildings, at Leicester, for the Rev. F. B. Meyer, B.A. Messrs. Goddard and Paget, M.R.I.B.A., architects, Leicester. Quantities by the architects:—

Gilbert and Pipes	£5,309 6 0
Hewitt, G.	5,277 0 0
Herbert, T. and H.	5,200 0 0
Langton and Son	5,120 0 0
Allen, H. F.	5,108 0 0
Duxbury and Son	5,052 10 0
Minchin and Law	4,981 14 0
Bass, C. (accepted)	4,971 13 0

Kingsbury.—For new mineral-water manufactory in Kingsbury, for Messrs. Samuel Gulliver and Co. Messrs. Taylor and Grist, surveyors. Quantities supplied by the surveyors:—

Snell, J. and Co., Aylesbury	£1,470 9 6
Spittel, G., Aylesbury	1,460 0 0
George, E., Stony Stratford	1,450 0 0
Green, W. Y., Walton	1,419 2 0
Osborn, D., Tring	1,366 0 0
Ball, F., junr., Aylesbury	1,280 0 0
Cooper, G., Aylesbury	1,247 0 0
Reduced estimate:—	
Cooper, G., Aylesbury	1,098 0 0
Ball, F., junr., Aylesbury*	1,089 0 0

* Accepted.

London.—For rebuilding the "Ship" publichouse, Minories, for Mr. Thorpe, Mr. W. Ansell, architect. Quantities not supplied:—

Andrews	£2,340 0 0
Sparkes	1,798 0 0
Grimwood	1,643 0 0
Langmead and Way	1,597 0 0
Beal	1,549 0 0

London.—For repairs at the Licensed Victuallers' Asylum, Old Kent-road. Mr. W. F. Potter, architect:—

Hill, F.	£212 0 0
Wells, W.	206 0 0
Carey, G. W.	195 0 0
Cawson	187 10 0
Stace, E.	185 0 0
Hersee, F.	173 17 6
Pritchard, W. H.	169 10 0
Harris, W.	158 10 0
Hayworth, S. (accepted)	145 0 0

Longton.—For the erection of public baths and school of art and science, for the Corporation of Longton. Mr. Arden Hardwicke, A.M.I.C.E., architect:—

Clarke, J. T.	£6,382 0 0
Jukes and Weston	6,260 0 0
Maddox and Bennion	6,210 0 0
Gallimore, J.	5,959 0 0
Inskip, H. and R. (accepted)	5,900 0 0

Morley.—For board school at Morley, near Derby, with teacher's residence, offices, boundary walls, &c. Messrs. Giles and Brookhouse, architects. Quantities supplied:—

Walker and Slater, Derby (accepted)	£950 0 0

Newport, Mon.—For new timber jetty on the river Usk, for the Newport Harbour Commissioners. Mr. E. A. Lansdowne, architect. Quantities supplied by the architect:—

Steel and Co.	£1,392 9 3
Presket	1,066 0 0
Firbank	930 0 0
Miles	900 0 0
Pickhall	795 0 0
Linton (accepted)	769 0 0
Steam crane for above:—	
Linton	£340 0 0
Appleby	330 0 0
Usk Side Iron Co.	318 0 0
Phillips	313 0 0
Hall	300 0 0
Miles	300 0 0
Bethen and Bullpit	300 0 0
Smith	290 0 0
Pickhall	250 0 0
Firbank	250 0 0
Steel and Co. (accepted)	227 11 0

Newhaven.—For new mission church, Newhaven, for the Rev. E. P. Southwood. Mr. E. P. Loftus Brock, F.S.A., architect:—

Godey	£2,178 0 0
Chapman	2,031 0 0
Matlock, Bros.	1,993 0 0
Norman	1,974 0 0
Nightingale, Bros.	1,839 10 0
Snewin	1,765 0 0
Morris (accepted)	1,575 0 0

Pixham.—For the erection of an infant-school at Pixham-lane, Dorking, Surrey. Mr. Gilbert R. Redgrave, architect:—

Hamblin, Bros.	£780 0 0
Lynn and Dudley	718 0 0
Heselgrave	705 0 0
Colls and Sons	694 0 0
Goddard and Sons (accepted)	677 0 0
Putney	675 10 0

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THE BUILDING NEWS.

LONDON, FRIDAY, MARCH 19, 1880.

ARCHITECTURAL EDUCATION IN ENGLAND AND GERMANY.

WE find from the columns of the *Cologne Gazette* that the question of architectural education is exciting as much attention in Germany as it has done in England, with this difference—that the people of Germany are more interested in the discussion of such matters than the English people. While we have been insisting on the need of the technical education of architects, the public and some members of the profession in Germany have been deploring the fact that they have too much of it, and that the architecture of their country has suffered in consequence, and is less vigorous and healthful than our own. The controversy, which has been waged with much spirit and warmth in Germany, owes its origin, we believe, to the remarks of Dr. August Reichensperger in the Prussian Diet, in which assembly the subject has been warmly debated. Dr. A. Reichensperger has strongly taken up and espoused the English system, and has openly charged the national system with faults and shortcomings, and called upon the Minister of Public Works to apply a remedy by official interference. As might be expected, these remarks, delivered last December, have produced a sensation among the profession in Germany, and one architect of eminence has published a reply in the *Cologne Gazette* extending over three articles of considerable length. Herr Reichensperger is not a professional architect; he speaks more from the popular side of the subject, and his remarks must be taken with some reserve. At the same time, we must admit that he represents the public sentiment, and he has found no difficulty in contrasting the freedom and individual vigour of the English school of architecture with the scientific, hard, barren, and formal style of that of his own country. Recent intercourse between the two countries must have made the visitor from Germany feel that our buildings were less cast in the same mould, bolder in conception, and less niggardly in ornament than those of his own land. Herr Reichensperger is struck with the development in England of the Gothic and other styles of architecture—the freedom and originality with which they are treated by English architects; and he approves in the strongest terms of the pupil-system of architectural education in this country, which he says is an adherence to and a development of the mediæval system of "master schools," or those in which the styles of individual masters of the art were perpetuated with all their individuality of power, and he maintains that it is only possible under such conditions for the conceptions of untrammelled genius to be encouraged, or for a national style to take root. It is clear to us that Herr Reichensperger is one of those *dilettanti* of whom we have several in this country, who affect to despise all native effort, and to cast an eye abroad for everything that is excellent—an idea in which we find we are supported by the remarks of the writer in the *Cologne Gazette*, who says that Reichensperger judges of English architecture from what he has seen, not from its intrinsic value. This disaffected amateur might learn more if he read the architectural treatises and correspondence in this country; he would then be better able to compare the essential differences and qualities of the architecture of the respective countries. No one knows better than an English architect the good and bad qualities of English art, and before sensational contrasts are drawn between the buildings of Germany and England the critic should possess more than a superficial acquaintance or a mere first impression of the works of this country. It is in this rough-and-ready sort of way that Herr Reichensperger contrasts the great national buildings of England with the plain and prosaic structures erected in modern times in Germany, which, he says, may be useful and scientific, but excite no admiration, without considering the actual conditions that have made them so uninteresting as works of art. There is a German term "Bauinspectoren Gothik" which signifies "official building inspectors' Gothic," and has become proverbial, which may help this hypercritic to understand the real causes for the stagnation of thought he complains of, though he himself employs it to deprecate German architecture.

The writer of the articles in the *Cologne Gazette* ably challenges many of the conclusions of this would-be reformer, but we must here content ourselves with giving the gist of his reply. The author is a professional architect, and evidently knows only too well the difficulties the architect in his own country has to encounter. In the first instance he shows that Germany is not rich enough to compete with England; he says that the want of magnificent buildings in Germany is due chiefly, not to deficiency of taste, or the absence of high artistic aspirations, but to want of money. In Germany the buildings are cheap, and are, therefore, meagre and poor. They are under the control of Government officials, a system which must be acknowledged to restrain inventive ability, but the very circumstance of the nation being poor renders it necessary for the State to patronise and take under its care the architectural and technical education of the profession. We are very justly told that if architecture were left to private patronage in Germany, as it can well afford to be left in England, its prospects would not be encouraging. It would fare worse than it does now. The architecture would not merely be poor, but if no State education for architects existed, it would become coarse or vulgar in conception and detail. By confining study to one style, the State secures at least good architecture, if it often falls into the common place. We cannot, however, deny that State patronage and its restrictions seriously limit and curb the individual freedom of the architect, and the writer in the *Gazette* allows that German architecture would gain if a little of the English spirit of originality and independence were infused into it. He maintains, nevertheless, that if Germany stands in need of this spirit, England would be to a larger extent benefited if her architects' study were less one-sided, and more subordinated to the scientific and utilitarian rules of the art. He observes with justice, and from a knowledge of the results of architectural works in this country, that architects regard too much the mere outward effect of their buildings, in illustration of which he points to the result of the competition for the new German House of Parliament, for which a few English architects competed, several beautiful English designs were rejected, with the exception of one which was awarded a second prize, because, as the author observes, all the artists had studied was outward appearance, the plans being devoid of all attempts to supply practical wants. With one voice it was acknowledged by those capable of judging that the designs were full of defects, badly arranged in plan, full of draughts, and fell wofully short of the requirements of such a building. The award was pronounced a scandal. We commend to the reader the passage relating to this subject at the close of the writer's second article. He declares, moreover, that Herr Reichensperger has been hard upon German architecture, because the Parliament building-design promoted by him has not found favour.

Discussing the vexed subject of the different systems of technical education for architects in England and Germany, the writer of the articles we are noticing boldly appeals to English professional opinion in corroboration of his own views, and it appears to us that in this final appeal he has considerably weakened the position of his opponent. He points Herr Reichensperger to the fact that for the last 20 years the English profession have been trying to insist on education; and that that critic can know nothing of the English agitation, or must have purposely ignored it, to have drawn the conclusions he has done. This fact, the writer thinks, is the best answer to the charges brought against the German system of technical education. In confirmation of this assertion, the professional critic refers to our own pages, and to those of *Nature*, and other scientific journals, which have for years past abounded in appeals in favour of a reform of the English system of architectural education on the lines of that in vogue in Germany. The writer's arguments agree in the main with what we have said from time to time upon the question. He also quotes Mr. R. Phené Spiers' remarks touching the shortcomings of English architecture at the Paris Exhibition, which were reported in this journal, in which that gentleman referred to France and Germany as possessing superior theoretical teaching, from which the English architects might derive profit. The formation of architectural classes and technical schools in England, and the proposed technical college at South Kensington, to be endowed by the City Guilds, are instances cited to show that the English recognise the advantage to be derived from the very system which Herr Reichensperger assails. It is contended that it is precisely in those features of the German training that critic most disparages, that the English architects feel that they are most in need of. There is a prevailing idea, founded upon some experience, that anything like State education would nip in the bud or check individual effort, and that a system of professional education for architects would suppress, or completely destroy, the artistic instinct. It is true that the native artists of India and Japan have suffered to some extent from the spread of technical education, and the general fact has been alluded to by many writers on education, and lucidly stated by Macaulay in his well-known essay on Milton. That far-seeing exponent of architectural art, Viollet-le-Duc, has also defended the freedom of architects by boldly denouncing the system of academic monopoly which largely prevails in his own country; he has shown that where, as in the domain of letters and philosophy, painting, and sculpture, there exists no intermediate authority between the artist and the public, no monopoly and interference, but where the appeal to the public is direct, the students of science, art, or literature are benefited; and he proceeds to contrast this state of enouragement of the individual with the condition of those who lock themselves up in the Villa Medici, or are bound by the arbitrary rules of an academic body in matters of style and taste. Le Duc was discriminate enough to see that it was not because of a school of art that architecture declined, but because its founders placed the art beyond the control of public opinion, because they became a mere *coterie*, and founded a kind of protectorate that was inimical to the interests of art. "If it would be really a school," he says, "it should derive all its influence from discus-

sions, the exchange of ideas, and the emulation resulting from rival principles, freely manifesting themselves under the control of public opinion." He concludes that in France, architecture, above all other arts, presents conditions favourable to the prolongation of mediocrity. The French Academy has been credited with the conventional reproduction of antique forms, with a set of rules and processes which have been called the very negation of art, which is said to have given us nothing but a miserable parody of the beauties of antique taste. In Germany the heads of the pupils are, according to authorities, crammed with theories, which have acted, no doubt, prejudicially, and restricted artistic genius and invention. In many recent works on architecture, the tendency of State interference in the matter of design is clearly seen; there is a mechanical restraint, an official routine expressed in the very lines and features of German architecture, but it is absurd to lay the charge to the influence of technical education simply. We quite agree with the remark that up to a certain point engineering and architectural studies might go together, after which they should be totally independent. We are told that the English system of instruction is not education, but merely a kind of training. It is certainly very little more; the young pupil imbibes his notions and taste from his master, or discovers them for himself. But with proper safeguards against the suppression of individual taste and enterprise, there is no need of a system of scientific education operating prejudicially. The fault is in setting up a standard of taste, an art beaurocracy; and this has been, from what we have gathered, the prevailing defect in the system, not only of France, but of Germany. The articles we have alluded to are well worthy the perusal of English architects, and we commend the controversy to the attention of the profession at large.

A RECENT VISIT TO RUSSIA—II.

A FURTHER stage, in the early part of which we cross the frontier of the great Empire of Russia, and we are introduced to the still more northern

CITY OF RIGA,

the capital of the old province of Livonia, on the banks of the "Dvina." This great river is navigable from the centre of Russia in Europe, where, by a short canal, it is connected with the "Dnieper," which discharges itself near Oddesa; by these rivers the Black Sea trade is connected with the Baltic. Riga is the second mercantile port of Russia, and its increase is such, that, owing to its being the shipping port of the south, or garden, of Russia, it bids fair to become the first. In 1858 the ancient walls of the city, and most of its sturdy bastions, were destroyed, prior to which the city was confined within their bounds. These fortifications were of brick, and still bedded in the remaining bastions are granite and iron cannon-balls, mementos of its ancient sieges. The city fell under the sway of Russia in 1714, from which date the Lutheran form of Christianity, professed by the inhabitants, has been respected by its conquerors. We mention this as, had it been otherwise, a great change would have taken place in connection with the old churches of the city, which date from the 12th and 14th centuries. We have, in the case of Dantzig, spoken of the decay of Gothic architecture at that northern port, but its character here improves; we can only explain this phenomenon from Riga in old times being more clear of North German influence than Dantzig, and more intimately associated by trade with Holland and Flanders. The Dom church, or cathedral of St. Mary, is a large establishment, to which is added an important range of cloisters. Up to the period of the Reformation it was the seat of a bishopric, and a great theological establishment. Like the other old churches, the Dom church is entirely constructed in brickwork. The size of the bricks are remarkable, viz., 12in. by 6in. by 3⅝. The details range from our Late Norman to the Decorated period; but from the nearly total absence of stone dressings, there is not much in the way of ornament to judge from. The rose windows in the transepts—the principal openings in the nave and tower, have long since lost their brick tracery, and are now for the most part blind; but from the details in the form of shafts and mouldings, which are in part preserved, they appear to have been bold and well designed. The plan of the church is a nave and aisles, a western tower and transepts, with eastern transepts of like character, and an aisleless choir. At the east end of the choir is a large and imposing apse, and smaller ones in the east walls of the east transept. The walls of the nave, which are ordinarily set back from the line of the transepts, are here in line, and the buttresses in the form of cross-walls are on the inside of the church. These recesses are filled with galleries, and the spaces underneath, with one exception, are walled off from the church, and used as trade stores or warehouses, the access to the same being gained from the exterior. The piers of the nave are very massive, and, with the exception of three orders of rectangular recesses at the angles, they are square in plan. The vaultings of the aisles are sprung from caps surmounting angular corbelled shafts, the imposts of the columns being a simple half-round mould. The arches of the arcades have neither moulds nor labels. The members engaged on the aisle sides, carrying the cross arches and the vaulting, are repeated on the nave side, and in this position they suggest that the nave has originally been vaulted at the same level. The seats of the nave portions of the caps are unoccupied, except in part with groups of clustered shafts, which, rising a great height, support the nave vaulting. As flying buttresses are unprovided, the thrust is counteracted by octagonal wooden tie-beams, placed on either side of the stilts of the nave vaults; these are strongly bound to the walls with iron, and from ten of them being in use they form a very remarkable feature.

Amongst the box-pews are those of the guilds of the town; these are distinguished by elaborate foliated ironwork cresting, of most chaste design, the date of which is inscribed 1752. The whole of the internal fittings of the church were removed prior to the arrival of Napoleon in 1812, and the fabric was used as a grain-store; but upon peace ensuing they were very carefully restored. The fine proportions of the choir are lost, from the great apse being partitioned off from the church, and converted into a separate chapel. The tombs of the bishops and other dignitaries are enormous structures, and from having large iron doors at their western ends, they partake of the character of mortuary chapels.

The external portion of the church is less original than the internal, having undergone extensive alterations about 1727. The character of these restorations and additions are of the type known to us as "Queen Anne," and to students of that period of architecture they are in the main pleasing examples. The steep roof of the choir was then removed, and the gable cut down to the level of the side-walls; the space was then covered with a large square dome, ogee in section, which, with its spire-like finial, gives one the impression of a great extinguisher, being entirely plated or formed of sheet copper. The eastern wall of the nave, in the absence of the original choir-roof, proved a bold feature; this they faced with pilasters; and a frieze or cornice was made to run across at the level of the eaves; above this, by the aid of pilasters, friezes, segmental pediments, inverted consoles, and tiers of small windows, the true gable is frittered away. The ironwork surmounting the various points of vantage is here very rich in its character.

The great tower has lost its pinnacles and battlements, and is surrounded by a gallery or balustrade of wood, from the rear of which springs a great square dome, working into an octagon at the top, upon which is seated an open temple-like construction, having a domed roof of ogee outline, and an elaborate growth of finial. The whole of this construction is of wood, and plated or covered with copper.

The cloisters on the south side of the church are very spacious, and above them are great suites of rooms, now used as the city library, museum, the residence of the pastor, the sacristan, &c. On some of the doors are charming examples of ancient ironwork. The cloister, or walk, is 18ft. wide, and each arm is composed of eight bays of arches. With the exception of the caps and corbels, which are of hard limestone, the whole of this construction is of brick. The inner orders of the arcade arches have long since vanished; but the attached, or wall-shafts, with their Late Norman caps, remain as their record. The cloister garth is all forlorn; but this state may be accounted for from the fact that a great fair is annually held here and in the cloisters, commencing on St. John's Day (June 24th), and continuing, Sundays included, for nearly three weeks. This great gathering is known by the quaint title of "the Dom gang fair" (*the church walk*, or *cloister fair*), and in point of antiquity is little inferior to that of the church itself. "St. Peter's," the next largest church, is a fine old structure. The church is apsidal, round which, to the full width of the nave, are clustered a group of chapels. The interior is remarkable for its fine store of chased brass (17th century) candle brackets, of most beautiful design. This church has had its west front remodelled in the Classic style, the three entrances being flanked with pillars, pediments, and groups of distorted figures. The tower is capped with an elaborate spire, the details of which are temples, domes, and obelisks. This addition, like that of the Dom church, is entirely covered with copper.

St. Jacob's, a somewhat smaller church, in like manner has its Mediæval tower capped with a copper spire. A bell-cot is fixed over the angle of the tower, viz., on the south-east face of the octagonal spire. The lower portion of this tapering spire is swelled out in a bulbous manner, from which it is clear that the architect was influenced by the domes of the Russian churches. This church in its interior is very plain and massive; the most noticable features, so far as the sacristan is concerned, are some holes in the nave and chancel-vaulting, the marks of Napoleon when exchanging artillery compliments with the citizens in 1812. The sacristry is here a veritable picture-gallery of past and present pastors of the church, and on a tablet is inscribed the historic fact that "the first Protestant sermon was preached in this church by Sylvester Teygetmerire, on November 1st, 1522."

St. John's, the chancel of which is Classic, is the smallest of the four churches. Internally it is remarkable in having the floor of the box-pews deeply strewn with hay, into which the fur-clad worshippers bury their feet during the time of service. Externally this church is remarkable for a florid western gable, of very broken outline, the prominent features of which are angular and moulded buttresses, blind windows, and circular perforations above the line of the roof.

The churches of Riga are closely hedged round with property, and no good views

of them can be obtained. This is owing to the fact that they are unassociated with burial-grounds or inclosures; the street-paving and the adjoining houses consequently abut upon the walls. As a concluding note, we may remark that this is a general custom in connection with Russian churches. Having glanced at the churches, we will now visit the

OLD STREETS OF RIGA,

which, although remarkably narrow, are very quaint and picturesque. The houses are mostly of 16th and 17th century date, with shaped gables towards the streets. From the nature of the climate the lofts cannot be used except for store-rooms, hence the openings are filled with shutters. The roofs, from the coverings being tiles, are of steep pitch, and in many cases are crowded with little dormers. The fronts of the houses are plastered; but no great variety of colour is indulged in. Hung over the doors are the emblems of the tradesmen and merchants, many of which are elaborate specimens of wrought ironwork. One we noticed was a bracket of great size, on the end of which was a wine-seller's garland, composed of the fruit and leaves of the vine, a splendid specimen of hammer-work.

In the Smith-Strasse, a narrow street that marks the lines of the old walls, are several silversmiths, the ring of whose anvils may be heard as you pass, and in whose windows, in the form of brooches and coronets, are beautiful art specimens forged from ancient models. The better class of the old houses are now largely used as offices, the merchants preferring to have their residences in the new and more fashionable quarter of the town. The streets, as a rule, are well paved with granite cubes or boulders, the causeways are curbed with the same material, and paved with slabs of granite, with hard burnt red and buff nine-inch quarries, or with thin grey hard burnt bricks on edge. The paving most popular is common bricks faced with a thin layer of asphalte, a form of paving that might, with advantage, be introduced into England.

(*To be continued.*)

THE REVIVAL OF ITALIAN ARCHITECTURE.

THE obvious revival of the spirit of Italian architecture, which is manifesting itself in our busiest thoroughfares, would have gladdened the hearts of many of the older school of Classicists. The late Sir William Tite, in his memorable address at the Institute of British Architects, on the Progress and Future Prospects of Architecture, as long ago as 1859, predicted with prophetic insight the reaction from the Gothic fever which had then set in. He attributed Mediævalism, as others have done, to the reacting influences which followed the Classical revival of the eighteenth century, especially the rise of the romantic school which succeeded the scepticism of the French Revolution, and also to the Tractarian movement in the English Church. These events influenced opinion, if they did not create the taste. The Gothicism was, at all events, thorough, as far as a revival of Mediæval art could be, and it was difficult to withstand the conviction that the Gothic style had taken deep root. Barely a quarter of a century has gone by, and our architects are found to have suffered themselves to become influenced by Classical traditions again. It is equally certain that we are doing creditable work in the Classic style, in spite of those among us who adhere to the quainter forms of another with which they have grown familiar by early study and predilection. If we examine a few recent buildings that have been erected in Classic, or rather, as it is called, Anglo-Italian—a designation, by the way, rather unhappily chosen to distinguish the style in England—we at once perceive a difference between the works of twenty years ago and those of the present day; we are breaking away from the trammels of the school. Taking such works as the Liverpool St. George's Hall, the Leeds Town Hall, and the works generally of such leaders as Barry, Tite, the Smirkes—we find they were closer imitations of Roman models—many of them were the renderings of literalists. The same may be said of the rank and file of the profession: they copied more or less timidly. A few new buildings barely completed indicate that there are yet some of our architects who can work in the Italian manner with freedom. A new building of decided promise in the style is nearly completed in Bow-street for the police-court. It has a long and conspicuous frontage opposite the Italian Opera-house, and its effect as a building is enhanced by the bold setting back of the line of frontage. The façade is broken into three parts by a wide centre and side wings; the centre is obtained, not by the usual portico or projection, but by the breaking forward of two bays of the façade, these are boldly pronounced by rusticated quoins up their entire height, and are carried up to a higher level and finished with terminal compositions upon the quoins. Between these projecting breaks the centre is relieved by three-quarter columns of the Corinthian order, supporting a well-proportioned entablature and attic above. Round the engaged columns the entablature is broken. A bold and effective façade is the result of this simple play in the front and skyline. The columns which divide the centre into three bays are plainly treated, and the whole is built in Portland stone, ashlar. No expensive carving or ornamentation appears, but the composition, dignified in its breadth of treatment, has an elegance and variety that more than compensates for elaborate finish. The façade is three stories in height, exclusive of the attic over the centre portion; the ground-story forms a rusticated basement to the lighter treatment above; there is an archway through one of the salient bays we have mentioned leading to the quadrangle and police-cells. The corresponding bay has the doorway to the official police department. The windows on the first story have rather large pediments of circular form projecting on consoles outside the architraves, while above, the windows are square-headed, and have moulded architraves relieved by small carved scrolls in the centres of the heads. The north angle of the building is splayed considerably, and is enriched by a well-proportioned three-light window beneath a circular tympanum carved with the Royal arms. The angle being rather obtuse, this mode of treating it was better than a right-angle return, and the architect thereby overcame a decidedly difficult point besides gaining an additional feature. Coming down the street, the eye catches the prominent angle quoins and central breaks, and the architect must be congratulated at least in giving to so prosaic a building as a police-court a pleasing variety of outline and a play of light and shade. In plan, the site is a trapezium, and there is an angle entrance for the public, besides the van and police entrance in Bow-street. The principal court, 40ft. by 30ft. by 26ft., on the ground-floor, is placed parallel with the return block towards Broad-court, and is approached by a long side corridor, the police corridor being on the rear side. The front rooms are intended for clerks' and superintendents' offices, the witnesses and clerks connected with the court being on the north side, facing Broad-court. The architect is Mr. John Taylor, of the Office of Works, and Messrs. G. Smith and Co., of Pimlico, are the contractors. The entire cost will be about £40,000. Messrs. Childs' bank, on the south side of Fleet-street, the site of old Temple Bar, is making progress. It has a stone-fronted façade of some length, and its architect, Mr. John Gibson, has also adopted a columnar ordinance of two stories resting upon a basement of rusticated masonry. There is an unquestionable dignity in the columnar front which the single-story or superimposed treatment entirely loses, particularly when it is frittered away over a large façade in the manner the Charing Cross Hotel is done. In the building under notice the architect has divided the whole front into five bays or intercolumnar spaces, the ends being massively marked by square rusticated quoins against the end columns. The latter are three-quarter and fluted, and are engaged to a front rusticated with horizontal joints. There are two bold arched doorways with projecting cornices on consoles, and the windows in the stylobate are also arched. The windows of the principal story have triangular pediments. At present the effect gives a promise of being a bold adaptation of the Italian to mercantile premises, and for a bank the elevation asserts a suitable character, if rather ambitious.

Referring to another new building for a similar purpose, Messrs. Drummond's bank, Charing-cross, we are struck with the rather meagre use of Ionic pilasters, embracing two stories, upon a plain rusticated Doric basement, treated in a rather plain and rigid Classic manner, though not without good detail. There is a pediment towards Whitehall, and the corner facing Spring Gardens is circular and is surrounded with pilasters. Mr. Hardwick, the architect, had here a good opportunity, as the corner is seen for a considerable distance up the Strand, and a handsome feature might have been made of it. The lofty curb roof, which directly pitches upon the balustrade of the façade, looks rather high for this style, and we can scarcely remove the impression that the new façade is simply the recasing of the old structure. A rather peculiar contrast too is produced between the severe simplicity of this building and that of the Charing-cross Hotel at the opposite corner, with its high-pitched pavilion and elaborate crestings. In the last-named structure the horizontal articulation of the architecture is carried to a wearisome excess, while in Mr. Hardwick's work the quietness and severity of the detail border almost upon baldness, if not poverty. Relief has been obtained at the corner by a bold porch of the Doric order, adorned with red Mansfield stone shafts and pilasters. We may add, there is a large vaulted basement for plate, and strong-rooms and offices. The banking offices are in separate apartments, and sets of chambers are obtained above them. Particular care has been taken in constructing the fire-proof floors; the iron joists are embedded in Portland-cement concrete, and are of tested resistance. All the buildings we have described have façades, with columns or pilasters, and in three instances they are designed with one principal order. In Queen Victoria-street, the newly-completed front of the Post-office presents another phase of the Italian; the windows are arranged in stories, and the façade has no relief in the way of ornament or pilasters, except the relief afforded by the window-dressings, the angle quoins, and the massive cornice which overhangs the huge façade. The magnitude of the building, and its over-powering mass, constitute a kind of grandeur independently of any effect derived from architectural treatment of the front. We might mention several other buildings where the style is adopted, but handled in a more timorous manner. After the many changes in taste since the Italian revival in this country, it was hardly to be expected that

we should again at this late hour return to building with columnar ordinances, and plain square or pedimented windows. Rabid Gothicists pronounced not many years ago such a thing as impossible, and many were the invectives and satires fulminated against pilasters and prostyles; but they have all died out, and we seem—in London anyhow—to be returning again to the doctrines of Vitruvius and Palladio, and have begun once more to think there must be something in the Five Orders, after all the abuse lavished upon them by the Mediævalists. The lessons of three centuries have shown us that the range of architectural invention is limited, and that there are only two or three kinds of styles we can work in—only two that have taken a deep root in this country. Each seems to have its own cycle, and to threaten to exclude the other; and the only thing that architects can do is to see how much each time they can eliminate from them, and how far they can adopt the spirit of either Classic or Gothic to the wants of their own times.

SURVEY PRACTICE.*

THE practice of surveying has become a large and important profession. Founded as it is on the most exact principles of mathematics, those who have most thoroughly acquired its rudiments are the most successful practitioners, once they have obtained sufficient experience of the operations. The books treating on surveying are as a general rule confined to one or two branches only of the subject. They deal, perhaps, with chain-surveying of ordinary areas and plots of land, and give some directions in levelling; but for the engineer or surveyor in quest of more general and detailed information, these treatises rarely meet the purpose. A comprehensive and yet scientifically exact text-book was wanted which should give the young surveyor some insight into the principles and technical knowledge necessary in conducting plane table work, compass and sextant surveys, theodolite surveys, with correct ideas of levelling operations, contouring, the setting out of curves, route surveys, &c. Our experience of the treatises published of late years clearly showed us a general text-book was wanted, and we are now able to speak with confidence of one written by Mr. Lowis D'A. Jackson, A.M.I.C.E., and published by Crosby Lockwood and Co. Mr. Jackson's treatise is called an "Aid to Survey Practice," to be used for reference in the many operations of a technical nature occurring in ordinary practice. The book, of course, does not aim at any original treatment; but the author claims for it that it is a compilation deduced from practice or experience, not a mere compilation from other books. In the valuable chapters of the book referring to the systems of ranging curves on polygonal methods, the author has given his own systems, and a few original methods are given on telemetric operations. Some portion of the treatise before us is a reprint from the author's curve-book, published in 1869, and other parts have been condensed from notes written for the use of pupils. Let us briefly scan a few sections of Mr. Jackson's book. One or two good hints are given by the author in his preface. Speaking of the knowledge of method, he observes that the beginner can only learn surveying properly by imitating other persons in the mechanical operations, and that the best person to teach should neither be a purely practical nor a purely theoretical man, for the former does his work automatically, and the latter cannot serve as a model for guidance in actual work. Surveying is, after all, a mechanical process, requiring not so much scientific skill as a practical knowledge of method, based upon geometrical principles, and we cannot recommend to the student who knows something of the mathematical principles of the subject a better course than to fortify his practice in the field under a competent surveyor with a study of Mr. Jackson's useful manual. Correctness and rapidity are insisted upon as indispensable qualities in surveying, and, perhaps, it will be allowed there is no more desirable quality for a surveyor than precision. We often meet with rule-of-thumb surveyors who pride themselves on their practical knowledge, but who waste time on trivial details; these men carry precision to an excess that is not warranted. Of course, rapidity depends mainly on experience, though the knowledge of the quickest methods to be employed and individual tact are also important requisites in the operator.

All ordinary survey-practice may be included between the highest work known as Trigonometrical Surveying, which is applied to large regions or countries, and the rough half-guesswork of the military survey. Thus the author enumerates (1) district surveys carried out after the trigonometrical method; (2) parish and estate surveys, more limited in scope and exactness required; (3) town surveys; (4) engineering surveys; (5) route surveys; (6) mining and subterranean surveys; (7) hydrographic and marine surveys. We might have suggested a more reduced, if not equally correct, scientific classification, by classing district, parish, and estate surveys together as one kind, as all three of them can be performed with the same class of instruments. The sections treating of instruments for measuring distances and angles are very full and trustworthy. In the measurement of distance for example, we have not only the steel chain and steel tapes, but wheel pedometers, passometers, telemeters, direct and reflecting. In speaking of chains, the author quotes Mr. Burt, who found that when all precautions were taken in keeping the chain straight and level, and putting the pins plumb, the average error was 1-500th, sometimes as much as 1-220th on using two sets of chainmen, though it was only 1-1600th on using the same set of chainmen. Common measuring tapes are of course condemned as altogether untrustworthy; those with cords of wire or cutgut are little better, and the steel tape is considered slightly more accurate than the common land chain. The telemeter is discussed at some length, and its principles explained. As some of our readers may not know it, we may explain that the telemetrical measurement of distance is based on the principle of reading upon the eye-lens of a telescope with two horizontal wires the intercepted height of the image of a rod held vertically at the required distance. We find it stated on good authorities that the error given by this means is only four inches in a single sight of 660 feet. It has been largely employed in America on the United States Coast survey, and on the topographical survey of Schuykill. The mode of operating and the form of field-book are given. For ordinary practical purposes, where very accurate results are not required, we believe this principle of measurement to be superior to chain work. Equally comprehensive in description is the section on instruments for taking angular measurement. These comprise (1), the theodolite type, (2), the repeating circles and reflecting instruments, such as the box sextant; and (3), magnetic instruments. The setting up and adjustment of the theodolite are fully explained, and its sources of error are pointed out, and the young surveyor will find these matters thoroughly and mathematically discussed. We do not find, however, the manner of reading angles explained, though of course, this is best learned by practical teaching. The methods of procedure are next gone into; these are by distances and offsets, by triangulation, by traversing, and by obtaining latitudes, longitudes, and azimuths of detached points. Each mode is explained, so that the young surveyor may adopt which plan or conjunction of methods he may prefer. The principle of each mode is clearly explained; in all of them a starting or datum point is required, from which the unknown or required point is obtained. The systems known as triangulation, or a network of triangles and traversing, are both useful to the architect and surveyor in surveying estates upon which buildings are erected, or other obstructions occur, which impede the direct method of measuring. The importance of checking is pointed out in all cases where a single measurement of distance or angle is relied upon; an additional angle or side becomes necessary in such instances. The author discusses the various kinds of survey dependent on the instruments used; these are chain, telemeter, plane-table surveys, and those in which angular instruments are employed. It is unnecessary to enter into these sections of the subject, as many of our readers are familiar with the methods in use. In ordinary chain work it is recommended that the pins should have tallies with numbers attached, and that the tallies at every 10 links of the chain should read from beginning to end of chain, not from both ends to the middle. These rules would save much confusion among inexperienced chainmen. On steep ground the chaining is best done by half-lengths. The methods of detouring obstacles are pointed out, such as the right angle, and half-right angle detours; also the chaining of impassable obstacles. Boundaries, banks of streams, &c., may often be laid down by traversing with a chain and cross staff; an illustration of this process is given, consisting of setting out right angles or half-angles at those points of the chain lines where a deviation in direction occurs, and taking offsets. The examples given of chain surveys clearly set forth the principles, and one showing a portion of a street with two lines of chain measurement is furnished. A very interesting mode of survey, though somewhat rough in its nature, is that in which the plane-table is employed. For the purposes of the architect this method of procedure may be relied upon, though it is necessarily rather open to inaccuracies in large surveys, unless employed in the filling in of triangles. The angles are plotted in the field on the paper by the aid of a sighted ruler directed to the objects, and by the principle of conducting it, it possesses all the advantages of a rough mode of triangulation. Compass-surveys have been conducted on a large scale, though the magnetic adjustments are difficult, and hence this kind of survey is not generally used. A plan showing the method of procedure is given. Triangulation or traversing may be adopted as the principle of operation, just as much or little detail be required in the survey. The principles of sextant and theodolite surveying are amply illustrated, and will be found of service. Of course these are founded on the same methods as that adopted in the great trigonometrical survey of large countries, with the difference that the astronomical observations of latitude and longitude, the corrections necessary on account of the spheroidal figure of the earth's surface, and the use of powerful theodolites are dispensed with. The author illustrates the principles of theodolite triangulation by a plan of district about four miles long and two miles wide, with a base-line of a mile in length. It is desirable to conduct the triangulation and the detailed survey simultaneously, though this is not always possible or necessary. The first step is of course to select a position for measuring a base-line, and the necessary conditions are pointed out. One of these is an elevated plateau, though it is

* Aid to Survey Practice. By Lowis D'A. Jackson, A.M.I.C.E. London: Crosby Lockwood and Co., Stationer's Hall-court.

not necessary that the extremities of the base-line should be visible from each other, if it has other advantages of location. In the main triangulation the angles should not be too small, or less than 30°, nor greater than 120°, and the nearer they are to equilateral triangles the better. To insure accuracy they should be verified by additional angular observations. Skipping over the sections on levelling, we come to the methods of setting-out curves. A curve, of course, supposes an angle formed between the two directions or the intersection, and also the radius of the curve, and these two elements being given, the curve is determined. Tables of these elements, or functions of the curve, are given, from which any curve can be set out. Curves are generally named by their radii, expressed in hundreds of feet or chains, but we should certainly prefer an angular nomenclature by which any curve would be expressed by the angle subtended at the tangent point, a system adopted in America. The author says, "an improved angular nomenclature would deal only with the *actual angle* of deflection," or that angle made by the chord of the curve with the straight line. A useful table of curve tangents is given for every angle of intersection from 180° to 60° up to a radius of 1,000. Proceeding to detail practical methods of setting out circular curves, the author speaks of Kröhnke's method, which consists in setting out equidistant points on the curve by ordinates from the two tangents to the curve, the main objection to which system is that bisections of the curve are required, necessitating the use of an angular instrument. Barker's tangential system is certainly simpler; though open to a similar fault, it is obtained by equidistant abscissæ along the tangent measured from one tangent point, the ordinates are set out at right angles to the tangent. The method is based on an equation strictly parabolic; it is yet a convenient and simple mode for curves whose ver-sine is not more than an eighth of the chord, the principal source of inaccuracy arising from the ordinates becoming long and the consequent difficulty of setting out accurately the right angle of the ordinate. The author proposes a polygonal system, in which the tangent points are fixed, and six equal distances are set out upon each tangent. From these points distances are set off at right angles to the tangent corresponding to values given in a table, and these give six points in the curve. A series of tangents may thus be formed, and similar points obtained in a like manner till the curve is completed. The system has the merit of simplicity, and the author gives an example. The ranging of curves for railways, bridges, and viaducts are fully illustrated. In setting out the piers of a viaduct on a curve, the arches are made cylindrical, not conoidal, to effect which the sides of the piers are not made radial, but so set out that the spans are equal to the arched cylindrical. On the whole, this part of Mr. Jackson's treatise is the most complete exposition of the system of curve ranging we know. The remaining part of the work enters into the subject of route surveys and traverses by land and sea, showing the methods of plotting, and the work concludes by a section on astronomical observations of a rough kind and a variety of examples. The field records at the end of the book illustrate every kind of survey, and will be found an essential aid to the student.

ARCHITECTURAL ASSOCIATION.

THE fortnightly meeting of the Association was held on Friday evening, the President, Mr. S. F. Clarkson, in the chair. Mr. Eales, hon. sec., proposed a vote of thanks to Messrs. E. I'Anson and Son for permitting a visit on the previous Saturday to the new rooms adjoining Merchant Taylors' Hall, with especial thanks to Mr. E. B. I'Anson for personally conducting the party. He also announced that the next visit would take place on Saturday, the 20th inst. (to-morrow), at Knightsbridge new Barracks; members to meet at 3 o'clock at the small gate in Knightsbridge. Mr. R. C. Page, sen. hon. sec., appealed for personal aid in arranging the members' soirée, and intimated, for the benefit of junior members, that morning dress was usual at these gatherings. Mr. Pratt, the librarian, proposed votes of thanks to Mr. Maurice B. Adams for the personal gift of a book on "Artistic Conservatories," the joint work of Mr. E. W. Godwin and the donor, and to the publisher of the *American Architect* for a volume of that publication. The President stated, with reference to the approaching architectural examination, that a member who had taken the Ashpitel prize had kindly offered to coach members in preparation. Mr. Page read a reply from Mrs. E. M. Barry in acknowledgment of the letter of condolence sent by the Association on the sudden death of her husband.

FAMOUS KENTISH HOUSES.

The following is a summary of a paper read by Mr. Page for the author, Mr. S. W. Kershaw, M.A., who had been called away from town by urgent business:—

The county of Kent is so rich both in ecclesiastical and domestic architecture, that it becomes a difficult task to do justice to either portion, so varied are the examples. On the coast of this county Christianity was first introduced into our island; the Romans also landed here, and have left traces of their occupation in roads, stations, baths, and monuments scattered broadcast over the south-east district. Through its cities of Rochester and Canterbury the great high-road led in after ages from the metropolis to the coast, and important monastic buildings rose up, from whence were spread a love for literature and the arts. Side by side with the gradual development of wealth and power in England grew the domestic buildings of this county, the Tourraine of England, which is particularly rich in those of the 14th century.

Eltham.—Not seven miles from London Bridge is the suburb of Eltham, and the remains of the stately palace so long the residence of many of our kings. What was once the hall is now the *rendezvous* of the volunteers. Sufficient, however, remains of the fine roof to attract attention and repay a visit. In early history we find Eltham a Royal dwelling, specially of Edward II., Edward III., Richard II., Henry IV., and Henry VI. Edward IV. expended large sums on the repairs of the palace, and is said to have built the Great Hall. Edward II.'s son, called "John of Eltham," was born here, and from that circumstance the palace is sometimes called "King John's Barn." The rise of Greenwich as a Royal abode was the downfall of Eltham, and though it was visited by several of our sovereigns after Henry VII., it was practically disused as a residence. The buildings exhibited that variety of style which in so pleasing a manner grew with the growth of time. The hall, alone remaining, is famous if only for its noble roof, in fair preservation, similar to that of Westminster Hall, and so well known as an example of construction to students. The interior is about 100ft. long and 36ft. wide. The ivy-clad bridge, by which the hall is reached, is of coeval date. A moat which it crosses is now drained and planted, and there are a few existing portions which show the former extent of the building.

With the construction or design of many a Kentish house is associated the name of Inigo Jones—to what particular extent is an open question. In two houses, viz., Charlton, near Blackheath, and Chevening, near Sevenoaks, he is said to have had a great share.

Charlton House, built in 1607, of a florid Jacobean character, with red brick and stone, is planned after the form of the letter E. It has a large centre hall, oak panelled, and a gallery wherein are some excellent paintings.

Franks, in the neighbourhood of the Crays and the valley of the winding Darent, is sometimes called the "little Hatfield." It was erected about 1591 by one Launcelot Bathurst, alderman of London, and is a brick and stone house with enriched chimney shafts and turrets. From a dilapidated farmhouse it has been modernised, but retains some of the features which made the Mediæval house so representative a structure. The ancient hall exists; the screen and panelling have been carried back; the "latticed" galleries at the far end still remain. Several carved mantelpieces and ceilings adorn this quaint and interesting house.

Cobham Hall, near Gravesend.—It is difficult, indeed, not to assign the palm of excellence to this stately mansion, the home of the Cobhams, the Lennoxes, and the Darnleys. Situated in a noble park, vast and well timbered, Cobham has been noted for the grandeur of its position, no less than for its architectural features and the treasures of art it contains. The largest part was erected in the reign of Queen Elizabeth, by William Brook, Lord Cobham. The first great alteration was made by James Stuart, fourth Earl of Lennox, who entertained Charles I. here. A classical façade was planned between the two Elizabethan wings, and for this work Inigo Jones is said to have been employed. Additions to Inigo Jones's central building were made about 1770, by John, third Lord Darnley. The remodeller was the fourth Lord Darnley, who greatly altered the exterior, and was at work on the house for more than thirty years. His architects were James Wyatt and the Reptons. Renewal of chimneys, doorways, towers, ceilings, &c., took place, but the original design of Inigo Jones's fine ceiling in the music-room, or great hall, was left untouched. The north gallery, about 130 feet long, is enriched with the famed collection of Titian and Rubens, and Flemish tapestry of the seventeenth century. The original Tudor panelling is either gone or hidden by alterations. The grand fireplaces of that period remain; they are enriched by figures issuing from small altars, ornamented with carving in bold relief. The fanciful exuberance of the late Renaissance is seen in figures of the Fates, and other devices carved around these mantelpieces. The portrait-gallery is rich in the works of Holbein, Titian, Velasquez, and Lely, and includes portraits of Sir Philip Sidney, Shakespeare, Villiers, Duke of Buckingham, Dean Swift, Sir William Temple, Sir Richard Steele, Lord Bolingbroke, Dryden, Gray, Thomson, and many other celebrities. The music-room is a most elegant apartment. The walls are lined with white marble, and the upper portions brilliant with gilding: an organ-gallery, supported by marble columns, is at the north end. The large dining-room at the foot of the grand staircase is replete with carvings in marble and other enrichments. The pictures framed in panel rival those of the portrait-gallery itself. They are chiefly of the Lennoxes, the lordly owners of Cobham, and one of Mary Stuart, whose second husband, Lord Darnley, was cousin to the first Earl of Lennox. In Cobham one point of interest attracts us, viz., the general resemblance between it and the more stately Hatfield, erected by Robert Cecil, Earl of Salisbury. Lord Cobham was father-in-law to Cecil, and it was but reasonable to suppose he gleaned many ideas for Hatfield from what he saw at Cobham. In that Elizabethan age, when so many "conceits" in literature were current, when a new order of things was arising, when Mediævalism was dying out, it is not surprising to find many novelties introduced into the domestic buildings of the day. The idea of Thorpe, in making the initials of his name represent the ground-plan of his houses, and the many structures planned after the letter E, in honour to Queen Elizabeth, does not then surprise us. With all the inconsistencies imputed to the Tudor and Jacobean houses, they are, in a special and peculiar manner, picturesque and dignified, of which no exact counterpart exists on the Continent.

Chevening, adjoining Sevenoaks, in the valley of Brasted, is a spot wherein artist and sketcher may long linger, the village churches, the neatly-timbered houses, and undulating woods forming a picture of beauty and repose. You must not forget to visit Chevening Church, where the celebrated recumbent figure of Lady Stanhope, by Chantrey, is to be seen. The house, said to have been built after a plan of Inigo Jones, has been greatly altered. The manor of Chevening belonged to the see of Canterbury from A.D. 1280 to 1536, when it was surrendered to the Crown by Archbishop Cranmer. The house, of stone, has a centre with Ionic columns, and there are large wings. There is a small collection of historical portraits.

Knole, near Sevenoaks.—In this noble house, all that is historical, architectural, and artistic

is combined with grand park scenery, making it one of the most attractive of Kentish seats. It was formerly a residence of the Archbishops of Canterbury, specially of Bourchier, Morton, and Warham. The estate was surrendered by Cranmer to Henry VIII. After passing through several hands, it became the property of Thomas Sackville, Earl of Dorset, better known as the poet Lord Buckhurst, who made Knole his principal abode. Passing through some of the Delawarr family, it is now in the possession of the Sackville family. The great hall, chapel, galleries, and usual appurtenances of a Mediæval house are all to be seen in this mansion. The gatehouse, second gateway, and much of the first quadrangle, appear to be of the time of Archbishop Bourchier (c. 1460). The present habitable portion is of the reign of James I., or later. The entrance to the hall is by a colonnade placed as a kind of porch, erected in the reign of William III. This hall is 74ft. long and 27ft. wide, and 26ft. 8in. in height. The screen is ornamented with shields of arms and bearings of the Sackville family, as are the stained-glass windows. From the "Wood Court" the visitor will see specimens of the architectural styles prevalent in England for 400 years, and the composite character of the buildings is here clearly shown. The grand staircase, decorated with divers allegories and carving, leads to the "long" galleries, and to various rooms wherein are distributed the works of art of this noble mansion. The Elizabethan and Jacobean furniture is of exceeding interest and beauty, and tapestry, embroidery, and the richest cabinets are here in rival excellence. Of tapestry, there are some fine examples by Crane, the master of the Mortlake Tapestry Works in the reign of Charles I., also specimens of German and Flemish work allegorically treated. The "Cartoon" Gallery, 90ft. long, 18ft. wide, and 15ft. high, is the very glory of Knole, and is so called from containing copies of some of the famous cartoons of Raffaelle. The "Brown Gallery," is 80ft. long, the side panelling of oak, and the ceiling of intricate design. The situation of Knole, unlike so many domestic buildings, erected in low situations, is on an eminence, surrounded by some of the grandest timber, and inclosed in a finely-wooded park. Amidst the constant change of other places, Knole is unchanged in style, decoration, or furniture, since the time of James I.

Istham, near Sevenoaks, a typical house for domestic architecture, illustrating the gradual process of the English manor-house from the semi-fortress of the Plantagenet period, to the dwelling of the Tudors. The plan is quadrangular, the moat washing the external walls. The fabric belongs to three distinct periods—the hall, the earliest portion, to that of Edward II. A remarkable feature of the hall is the stone arch to carry the roof, similar to that of Mayfield, in Sussex. The chapel, specially perfect, with its old arrangement and furniture, has a wooden barrel ceiling, and the original painting with the Tudor badges is preserved. The gateway tower and much of that side is of Henry VIII. period; the barge-boards of the two gables of the hall belong to the Elizabethan age.

Penshurst.—Richer, perhaps, in association, historical or literary, than any other of the Kentish houses to which the towns of Tunbridge or Sevenoaks form a centre, Penshurt teems with interest of every kind. Its situation of retired and tranquil beauty, in a fine park adjoin the parish-church and several half-timbered houses, makes it worth a pilgrimage, especially as the house is shown most days of the week. One great historical name for ever linked with Penshurst is that of Sir Philip Sidney, who, born here, was killed at the battle of Zütphen, in 1597. The long avenue walk, still pointed out as "Sacharissa's Walk," commemorates the name of Dorothy Sidney, the "Sacharissa" of Waller's poems. Sir John de Pulteney, who died in 1350, erected the great hall of Penshurst. It came to the Sidneys in the reign of Elizabeth; and, after the beheading of Algernon Sidney, in 1683, the estate passed by a daughter to the Shelleys, ancestors to the present possessor, whose father assumed the name of Sidney, and was created Lord de L'Isle. The front elevation of Penshurst is imposing and picturesque, chiefly built of stone. A great feature is the hall—the most carefully preserved of the old portion. It has a fine open-timber roof, which springs from quaintly carved corbels. The Decorated tracery of the windows consists of a square opening in the head with foliations, a peculiarity known as "Kentish tracery." In this hall is the louvre for the smoke to ascend, and here are placed the fire-dogs for arranging the wood. The custom of having fires in the centre of the hall remained long after chimneys and fireplaces had been introduced. The dais or raised platform, the music-room, with its finely carved panelling, are worthy of notice, also the armour of different dates. Various rooms ornamented with tapestry, paintings, and rare china, make an *ensemble* of rich variety and interest. The great gallery contains many portraits. The tapestry-room—an important chamber—is entirely hung with that fabric, the designs being the triumphs of Ceres, Æolus, and the Winds, &c. Disposed throughout the various rooms are pieces of furniture, old Venetian glass, and a worktable said to have been embroidered by Queen Elizabeth herself. Her portrait, represented as dancing with the Earl of Leicester, is at Penshurst. The student will find many points of interest in the church close at hand, and in the neighbouring villages, where half-timbered houses are to be seen, especially at Chiddingstone.

Hever illustrates the construction of a fortified house somewhat between the castle and the manor of the middle ages. It is situated about four miles from either Edenbridge or Penshurst. It was erected by one William the Hever, a baron who, in the time of Edward III., obtained the king's license to "embattle his manor-house." Hever is specially connected with Queen Anne Boleyn, whose great-grandfather, Sir Geoffrey Boleyn, purchased the estate. The present owner allows visitors twice a week to inspect it. The approach or entrance-gateway is flanked by two towers, embattled and defended by a portcullis. A moat supplied by the river Eden surrounds the building, and there was in all probability an outer moat. From the quadrangle several apartments, with high-pitched roof and gable, are entered, and communicate by a fine staircase with panelled rooms. The external appearance of Hever is very picturesque—the grey stone walls of the fortified portion blending with the mellowed brickwork of the chimney-shafts, affording some excellent sketching. In Hever we find points of constructive interest as a building of defence. Such are the portcullis and the elaborate defensive arrangements. The doors have riveted frameworks of oak, and small doorways, now blocked up, through which those who had been defending the gatehouse from above might withdraw. There is a room called the "Council" room, where there are some old chairs and needlework, the latter attributed to Anne Boleyn.

Groombridge Place, near Tunbridge Wells, occupies the site whereon in Saxon days stood the moated house of Groonenbregge. During the 17th century the rebuilding of Groombridge Place was commenced, and John Evelyn, who had just returned from abroad, enraptured with the Classic taste of Italy, persuaded his friend Packer to rebuild Groombridge in that style. The present mansion is in the form of an H; the walls are of red brick, with stone dressings. The whole building is moated, and the stately gardens have trim hedges of yew and laurel. The interior reveals some fine oak panelling saved from the old house, and the "linen" pattern, surmounted by a frieze of scroll-work, can be distinctly traced.

Allington Castle.—All round Maidstone are ancient houses of more or less importance; not stately, but offering great interest. The little town of Aylesford, on the Medway, recalls some old-world village on the Moselle. The "Friary," now incorporated with a modern house, is said to have been an early Carmelite foundation. History, however, centres round Allington Castle on the Medway, the birthplace of Sir Thomas Wyatt, the poet, and the abode of his son, who headed the Wyatt conspiracy in Queen Mary's reign. The castle stands within a bend of the river, which fills the surrounding moat. The gateway-tower, parts of the hall, and chapel are remaining, and the adjoining farm-house, built out of the ruins, is almost as picturesque as the castle itself. The remaining part of the castle dates from the time of Henry VIII.

Maidstone Palace—erected by Archbishop Ufford in the 14th century, stands near the parish-church of All Saints'. It has been added to at various times, and remodelled partly in the Elizabethan style. Together with the adjoining college, also of Mediæval structure, is worth examination. Chillington Manor House (now the county museum) is an excellent example of Jacobean work, and, though much rearranged, is in good taste, and serves as a picture-gallery, library, and museum. The private chapel of the house is preserved, and as old buildings in the neighbourhood are taken down, they are occasionally replaced here, and added on to the main structure. In this way several half-timbered houses in the locality have been saved from destruction.

Leeds Castle—is a valuable specimen of the military architecture of the 14th century, and is a combination of several architectural styles. The great castle was erected by one of the Crêvecœur family in the reign of Edward I. In 1321 the castle stood a siege for some time. During the reign of Henry VIII., costly and extensive repairs were undertaken, and were conducted by Sir Henry Guildford, a distinguished man of letters, and a friend of Erasmus. In Edward VI.'s reign, Leeds ceased to be Crown property, and was granted to one Antony St. Leger, of Ulcombe, in Kent. Henry VIII. adorned it as a palace, and it was converted into a handsome Elizabethan house, and so remained till realtered by the seventh Lord Fairfax. It consists of four distinct forts and an outer and inner barbican. The surrounding water, the chief element of defence, was ingeniously contrived to flow between the defences in three places, so that any one of them could hold out for a time after the rest had been overpowered. The original internal buildings are all nearly beyond identification. The ancient guard-robe can be distinguished, also some of the chapel with "Kentish Tracery." The old banqueting-hall is turned into a kitchen. A great part of the remaining rooms were pulled down in 1822, and the modern block erected.

In the Weald of Kent, extending from Tunbridge to Ashford in one direction, and bordering Sussex on the other, are a few houses, several modernised. In Cranbrook, once the centre of the cloth trade, are many examples of timber-work in the remains of the cloth halls, which formerly abounded here. Adjoining is Mr. Beresford-Hope's mansion, Bedgbury-park, and an old Elizabethan house, known as the "Twysdens." A group of smaller houses are scattered around the district between Tunbridge and Ashford, including Boughton Malherbe, Surrenden, Hothfield, East Sutton Place, and Godington. Chiefly Tudor in style, now passed into new hands, improved and dismantled, they tell a tale at once of the past and present.

Boughton, near Headcorn, was built by Sir Henry Wotton, in the reign of Henry VIII. Externally, the east and west sides of the old house remain intact; the front has been entirely remodelled. The interior panel-work of carved leaves and grapes is to be seen in several rooms. The drawing-room as represented in "Nash's Mansions of England" no longer exists, but is now partitioned into three small rooms with a flat ceiling.

At *Charing* is one of the many palaces or manor-houses of the Archbishop of Canterbury. The remains of the Palace (close to the church) are the gateway of the Decorated period and part of the court and chapel. The parish-church has lately been enlarged and restored under the direction of Mr. J. P. St. Aubyn. Eastwell, near Ashford (now the residence of the Duke of Edinburgh) claims origin in Henry VIII.'s reign and afterwards passed into the Winchelsea family. It has been a good deal altered, and is unprepossessing externally.

Chilham.—The church and castle are prominent and picturesque objects. Here, as in other places near the coast, we have evidences of a Roman camp, which formed the first site of this castle, enlarged by the Saxon kings, and, till the seventeenth century, remaining the same in construction. An entirely new house was then erected, some of the old portion, viz., the keep, standing near. Chilham consists of an ancient and modern structure. There are some examples of domestic work in the Isle of Thanet, in cottages and farms of flint and brick, with picturesque diapered gables, which have certain artistic features. We have also that structure between a monastery and a mansion, of which Salmeston Grange, near Margate, is an example. This house, of the time of Edward III., was one of the granges or farms belonging to St. Augustine's Monastery, and is now a picturesque ivy-covered farm. Some of the former buildings

can be traced, consisting of an infirmary and crypt. The remains of another house, called "Dandelion" or Dent de Lyon, near Reculvers, has a gateway of alternate brick and flint, over which are the arms of the Dent de Lyon family. This structure is of Edward III.'s time. Near to Chillingden is Goodnestone or Gunston Park (Lord Fitz-Walters). The house was rebuilt during the Georges. Towards the coast off Folkestone and Hythe are many interesting places, such as Saltwood Castle, the rendezvous of Becket's murderers on their way to Canterbury. Saltwood, built by Archbishop Courtenay, in the reign of Richard II., is still a conspicuous ruin; the circular gate-towers lead to the inner court, now used as a farmhouse. The moat (now dry) was formerly crossed by a drawbridge; the ruins are extensive and picturesque.

Near Hythe, on the high chalk range, is Lympne, a castellated Edwardian house, probably built by Lanfranc, and afterwards altered as a residence for the archdeacons of Canterbury. It is now in the possession of a farmer.

At Dover, we have traces of some monastic ruins, specially in the remaining gatehouse of St. Martin's Abbey. The refectory and dormitory, which have been restored, and are now used as the Dover College, has Early English details.

History lingers lovingly over these past and present memorials. They conduct us by study and research to the knowledge of all that is instructive and lasting in architecture and art. The mansions of Kent are an exponent of the social life of our ancestors, and thankful must we be that in this county so many of them have been preserved.

Mr. Aston Webb, in proposing a vote of thanks to the author, with which he coupled the name of the reader of the paper, remarked that such papers, when printed in the professional journals, were most valuable as references in future years, when planning summer holidays, as indicating what was to be seen. A very old house at Wrotham, near Sevenoaks, had been omitted, but it had an interest to architects, not only for its quaintness, its prim terraces, and perfect gardens, but also as having been for some years the residence of the late Sir Gilbert Scott.

Mr. Hilton Nash, who seconded the complimentary motion to author and reader, thought an attempt might have been made to distinguish between the castles and halls, properly so-called, of Kent. To the former class belonged Hever and Lympne, and also a picturesque house near Westenhanger station (Saltwood). The majority of the Kentish houses seemed to have been built or remodelled at the time of the great revival of domestic architecture in the early Tudor period, and so had a double character.

The President reminded the last speaker of the definition between a castle and a hall, that the latter was planned to look outwards on the surrounding country, while the former, being designed with a view to security, had all the larger windows opening inwards.

THE ART OF THE SILVERSMITH.

Mr. W. HERBERT SINGER, of Frome, read a paper exhaustively treating upon the historical character of the silversmith's art, and making suggestions for its revival in our own country, before the Society of Arts, on Wednesday evening. Numerous specimens of work in silver were exhibited as illustrations. That both silver and gold were prodigally used by the Hebrews is apparent from the frequent references to their application to be found in the Scriptures, and the arts were probably derived from the Egyptians. At the time of Homer, and long after, all decorative metal-work, and also statues, were made by the hammer, out of thin pieces of plate, the pieces being joined by pins or rivets; this being long before the process of soldering was invented. Great progress was made in the modes of working metals between the age of Homer and the fifth century before Christ, the art of casting in moulds with a core being then first practised. Three different processes were used by the Greeks in the formation and ornamentation of their silver-work. The first was that of beating, by the hammer, thin plates into various forms. A thin sheet of metal was put upon a cement, which yielded sufficiently to allow the requisite relief; it was then worked upon with blunt punches of different shapes, the ornament or figure being gradually raised by the ground being sunk; if was, in fact, what is now termed *repoussé* work. The second process was that of engraving the surface with a sharp tool, or chasing; and the third, that of inlaying one metal into another, or damascening. These different methods were often united in one work. The silversmith's art attained its highest point of perfection in the time of Phidias, a coincidence probably due to the close relationship then existing between the two arts. Through Etruria the art of Greece first reached Rome, and jewellery of this artistic people is still the wonder of all true workmen. The decadence of the silversmith's art in Rome was synchronous with the decline of political power, and was attributed by the author to the love of change, which led to the replacement of new and vicious shapes for the old artistic forms, and also to the influx of fresh styles from every country of the world, when each became in turn the whim of the hour. No two events caused so complete a revolution in the world of art, and therefore in the design and execution of every kind of metal-work, as the conversion of Constantine to Christianity, and the removal, in the year 330, of the seat of Government to Constantinople; and the result of the new demands for wrought metal was debasement, intrinsic value being more considered than beauty of form or delicacy of ornament. Indeed, the secret of the distinction between Greek and Byzantine work is that whereas the earlier artists specially cultivated beauty and purity of form, the later men sought for beauty and richness of colour. In the effort to gain these effects, enamelling was brought by the Byzantines to perfection, and they were the first in Europe to practise *cloisonné* enamel, a process in which each colour, applied to the metal in a thin layer by vitrification, is separated from the other by a narrow strip of metal. An important specimen of early silver-work is the altar-frontal in the church of St. Ambrose, at Milan. It is of silver, partly gilt, and set with a profusion of precious stones and enamel plaques; it was the gift of the archbishop, in 835, and seems to be of Latin origin. In the eleventh century, the Romanesque revival of the art took place; artists were tired of following the traditions of the antique, and therefore created new shapes, and their art was gradually moulded into that severe style, so pre-eminently ecclesiastical, which retained its hold upon the people until the era of the Græco-Roman style, 400 years later. The characteristic object of the Gothic period is the shrine, which took the form of a coffer, of wooden framework, with a sloping or gabled top, overlaid with thin plates of the precious metals. The sides were a series of arcades, enriched with *cloisonné* or *champ levé* enamel, filagree work, or set with precious stones. Between the arches were silver statuettes, executed by *repoussé*, in high relief, and stiff and monumental in treatment. About the middle of the twelfth century, it is believed, the monastic artist Theophilus wrote his wonderful treatise on the various arts. Of the six books which are extant, 69 chapters deal with the silversmith's art. He commences by mentioning the different tools that were required for the working of the precious metals, and goes on to minutely describe the various processes that it was then necessary for an artistic metal-worker to be skilled in, the requirements being so varied that there are but few, in our days, who could fulfil them. He must be able to execute *repoussé* work in its many and difficult branches; also to engrave, and, if necessary, to compose the niello, sometimes filled into engraved lines to produce a stronger contrast; to understand the mixture and application of *cloisonné* enamel, and the setting of precious stones; he must also be able to model in wax, so as to make the patterns for objects to be cast in silver or gold, which process he must also be able to undertake himself. We see, from the standard held up by this author-artist—who, from the way in which he treats the different subjects, must have been himself able to produce work in the various processes he describes—that silversmiths had, in his time (of which, unfortunately, the date can only be inferred), mastered nearly every difficulty of their art. It is disappointing that so few specimens of this period have descended to posterity, most of the examples still extant being of German origin, consisting of either shrines or reliquaries. The treasures of the cathedrals of Cologne and Aix-la-Chapelle are very rich in work of this time. One of the most famous examples of this period is the Gloucester candlestick. It is executed in a white alloyed metal, containing a good proportion of silver. This interesting specimen is still preserved in the South Kensington Museum. In outline, it follows the general design, having a straight stem, with a knop in the centre, a triangular base, and a large receptacle at the top to prevent the grease from dropping, with a pricker to hold the candle; but it is remarkable for the marvellous amount of decoration with which it is covered, every member being loaded with ornamental detail, consisting of volutes and foliage, in the folds of which are grotesque figures of men, birds, and monsters. The chalice was ever an object of especial care, and was generally made of silver. In the twelfth century the cup was reserved to the celebrant, and from that time the cup was made of a much smaller size. The earliest examples of the small chalice are of massive character, with semicircular bowl, thick stem, and rather small round base. The silversmith's art of the Middle Ages reached the greatest perfection during the thirteenth century, continued to flourish throughout the fourteenth, and slowly declined in the fifteenth century. The Pointed style of architecture marked a complete change in this art, and now all likeness to Byzantine productions entirely ceased. In the fifteenth and sixteenth centuries another great change took place: the art had hitherto been restricted to the use of the Church, and its workmen were chiefly inmates of monasteries; now the art fell into secular hands, and the nobles were its chief patrons. The chalice now underwent an alteration of form, although the proportions of the whole were still excellent, the bowl being made smaller and sometimes semiovoid in outline, and the base and stem being ornamented with architectural detail. In secular art, the salt-cellar and nef—the latter a miniature ship, which held the goblet and other utensils, and occupied the place of the modern epergne—received the greatest attention from the silversmith. But very few specimens of French art of the fourteenth century remain, and still rarer are those of English workmanship. Limoges was one of the districts of France conquered by our Edward I., and soon after that date large quantities of enamelled plate were imported into England, and the art known by that name was greatly practised in this country. But few specimens of fifteenth-century silver-work are left to us, the ecclesiastical plate, with but very few exceptions, having disappeared at the Reformation, and most of the plate in the hands of the rich nobles and commoners having been melted up during the civil wars. From the numerous dispositions to be found in Mediæval wills we learn that many feudal lords were possessed of great riches in gold and silver plates, both for ecclesiastical and domestic purposes. The merchant princes of the fifteenth century also had their treasuries well stocked with silver plate. Some of the London guilds, and colleges in Oxford and Cambridge, possess specimens of the latter end of this century, but they are probably not examples of the best work of the age. The village of Nettlecombe, in Somersetshire, has in its church a pre-Reformation chalice and paten. The chalice is very beautiful in its proportions, and has served as a model for many of those produced in modern times. It stands nearly six inches high. The bowl at the lower part is broad, with the sides conical. The hexagonal stem is divided into two parts by the knop, an excellent piece of work. The base is divided into six compartments, and in one of these is an engraved plate, upon which traces of enamel are still visible, the subject being that of the crucifixion. This chalice and paten are of great interest, not only on account of their beauty, but also from their antiquity, for they are almost the oldest examples of hall-marked English plate known. It was during the reign of Edward III. that the workers in the precious metals had granted them their first charter of incorporation, and in 1462 they were formed into a regular company, with the power to inspect and stamp all gold and silver-work produced in this country. From the commencement of the 13th century, throughout the Middle Ages, the silversmith's art was in special request, and in high estimation, and a rapid improvement in style and character of work is apparent. Not only did the nobles vie with each other in the acquirement of works of art, but the Church had command of

enormous revenues, and the surplus funds were invested in costly metal-work, such as altar frontals, and chalices. From the middle of the 13th century to the termination of the 15th, the metal-work created by the Italian artists was of the greatest beauty; the forms were both pure and correct, and it was the study of ancient art that brought about this splendid result. The style of these two centuries in Italy is one peculiar to herself, and of which she may indeed be proud. The 16th century witnessed the return to Classic traditions, known as the Renaissance, the silversmiths being amongst the first to lead the way. The work lost its former excellence and grandeur of character, one great reason of the decline being that about this time the artist and the workman was no longer one and the same individual; the designer now occupied a higher social position than the artisan who executed his thoughts. But just before this fatal change took place there flourished Benvenuto Cellini, a man who united in himself the genius that usually falls to the share of a whole generation of artists. After Italy, in no other country of Europe flourished so beautiful and characteristic a style as that which was developed by the Germans during the 16th century. It is a national art, and not a mere copy of the Italian Renaissance, and it is one almost confined to secular uses. The constructional lines of the Gothic style were gradually modified, and at length superseded by vegetable forms, which at length formed the essential parts of silver-designing. This peculiar characteristic was impressed upon their art by an eminent group of artists, at the head of whom was Albert Dürer. In this country there was an almost entire destruction of pre-Reformation ecclesiastical silver work, owing to the active searches carried on during the reigns of Henry VIII., Edward VI., and Elizabeth. It is very remarkable what exact uniformity of design was maintained in the "fair and comely communion cup of silver" which was ordered by Elizabeth's Commissioners to be used in every parish-church, and of which numerous examples exist. These cups were made in London, York, Exeter, and Norwich, the greatest divergence from the typical form being observable in those made in the latter ci y. About 1600 the style of this cup greatly degenerated. Of secular plate, the hanap was at this time the most elaborately worked, and was very similar to the cup. The hour-glass was a fashionable form of salt-cellar at the commencement of the sixteenth century; it then became square, and more highly enriched with *repoussé* work, but at the close was less ornamental, and now took a circular form in three tiers. In this century Apostles' spoons came in general use, as the christening present of the period. The most important productions of the silversmiths in England during the seventeenth century were the large drinking-vessels, known as grace or loving-cups. These are generally composed of a bowl covered with ornament in low relief, surmounted by a cover of open or pierced work, and in form somewhat resembling a steeple; the stem is often of acanthus-leaves, with baluster-shaped mouldings, the foot being round. Many of the City companies still possess examples of these grace-cups. *Repoussé* work in high relief seems not to have come much into fashion before the time of Charles II., but after his time, large tankards, and particularly caudle cups and trays, were covered with bold *repoussé* work, to the exclusion of the former style of James and Elizabeth. During this century, a large amount of engraved ornament was applied to smaller objects, especially to watch-cases. As the use of wine became more general in the Church of England, so the chalice increased in size. In many places we find a kind of grace-cup, or hanap, amongst the Church plate. These large cups, with covers, were silver-gilt, with ornamental open work forming the stems. In the reign of Queen Anne, great excellence was reached in this art for all secular purposes, including coinage, but the Church plate became more and more debased. Most of the work of the eighteenth century was done by men of small means, who had usually two or three workmen only. Quite at the end of this period large factories were formed for the production of silver-work, amongst the first of these being that of Rundall and Bridge, who employed Flaxman to design for them.

Few industries have had to struggle through more difficulties, restrictions, and penalties than that of the silversmith, so that it is wondrous how his art has flourished at all in this country. If much has been accomplished, how much more might have been done had the trade been as free as other art industries? Whatever preservation or value marks are to plate, the decadence of modern times commenced as soon as a tax was laid on silverwork. This had its beginning in the time of George I., with 6d. an ounce, and went on—with a short interval between 1758 and 1784—increasing up to 1815, since when it has been 1s. 6d., with also a tax on everyone dealing in silver; so that, in fact, there is a double tax. The present condition of this art may be briefly stated. In Germany, some very fair work is produced, but chiefly of a heavy character, chased up in the Renaissance or Classical style. Italy and Spain may be classed together, each being clever in small objects, and the latter country is particularly famous for her damascened productions. France is deserving of high praise for her nineteenth-century plate; the figures with which French artists enrich their work being admirably designed and modelled. America is at present making the most rapid advancement to the silversmith's art; from her we have much to learn, if not to fear. In France or Germany the master is often artist, workman, manufacturer, and merchant combined; technical education being more common in those countries than with us. But in England the master is generally a man who does nothing himself but receive the orders given to him, he hands these on to his foreman, who distributes the work amongst the workmen. Individual skill and merit occasionally come to the front, and from our division of labour great success has been obtained in various processes; but who would think of apprenticing his son to a silversmith if he had any other branch in life open to him? The results of our doings in modern times have been that during the reign of George IV. we had the "king's pattern" epoch, and that now we have come to the "fiddle pattern" era, and this we can only manufacture in three or four places in England, whereas a steam-engine can be made in hundreds of towns and villages of this kingdom. In conclusion the author urged that this state of things can only be obviated by, firstly, the repeal of the duty, and this is irrespective of the question of hall-marking. Hall-marking existed long before the duty, and there is no reason why it should not continue long after the tax has been removed, if thought advisable. Next, a great change should be attempted in the teaching of apprentices to this art, it being now too often learnt by the rule of thumb. Schools exist for instruction in the liberal professions, and if this art is to be great in England, we must, he considered, have a grand central school, in which a thorough education can be given to the silversmith—a veritable college for metallic art. With such a college in which to train those who wish to follow this beautiful art, the author thought we might reasonably hope that the silversmith's work of the Victorian age would soon be found worthy to rank with the noblest works of Ancient Greece and Italy.

"BUILDING NEWS" DESIGNING CLUB.

REVIEW OF DESIGNS FOR A COUNTRY PARSONAGE.

PICTURESQUE architecture is bought rather dearly by those who finish a sketch first, and endeavour to fit a plan to the exterior afterwards. Some such a mode must have been followed by many of the members in designing the parsonage for a country locality. It was a subject that suggested a picturesque treatment, but it was also one calling for some care in planning, and it occurs to us there is no reasonable excuse for adopting a Gothic or "picturesque" style, unless it be made, as it ought to be, and as the old builders always thought it should, the natural outcome of the plan. We make these remarks, as we find that "Alfred," while sending us certainly the most suitable sketch, has failed in his arrangement. Among the faults of plan we may mention that the kitchen is too far from the dining-room, which would have been much better in the position of the study. The dinner would have to be brought right through the hall by this arrangement, and in front of everyone who happened to be at the front door. The doorway of the dining-room, to make matters worse, is placed close to the front entrance, so that the servant will have to walk from one extreme angle of the house to the other, and, when about to enter the room with the dinner-things, be so close to the front door, that she would stand the chance of an awkward collision with anyone who chanced to open the said door at the moment. The parishioners' entrance, also, is rather too close to the main entrance; it would have been better on one side. There is not so much to find fault with in the upper plan, though the landing is small for four bedrooms to open from, and we cannot see the use of the casement leading from one bedroom to the lead flat over a portion of the dining-room. The construction is defective. The girder or beam carrying the wall above across the dining-room would have to rest at one end on the window lintel, and the difficulty of keeping ceilings free from damp with lead flats above them should have been avoided. With all its faults, however, the design has the germ of something good, and the half-timber treatment and grouping of gables are pleasing. The hall is not cramped, and the design has the character of a parsonage. "Sub Rosa" sends a better plan in some respects; the main entrance-hall in front crosses the parish entrance from the other side of house, and the study-door is close to the latter, and does not lead to the unpleasant consequence of any of the parishioners who come to the parsonage on business, or for advice, jostling against other visitors or members of the family in the hall, as would be the case in "Alfred's" arrangement, but the position of w.c. is not nice. The staircase, kitchen, pantry, stores, and scullery are well placed; there is plenty of light to the landing and stairs from the window over the pantry, and the five bedrooms and bath-room are compactly obtained. We cannot see the advantage of three windows to the dining-room. The style is Domestic Gothic, and suitable, but we do not like the chimney heads, which are over-topped, nor the queer excrescence in the shape of a corner attic window and we cannot quite understand how it is roofed. The materials are proposed to be red brick, and stone dressings, with tile-hung upper story. Estimate is £1,356.

"Edwin's" design, as usual, is a picturesque composition, made up of brick and stone tiled upper stories and overhanging gables of timber and plaster. The front elevation is exceedingly pretty as a picturesque massing, but certainly a little too antiquated and irregular in its features. The materials and colours suggested would make a charming model for the painter. We cannot admire so much the plan; it is long. The principal entrance is too near the garden one, and the long passage from the latter to the back-door would make a cold, draughty house. We do not see why there should be four entrances; the parishioners' might have served for one. The long, irregular-shaped passage on the first floor is unnecessary and wasteful; and there is a want of compactness in the planning, which might have been obviated if the offices had been turned round, and the passage to them made right-angled to the hall. The nursery and bath-room are desirable additions, and the conveniences are handy. "Castello."—This plan has much the same fault as the last; there is a long passage through the house, at one end being the staircase and the other the back-door. The offices are convenient and complete; but we certainly object to the parishioners' entrance being the same as the principal entrance. Nor can we admire the treatment of the latter externally under a lean-to roof. The flat-headed doorway, with its depressed arch and spandrels, look out of place under the raking line of coping; the garden-elevation is the best; but the chimneys are poor in detail and commonplace. "No. 90" has a characteristic treatment; tiled and timber-framed, but the parishioners' entrance and passage to study, which also passes the kitchen-door, is injudicious. The passage, too, would be ill-lighted; in other points there is commendable care shown, and the drawings are detailed and figured. "Ora et Labora" is too heavy in some of the detail: we do not understand what the string-course between the stories is intended to be made of; it looks like timber insertion; if so, it is not a durable mode of ornamentation. The plan is tolerably good in general grouping of parts, but the complication of passages and doors near the kitchen and servants' stairs is awkward and dangerous; and

we fail to see the utility of lighting of the inner passage. It would have been better to have omitted the servants' passage and stairs altogether. The upper plan is less objectionable, and the parishioners' entrance in a good place. "Honey-Dew," an old contributor, sends in a cleverly-treated front elevation, carefully lined, half-Jacobean in the entrance and lower-windows; the porch and entrance-hall is made a centre feature between two square bay-windows, and is 11ft. wide, with seats round porch, a good feature; the parishioners' entrance is quite distinct from the house, and is by a narrow passage closed at the hall end leading to the study. The kitchen and offices are not well located, and the drawing and dining-rooms have too many windows for comfort, to say nothing of the want of wall-space for furniture. On the upper plan the arrangement is convenient. The author proposes moulded terra-cotta for strings, with red Ruabon-bricks for walls, green slates, and woodwork painted brown. There are some good points in "Mot"; the plan is compact, and the entrances are well placed, the first floor is complete in its appointments, and the servants' stairs and rooms are well shut off from the other part of house. The front elevation is spoilt by the crowded and small doorway, and some of the doors and windows are awkwardly placed. The estimate at 8d. per foot comes to £2,100. "T. Square" is an antiquated elevation, with 17th-century brick and stucco detail, but the simplicity of the gables and bay windows is marred by the unmeaning wooden brackets which support the angles of the upper gables. The plan is extravagant in the hall, and no offices are shown. The author is quite imbued with the style he adopts, and has avoided a frittered effect. "Toledo" is parsonage-like, and has a resemblance to compactness of plan. The parishioners' entrance is well located near the study-door, and shut off from the kitchen, and the general appointments are well provided for. The elevations are in a suitable Gothic style, but the chimneys are too low, and the main-entrance door is not happily introduced externally by the side of chimney projection. The estimate at 8d. comes to £1,570. "Merlin," in a solid-brick style, with thoroughly English Renaissance features, is scarcely a parsonage for the country. It has more the suburban-villa look. The plan is cut up and spoilt by the passage which connects the parishioners' with the main entrance. The up-stairs passage in one part is not well lighted, and the arrangement lacks study. "Fleur de lis" sends a pleasing and suitable stone treatment. The front elevation is simple and effective in its details; but the plan is awkward, and the climax of absurdity is reached by making the passage to the kitchen abut upon the front hall close to the principal entrance. "Vanity Fair" has certain good points. It is compact; the entrance for parishioners is separated from the house by a door, and the kitchen and dining-room made convenient for service by an intermediate butler's pantry; but the lobby is cramped, and we do not like the balcony elevation; it is a trifle too ingenious. The style is suitable. "North" has an elevation of moderate character, but the porch, conservatory, and general arrangement indicate crudeness and want of study. "Wasp" is a decidedly better plan; the parish entrance and general arrangement is well managed, and there is a good porch with gabled bath-room above. The chief defect in the design externally is the want of harmony in the gables, and the roof is awkward in grouping. "Heart with an arrow in circle" is pretentious in design, and the detail is coarse and heavy. The plan is based on the right principle, but the parish-entrance would have been better on one side. "Chimney Pot" is a modest design, suitable in its general features; the parishioners' entrance is well located, and the general planning is worthy of better drawing. In the section the ridge and purlins are shown too large in scantling. As we cannot comment upon all the designs, we must class them in groups. "Juvenis" is tawdry, in a rather common-place Gothic style, and the plan is not happy in the entrances and offices. "W." (in W.), "Our Praises are Our Wages," "A. U. C." (in triangle and circle), "Fish," "X. L.," "Gemshorn," "Burswell," "J. L.," "F. W." (in a lozenge), have all worked out the plan with more or less success; but the elevations are generally too ornamental, or not characteristic of the country parsonage. The last-named is more suitable than others of the group in this respect. "Quod," "Null Bien San Piene," "Pendennis," "Sagitta," "Lancaster," fail more in their internal planning, either from the want of economical arrangement of the walls and passages and entrances, or else from ignoring the relation between the chief apartments. "Attempt" is particularly unhappy in his passages: the centre corridor between dining-room and study is waste of space, and might have been served better by another door from hall into study. The kitchen and offices are in the basement—not a desirable arrangement in the country. "Clansman" spoils his design by his high roof in one case, and by a crowded hall arrangement in the other. "Mustapha" cuts up his plan with a long parishioners' passage; the porch and vestibule entrance to the drawing and dining-rooms are defective, and the kitchen is too far away from the latter. "Pupil J.," "Frankton-hook," "Ogmore," "Hornet," "Excelsior," "Presto," and "Leopilton," are other designs. The first-named has some merit of plan, but the design is spoilt by the balcony over the entrance, and the peculiar bracketing. "Hornet" has a compactly-planned hall, but the angle window spoils the exterior. "Ogmore," if he had a better-drawn elevation, would have stood a better chance; his windows are small, and finical in detail; while the design of "Excelsior" might have ranked higher with a little more care. It is gratifying to find more uniform merit in these designs than on a previous occasion; the plans are, as a rule, more studied, and many of our junior members show a decided improvement in their work.

A PARK ENTRANCE.

"Edwin" sends us certainly the best-framed gate, and plainly and sensibly treated. It is hung to plain, square posts of oak, and has a centre rail with open panels above, the lower part being close boarded with cleft-cut boards. A side wicket-gate is shown, of the same height and construction. The top rails have a moulded capping, and the posts have moulded caps. In the framing the author has well disposed his struts in three panels, besides which we see that a flat iron bar or tie is fixed upon the inside of gate, as an additional security to prevent the gate dropping. In the footway gate the strut, by mistake apparently, is put the wrong way, its top being framed into the hanging stile instead of the reverse. "Alfred" sends a handsomer design; the gates are hung as a pair to the side posts, each is simply framed in three moulded panels below, and above the middle rail the space is filled with turned balusters of good shape. The top rail is ramped at each end to the hanging stiles, and these are carried up a few inches and are finished with a scroll. The posts are square with plain cappings. At the side the small gate works in a coop, and its posts are ornamented with some fairly designed wrought ironwork at the tops, and united by scrolls of iron carrying a small lamp in the centre over the gate. Over the inside post the ironwork is carried up as an open standard, and has a bell fixed at the top below a metal gablet. The sketch is effectively drawn. "Binny" designs a monumental gateway in a French Renaissance style, having a wide centre archway with elliptical arch and two side narrow archways. The centre gateway has pilasters and is surmounted by a carved frieze, a pedimental centre with coat of arms, and a high roof. The gates have open balusters above and panels below, and a turnstile is shown in the side entrances. We note a weakness about the piers and arch, and the upper part looks heavy. "B," in circles, shows a pair of gates framed and filled in with V-jointed boarding below, and with turned balusters above. They are suitable in design, the posts are stop-chamfered at corners, and have moulded and weathered cappings with balls. The detail of the hanging and meeting stiles, and the chamfered angles of posts, are Gothic, and do not harmonise with the Classic mouldings and egg-and-tongue ornament of the caps. The drawing is neat. "Quod" has a strongly-framed gate with suspending pieces from the hanging stile. We do not like the panelling, and the upper balusters look weak and finical. The posts are curiously panelled and grooved, and the grooving of the rails and stiles would have been better avoided. "Mot" is the device of a very ornamental pair of gates made with oak framing with ash panels below, the whole being stained and varnished. The upper square panels are filled with intersecting vesica-shaped ovals, the centre part having iron scroll-work. The piers of masonry are too heavy in design for the gates, and the side wicket, constructed as two narrow gates hung to the centre-post by rocking hinges, looks out of proportion. The author makes his centre gate 12ft. wide, and the small entrance 4ft. 6in., the gates being 6ft. high. 10ft. would have been sufficient for the centre gates. "Black and White" is too fantastic; the open panels at the top are filled with wheel-like devices having carved centres and spokes; the lower panelling is even more absurdly elaborate, and the piers remarkably heavy and massive. There is a lack of principle throughout the design, while the author has bestowed too much ill-directed pains and labour upon the drawing. "Fidessa" shows a covered entrance, with timber-framed gable; not an ill-advised idea as a shelter. We like the framing of small gate; perspective drawing is poor. "Ogmore," as usual, is much too fanciful. Imagine park gates, filled in with delicate-flowing tracery only suited to an altar-railing, within the reach of mischievous boys! Why choose Late Gothic? We advise "Ogmore" not to try his hand at ornament till he has mastered the practical detail of construction. "Wasp" is also far too fanciful. What do all the turned cross-pieces mean? The sketch is pretty, but fantastic in detail. We strongly advise our younger members to abandon conceits when dealing with matters of this sort.

WATERFORD CATHEDRAL SPIRE.

PROBABLY many of our professional readers have experienced difficulty, in works of reconstruction, in arriving at a complete agreement with the contractor as to the actual amount of demolition and rebuilding necessary. The builder may consider that an uncondemned section of the fabric is so far dangerous that he declines to take the responsibility of building upon it; while the architect, although convinced that he is acting within the bounds of prudence, not unnaturally objects to this shifting of the onus on to his shoulders, lest he should be made answerable for negligence or bad workmanship occurring without the knowledge of either the contractor or himself, which might affix an unjust stigma on his professional character. One of these awkward differences of opinion between architect and builder recently occurred in the rebuilding of the spire of Waterford (Protestant) Cathedral, and has resulted in the satisfactory vindication of the architect's opinion. At the last meeting of the Diocesan Council of Waterford, a letter was read from their architect, Mr. J. Franklin Fuller, F.S.A., of Brunswick Chambers, Dublin, announcing the successful completion of the cathedral spire. The old spire was faced with flags, laid against a brick cone; and some of these were broken by the corrosion of the iron cramps, others had slid and fallen. A contract was entered into with a local builder, to repair and point the old spire; but, after fixing the scaffolding, he reported that the stonework could not be repaired. In this Mr. Fuller, on re-inspection, agreed, and the spire was taken down and a contract for a new one, of well-bedded masonry, signed. The builder now reported that the tower itself was unsafe, and refused to build, except at the architect's risk. Mr. Fuller not unnaturally declined to accept such a responsibility, and, to end a dead-lock, suggested that the builder should be compensated for material and loss of contract, offering his own fees to meet the expense. This was adopted, and the architect then offered to take all risk and get a new spire built, if he might enter into a fresh contract with one of two builders whom he named, and appoint his own clerk of works. He was allowed to have his own way as to both builder and foreman, the latter being Isaac Abraham; the spire was successfully rebuilt on the tower reputed to be dangerous, and, although surrounded at the time by scaffolding, withstood the test of the gale which caused the Tay-bridge disaster. After hearing the letter in which these facts were recorded, the Chapter of Waterford passed, at the instance of the Dean, a motion in which they congratulated Mr. Fuller on the successful termination of the undertaking, and thanked him for having generously remitted his fees as architect.

The foundation-stones of a new Wesleyan chapel were laid at Hillhouse, Huddersfield, on Wednesday week. The building will cost £4,000.

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ILLUSTRATIONS.

WALL ARCADING ROUND LADY CHAPEL AT ELY CATHEDRAL.—DESIGNS FOR OXFORD HIGH SCHOOL FOR BOYS.—WESLEYAN CHAPEL AT LEICESTER.—BARGE FOR UNIVERSITY COLLEGE, OXFORD.

OUR LITHOGRAPHIC ILLUSTRATIONS.

THE LADY CHAPEL AT ELY.

The erection of the Lady Chapel, Ely Cathedral, was mainly due to John of Wisbech, a brother of the monastery, and was begun under the direction of Alan de Walsingham—also the architect of the octagon—in 1324, and completed in 1349. The octagon, the western choir, and the Lady chapel of this cathedral* are probably the finest examples of pure Decorated work to be found in England. The Lady chapel, which stands in an unusual position, when perfect must have been very beautiful. It is 100ft. long by 46ft. wide, and 60ft. in height, and is divided into five bays. There is rich tabernacle work with canopies for figures, which have been unfortunately destroyed, between each window, beneath which runs an arcade of great beauty. This is formed of three arches in each bay, with projecting canopies, the spandrels above being filled with sculpture. The east end has a somewhat different arrangement, which may be seen in the accompanying illustration. The portion of the arcading shown is in better preservation than any of the rest, and the colour decoration is also more plainly discernible. The eight niches at the east end, four of which are shown, were evidently filled with nearly life-size figures, which have entirely disappeared; indeed, the despoilers of the chapel seem to have taken the greatest care to smash everything in the shape of a figure that they could lay their hands upon. Mr. Pugin is said to have burst into tears when he first saw this chapel, and on being consulted as to its restoration, said it would cost at least £30,000, and if they had the money it would be impossible to find men able to do the work, so it has happily escaped so far. Mr. J. O. Scott has lately been employed on the restoration of the west front; let us hope that the dean and chapter will follow Mr. Pugin's advice, and leave the interior unaltered. Our drawings are those for which the Pugin Travelling Studentship has been awarded to Mr. Leonard Stokes.

HIGH SCHOOL FOR BOYS, OXFORD—MR. CODD'S DESIGN.

It is sufficient to state that this design shows a great hall 84ft. by 28ft. fronting George-street, over four classrooms and a corridor, with a staircase at each end, intended to communicate also with additional classrooms, master's house, &c., should these ever be required. Two variations of the same design were also submitted, to meet points which were left in doubt by the instructions; but the position of the school and its general arrangements were the same in each. The question at issue is not, as to the relative merits of the designs, but as to whether the chosen design has not been abandoned in favour of a fresh one, in which all the more important arrangements of one of the rejected plans have been embodied, together with many of the outline ideas of its elevation, however much these latter may be altered by their treatment on a different style.

Frederick Codd.

HIGH SCHOOL FOR BOYS, OXFORD—MR. T. G. JACKSON'S DESIGN.

I have to thank you for allowing me to publish my original design* for this building, and in that way to reply to Mr. Codd's charge of plagiarism. In his letter to you, published Feb. 20 (p. 237), I understand him to complain, that after the governing body had chosen me their architect from among the three who competed, they allowed or induced me to copy his rejected design, merely disguising it under a different style, in which he is pleased to detect a resemblance which had escaped me, to the architecture of Queen Anne's reign. He says, "the ground-plan and general arrangements of one of the unsuccessful competitors is adopted . . . . . not, mind, a mere adaptation of it, but the actual plan itself, with no greater alteration than an enlargement, and carrying up the porch. The elevation also is treated to a central gable, a high-pitched roof, and bell-turret, as was the case with the unsuccessful design alluded to, but not an idea of which existed in the successful architect's previous plans. The whole is then stripped, and very cleverly redressed in Queen Anne's clothes." Mr. Codd will find, on referring to your illustration, that his memory is inaccurate, and that a high-pitched roof, a central gable, and a bell-turret, are all three to be found in my original design. He will also find that my plan remains virtually what it was, the main difference being, that by buying up the leases of some adjoining houses, and by allowing me to spend more money, the governing body have enabled me to show my main building to the street, which I was prevented from doing before, by considerations both of space and economy. This has enabled me also to enlarge the main staircase, and has occasioned its removal from the corner to the middle of the main front. The only other change of consequence is in the position of the second staircase, which I have attached to the main block, because the building in which it was placed at first is not to be built immediately, and one staircase did not seem sufficient meanwhile. Whether my plan resembles Mr. Codd's or not I am unable to say. I did, indeed, see the competition drawings when they were publicly exhibited, but the half-hour I spent in the room was devoted chiefly to the design of the other competitor, who seemed to me the more formidable rival of the two. Of Mr. Codd's plan I have no recollection; I remember his elevation and perspective view better; but he may be assured that I have not derived the least inspiration from them, in any design I have subsequently made.

T. G. Jackson.

WESLEYAN CHAPEL, LEICESTER.

This chapel, now in course of erection, was recently obtained in a limited competition by Messrs. Redfern and Sawday, architects, of Leicester, who have been employed by the committee to superintend the carrying out of their design. The site is a commanding one, being at the junction of the King Richard-road with the Fosse-road. The external walls are of local granite, relieved with Bath and Attleborough stone dressings. Accommodation is provided for 850 persons. The whole building when complete will cost about £4,500. The design also includes the improvement and extension of present school-building, to make it harmonise with chapel, at an additional cost of £1,000. Mr. Allen, of Leicester, is the contractor, and Mr. Stanyon, clerk of works.

OXFORD UNIVERSITY COLLEGE STATE BARGE.

This barge has been built at a cost of about £950, by Mr. Saunders, of Streatley, and Mr. Dodd, of Caversham, the former building the hull, and the latter the house. The former barge of this college was an old one, which had belonged to one of the City companies. It was of very graceful design, but had become so much decayed, that it was impossible to retain it in use any longer. The new barge has more accommodation, for while it occupies about the same space from stem to stern, it has a much shorter prow, and therefore a larger house. This consists of a good clubroom, a dressing-room with other conveniences behind. Externally the barge is painted an ivory white, relieved with blue and yellow, the College colours; the inside is panelled in carefully-picked white deal, varnished, with a little gilding. The architect is Mr. J. Oldrid Scott.

* A large woodcut illustration of the octagon of Ely Cathedral was published in the Building News, July 10, 1863; another of the west front was given Nov. 15, 1867; and a photolithograph of the nave interior Dec. 2, 1870.

* Mr. Jackson's modified design was illustrated in the Building News for Feb. 13th last.

ACTION OF THE SUN'S HEAT-RAYS ON HOUSE-WALLS.

The solar radiation is not without influence on the comfort of the occupants of a house, and it may be very different, according to the orientation and exposure of houses. In a recent number of the *Zeitschrift für Biologie*, Herr Adolf Vogt, having discussed this question theoretically, describes some experiments which he made with reference to it. He cut out of a block of sandstone three square plates, 51ctm. length of side, and only 14mm. thick, and attached to the back of each plate a water-vessel of thin sheet-zinc of the same extent as the surface of the stone plate, and with a width of about 2ctm. In the water a thermometer was inserted, and the whole vessel, exclusive of the front stone plate, was inclosed in a wooden case, and packed with hair, so that the communication of heat to the water would probably be only from the stone plate.

Three plates so arranged were now set up in an open space unaffected by any shade: one plate looking directly eastwards, one southwards, one westwards. In the shade of the hollow space between the three plates the air-temperature was measured, and at a short distance from these the solar radiation was measured with an actinometer. Hourly observations the whole day through were possible last year, at Berne, only on two days, July 25th and 29th. These observations, which alone were undisturbed by cloud or mist, led to very remarkable results, which are shown in tables.

"If we sum up the calorics," says Herr Vogt, "which passed through each of the four walls in the course of one day, the same unexpected result appears from both series of observations—viz., that the south wall took insolation-heat least, although it was twice as long exposed to the sun's rays as the east and west walls, and although at the time of the most favourable angular position of the radiation to its surface—viz., mid-day, the power of insolation had reached its maximum for the day. The heat which penetrated through the east wall during about fourteen hours was to the same heat at the west wall, and to that of the south wall, on 25th of July, E. : W. : S. = 100 : 75 : 68; and on 29th July, E. : W. : S. = 100 : 88 : 86."

The following are amongst the values given in the table:—On the 25th July the highest temperature of the air was 27·6°, at 4 p.m.; the maximum temperature of the blackened actinometer, 46·4°, appeared about one o'clock. Of the three water-vessels, that in the east reached its highest temperature, 33·4°, at 11 o'clock a.m.; the southern, 36·2°, at 3 p.m.; and the western, 40·3°, at 6 p.m. On the 29th July the highest air-temperature, 29°, appeared about 3 p.m. The dark actinometer reached its maximum, 45·7°, at 1 p.m.; the eastern water-vessel reached its maximum temperature of 34·8° at 11 a.m.; the southern was 37·4° at 3 p.m.; and the western reached a temperature of 44°, which was observed both at 6 and at 7 p.m.

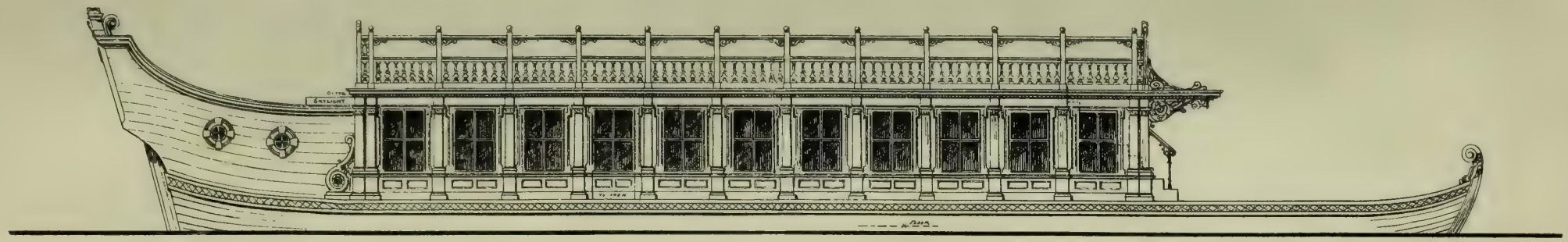
CHIPS.

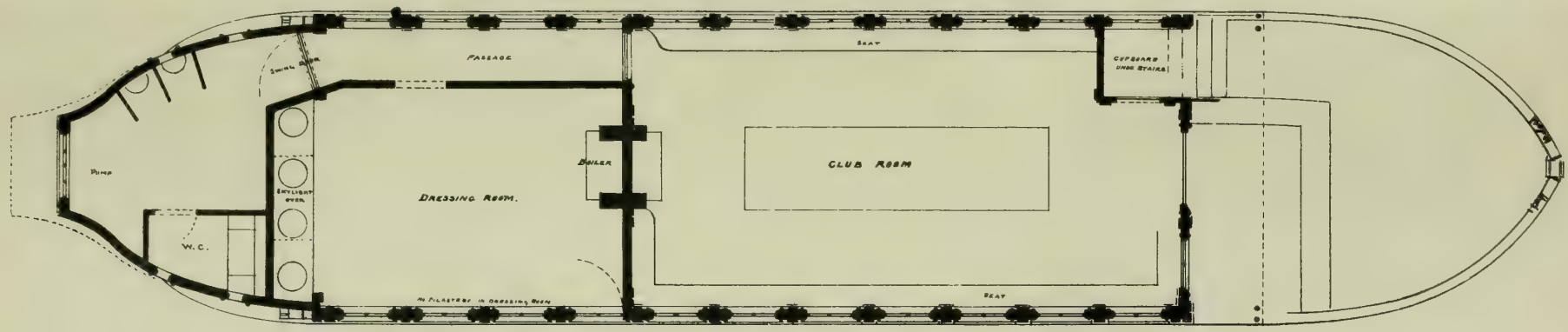
We happen to know that the rumour mentioned by *Truth*, that Mr. Geo. Gilbert Scott, M.A., F.S.A., has joined the Church of Rome, is correct.

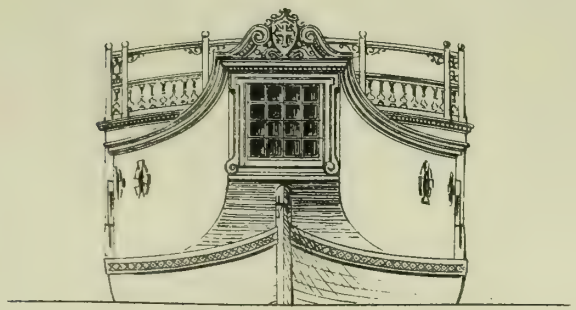
The peal of bells in the tower of Saxmundham Church, East Suffolk, has been thoroughly restored, and the bell-frame strengthened, new fittings, wheels, stocks, and gunmetal bearings being provided. The work has been carried out by Messrs. George Day and Son, of Eye, and the reopening ceremony took place on the 11th inst.

UNIVERSITY COLLEGE, OXFORD.

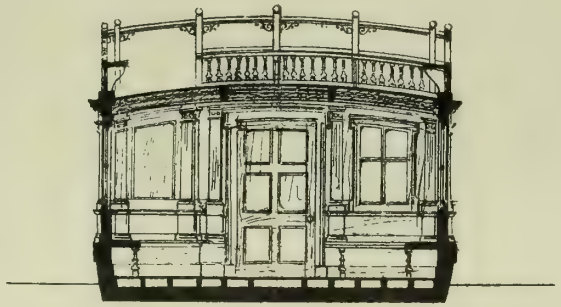
BARGE.



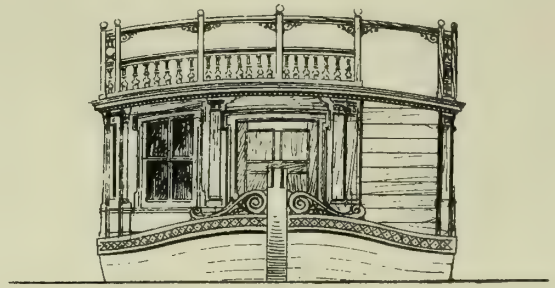




STERN

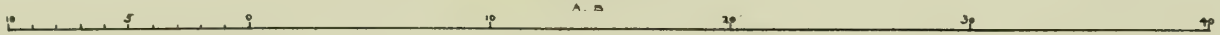


CROSS SECTION
A. B



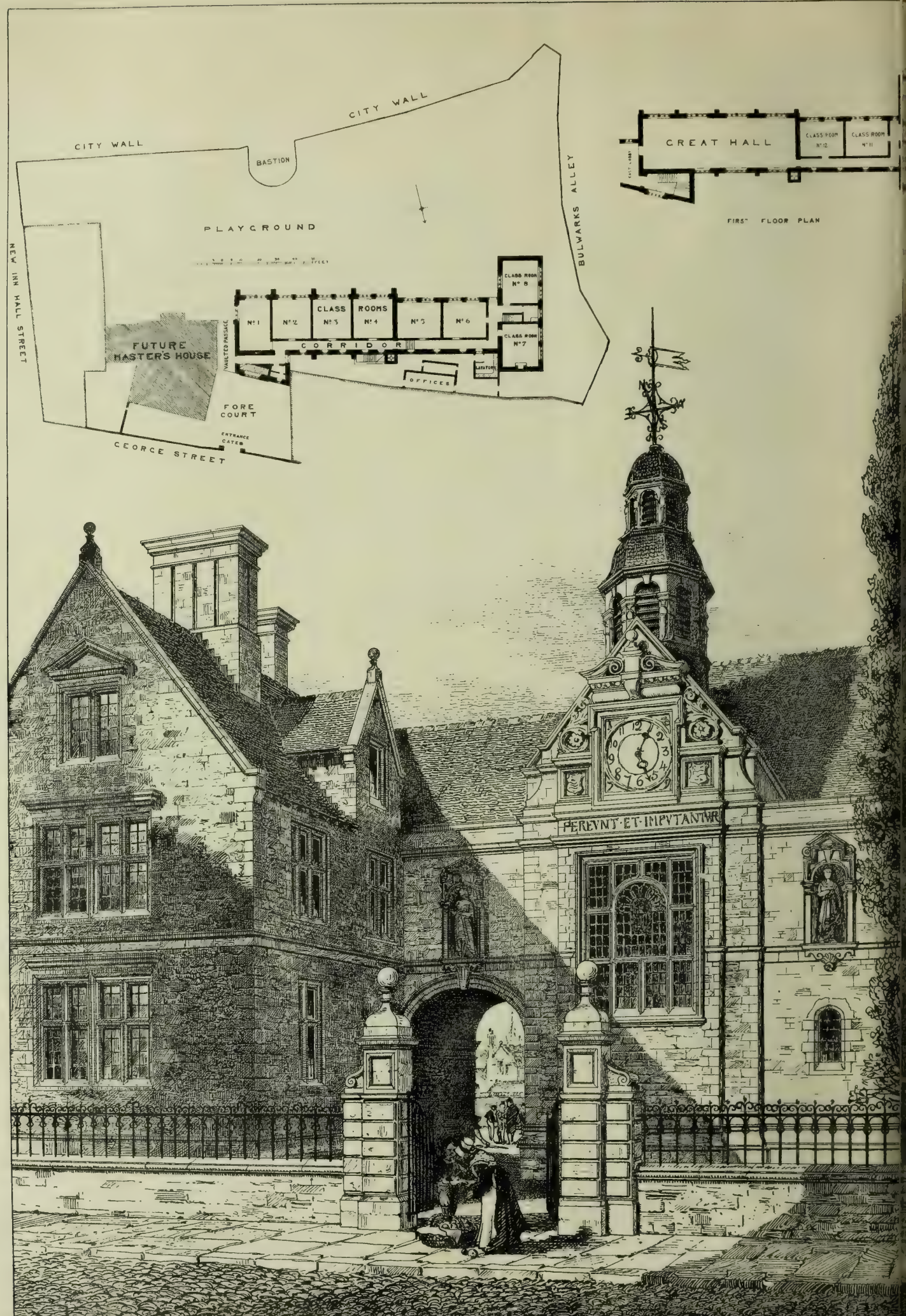
PROW

JOHN OLDRID SCOTT ARCHITECT
31 SPRING GARDENS LONDON.



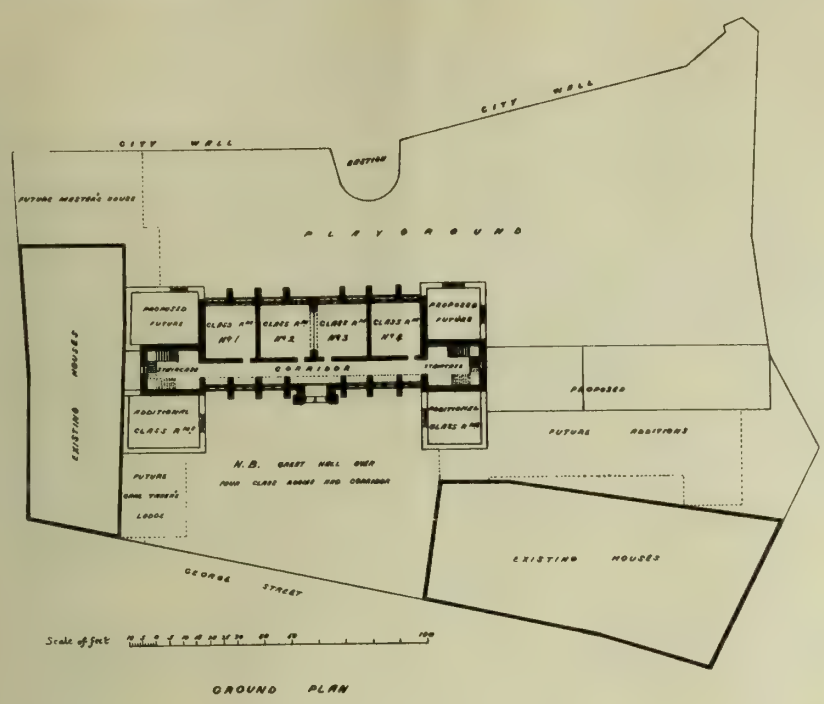
SCALE OF FEET

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.



OXFORD · HIGH · SCHOOL ·

Mr T.G.JACKSON'S DESIGN



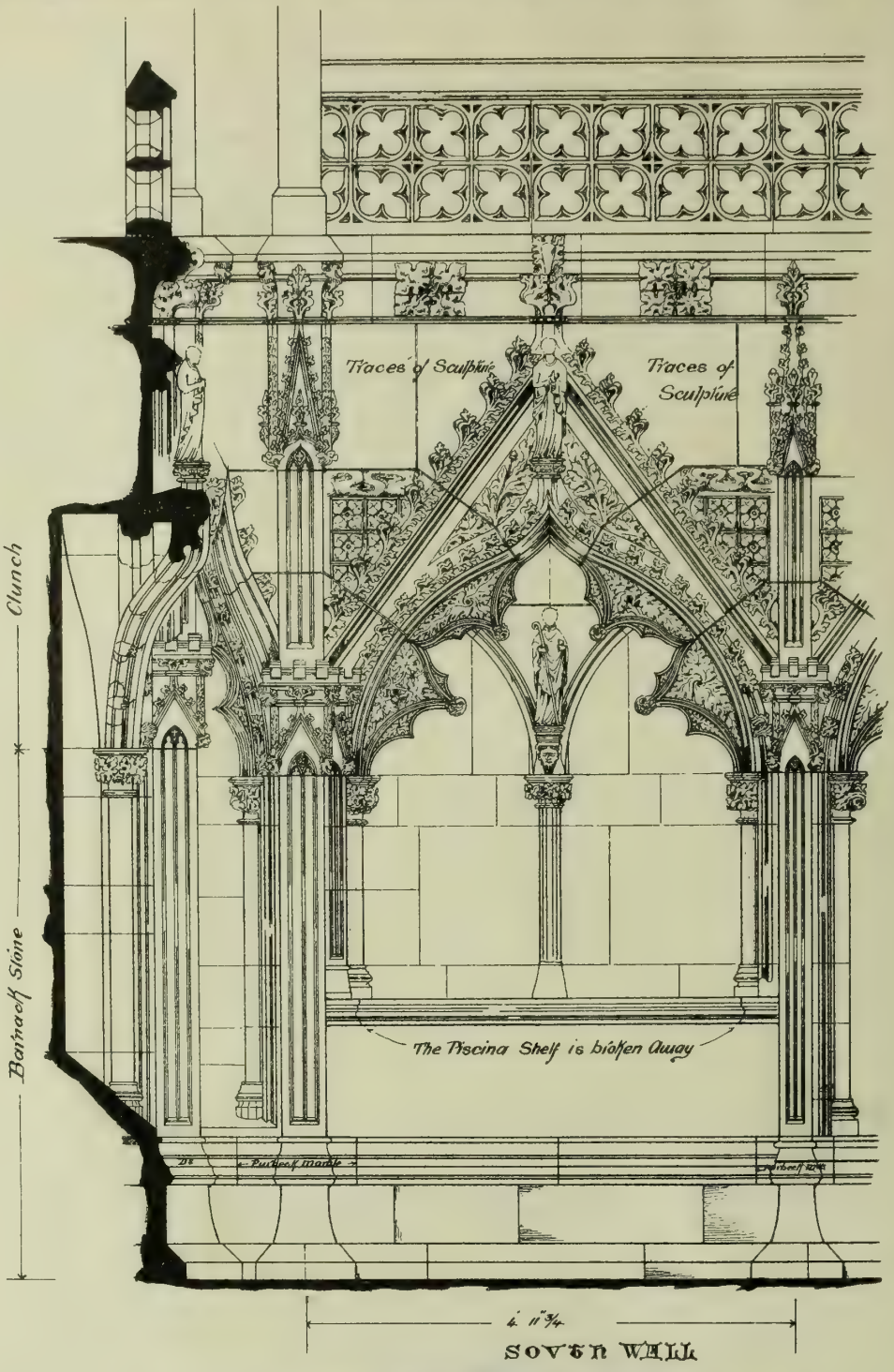
GROUND PLAN

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W C

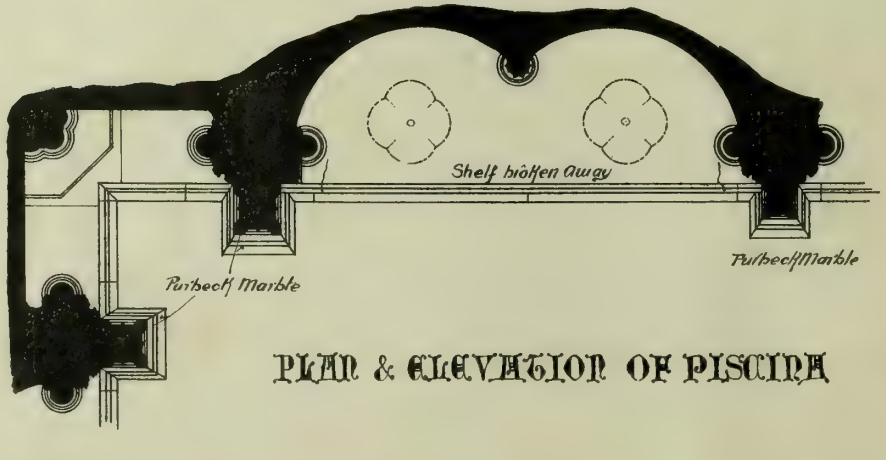
R · BOYS · COMPETITION

Mr F. CODD'S DESIGN

PORTION OF WALL-ARCADING ROUND LADY CHA

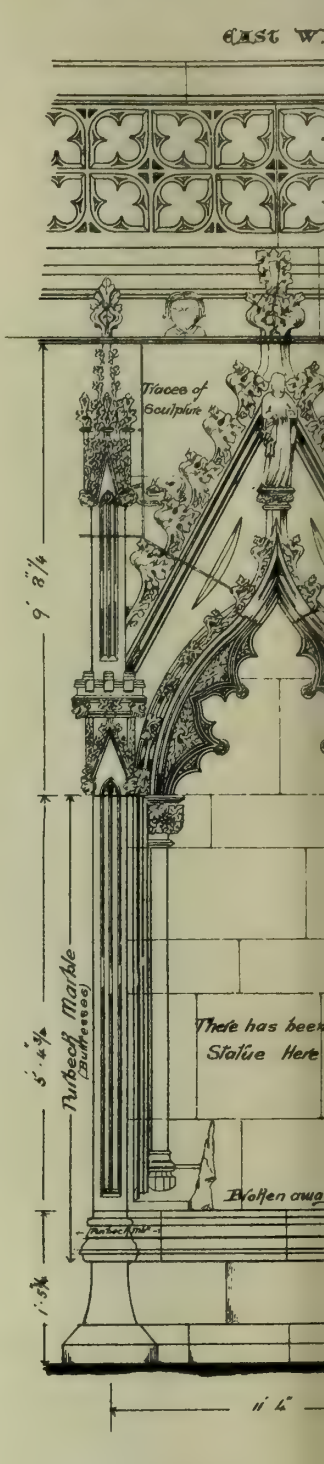


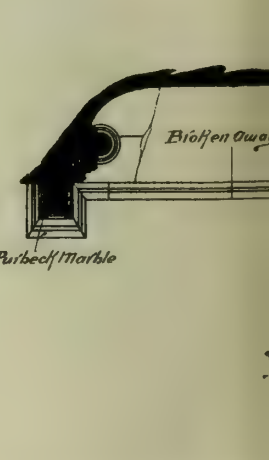
SOUTH WALL



EAST

PLAN & ELEVATION OF PISCINA



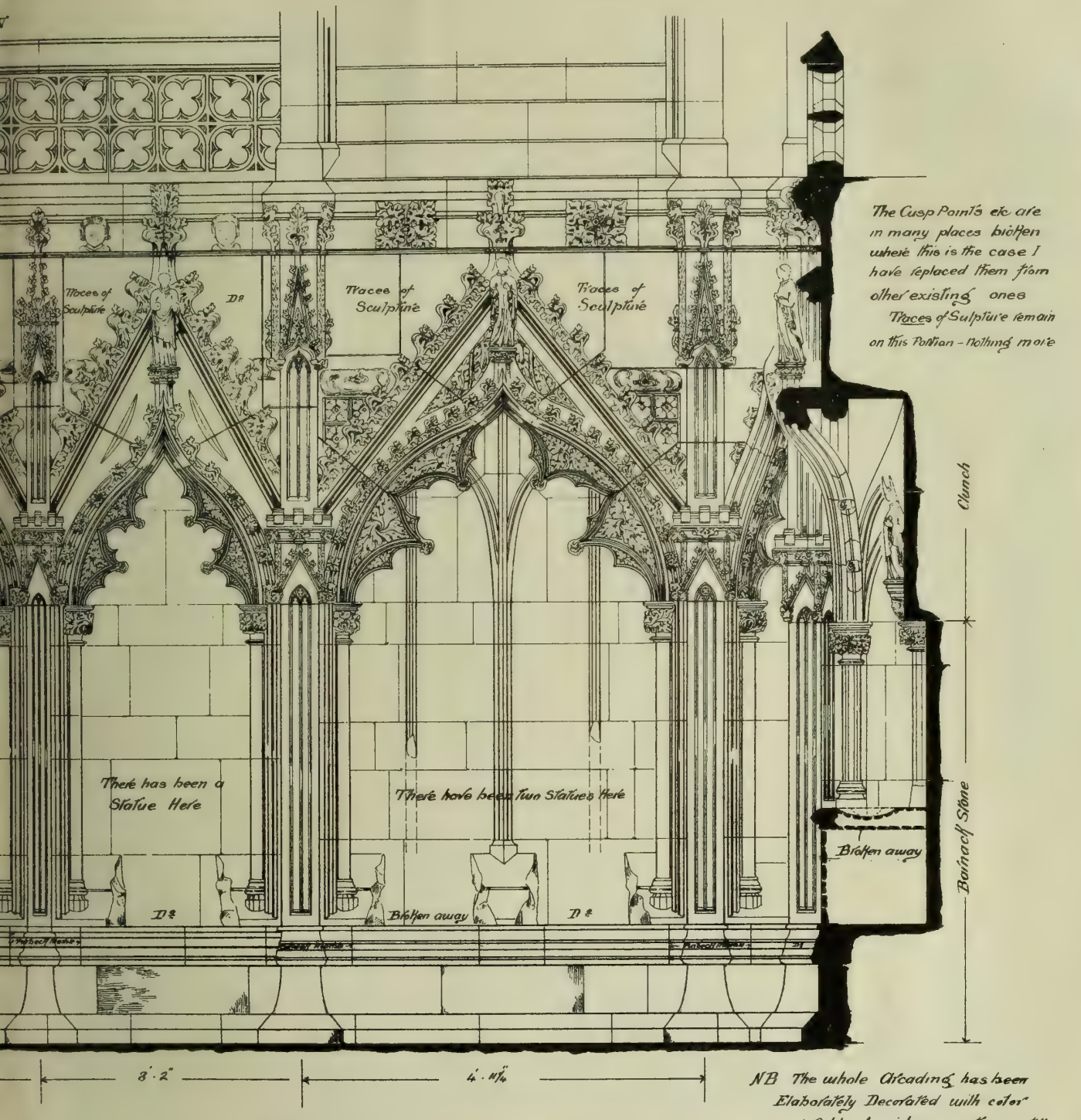


Scale of 0 1 2 3 4 5

L ELY CATHEDRAL

PUGIN TRAVELLING STUDENTSHIP

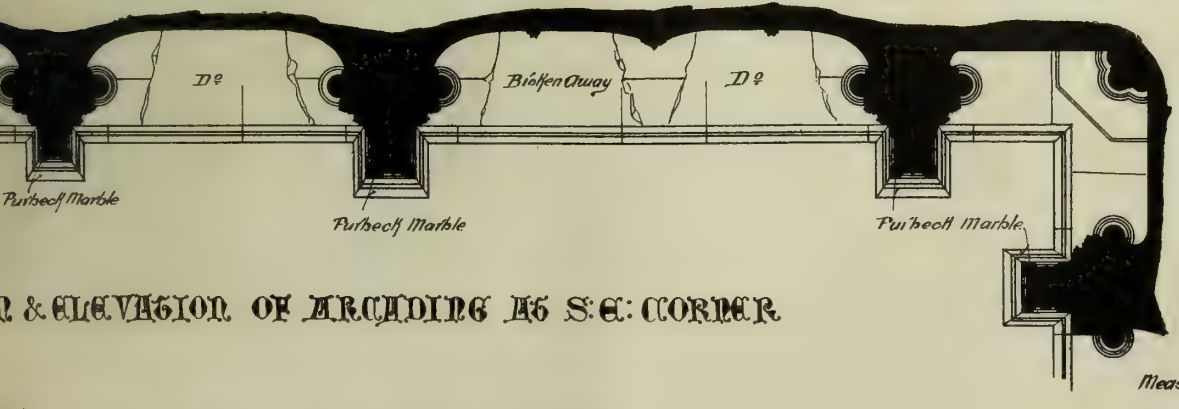
THE PRIZE DRAWINGS



3'·2" 4'·11¼"

NB The whole Arcading has been Elaborately Decorated with colors and Gold of which many traces still Remain (See Details)

EAST WALL



The whole of this Work was drawn to Scale on the Spot

SOUTH

N & ELEVATION OF ARCADING AT S.E. CORNER

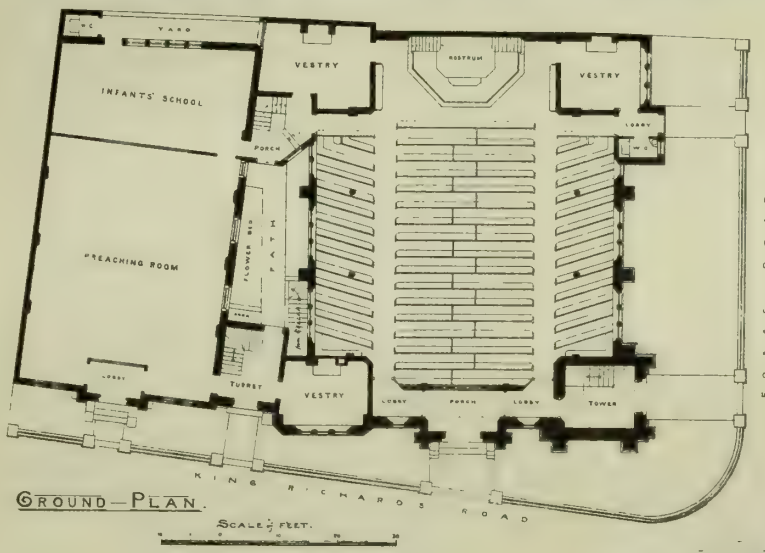
6 7 8 9 10 11 Feet

Measured in July
Drawn in December } 1879
Leonard Stokes

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

Wesleyan Chapel King Richard's Road, Leicester.

Messrs. Rodgers & Sawday, Architects.



GROUND—PLAN.

SCALE ¼ FEET.

Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

SIR FREDERICK LEIGHTON'S NEW FRESCO.

LAST week we noticed briefly the completion of the fresco painting in the Central Court of the South Kensington Museum, upon which Sir F. Leighton has been engaged for some time past. The President of the Royal Academy had been commissioned to paint two subjects: one, the Industrial Arts of Peace, and the other, the Arts of War. It is the last subject that has been finished at the end of the South Court, and occupies the semicircular space at the end of it. The general effect of the finished fresco, we can hardly say, realises what we expected from the study in monochrome which had been on view in the gallery for some time, though of course we must take into account the larger scale of the executed work and the difficulty there always is in focusing the eye to the scale of the painting which was intended to be seen from below. In the present instance also the visitor can only see it from the side or end gallery of the court, or from the body of the court below at the extreme end. These are undoubted obstacles which the painter had to overcome. Viewing the painting as a composition, we are still less inclined to say the treatment fully realises our expectation of it; there is a crowded effect in the groups of figures on the right and left of the arched entrance, and the chiaroscuro is not so happily managed as in the first study. The view given represents an armourer's yard, such as might have been seen in an Italian town in the Middle Ages. The first thing that strikes us is the architecture; this is certainly defective: the centre arched doorway looks cramped, and the caps and shafts especially so; the corbel table coming down over the voussoirs of the pointed arch is bad construction, and is only what a painter unversed in architectural detail would do. The corbelled roof on the right-hand side, and the corbels on the left, are equally feeble and unsatisfactory, and we are sorry that Sir F. Leighton did not obtain the assistance of an accomplished architect of Italian Gothic to assist him in these accessories. The group in the foreground shows a number of fine and athletic-looking youths, clad in rich and tight-fitting costume, choosing and trying their weapons, while immediately in front is a sitting group of Italian girls, engaged in the embroidery of banners. The attitude and outline of some of the nimble figures of young warriors are creditable to Sir F. Leighton's powers as a decorative artist, while the colouring and high lights are rich and varied in tone. The subject is handled with a masterly simplicity and breadth. We may particularly refer to the figures in white doublets, and the sun-lit banner in the open gateway. We think if the left-hand part of the walls, now shaded, had been in a little darker tone, so as to have thrown out the figures with more contrast, the composition would have gained in force and balance. The young soldiers engaged in buckling on armour, and others trying their crossbows and swords, are skilfully portrayed, and the painter has imparted life and action to them, if he has not preserved in every instance the relief or perspective idea of distance in the figures. On the whole, the work must be pronounced a successful one, though we should have preferred to have seen the original sketch more closely followed. We cannot approve the dark blue border which has been painted round the fresco; it has certainly a heavy effect, and somewhat destroys the balance of colour.

The annual distribution of prizes to the students of the Cambridge School of Art took place on Monday evening.

THE USE OF STEEL FOR STRUCTURES.

THE employment of steel instead of iron for bridge-building is one of the recent developments of engineering. Although there are many who believe it has only to be used more to become general, there are others who hesitate to do so till more practical experience has been gained of its properties for constructive purposes. There is no doubt a considerable practical difficulty occurs in the use of steel as any material that has not been brought into general use; this is chiefly owing to the need of more definite knowledge of its properties, and the want of recognised proportions for the sections of members, so as to obtain the desired economy in the use of the metal. The cost of manufacture is, of course, another serious consideration, which can be only solved from an extended use of steel.

It may be of interest to refer to a few opinions of practical engineers on the subject, as we believe the reason why such difficulties as we have named are still in the way is the want of a consensus of facts and opinion on the matter. In Holland we find considerable experience has been acquired of the use of steel. There have been many bridges constructed of it. Knilenberg bridge has its floor constructed of steel, while we hear that the plate-girder bridge, carrying a railway over a canal at Amsterdam, had the main girders of steel. These came to grief, it is said, because the riveted beams were built out of plates and angles that had previously been subjected to tensile tests. On loading them the beams gave way under a comparatively small strain, a fraction of the load they had previously borne; the angles were found to snap or twist. The engineer of the central bureau of Rhenish railways, on whose authority we give this information, mentions two large bridges, one across the Rhine at Arnheim, which had been strengthened by additions, in consequence of the failure referred to. The reliability of steel has, therefore, been discredited by the Dutch engineers; but we take it that the steel had been manufactured from insufficient data as to the risks of manufacture, especially in the processes of punching and riveting the plates, and that it would be unwise to abandon steel because one or two instances of its application had failed from the lack of experimental investigation. If we turn to a discussion which took place some time ago, before the American Society of Engineers, the quality of steel before and after manufacture is referred to by several engineers. Mr. Macdonald cites the case of the steel eye-bars used in the Glasgow bridge, which had been made in Pittsburgh. The speaker said "he had seen photographs of the eye-bars that had been taken out of the wreck of the Glasgow span, which was carried away by the ice during erection, and they were bent and twisted in every conceivable direction. They were sent back, to the shop, re-heated, and straightened, and put back into the bridge." Gen. Sooy Smith, the engineer, said only four eye-bars were broken in the fall, although they were not so fortunate with the compression members. The speaker further said, "when it is remembered that in this accident upwards of 250 tons of finished steel were precipitated from a height of 80ft. into the river, with so little injury to the material, it at least furnishes some evidence of the possibilities of steel as a material for bridge-construction. The evidence this instance affords is of some weight, and we think it worth while the attention of those engaged in the inquiry into the Tay bridge disaster. A very important question, in reference to steel, is to secure a necessary degree of ductility. It has been affirmed, by excellent authorities, that a low grade of steel should be used for structural purposes, because it can better stand violent shocks and vibration. They say that a ductile metal is more necessary than one of high tensile resistance, as it will stand better the manufacturing processes. On the other hand, we find a very opposite opinion is expressed that cast steel, having as high as 9-10ths carbon in its composition, gives the best results in withstanding vibration in machinery and steam-hammer rods. If we refer to an eminent authority at home, Mr. Kirkaldy, we find some valuable experiments on the Fagersta steels which prove that, with a high grade of steel, containing the above proportion of carbon, the ductility is reduced considerably, and this fact, we think, is of the greatest importance in the determination of the question. A few well-conducted experiments, with steel of high and low grades, would set the above difference of opinion at rest. It is whether steels of high tenacity are preferable to those of lower tenacity for structural purposes, taking into consideration the sudden shocks and manipulations the steel is subjected to, both during muanufacture, and when used in a bridge. We have no doubt that experiments will prove the wisdom of selecting a steel of moderate character. It must be borne in mind that steel has a remarkably wide range in tension, from 40,000 to 300,000lb. per square inch, and this fact is one of the difficulties attending its employment. We do not know practically what to expect from it, and, what is of more importance, its modulus of elasticity varies within wide limits, and therefore if two bars are placed together having varying moduli, it is impossible that the strains can be equally borne between them. In structures, such as bridges, we have to consider the degree of uniformity between the members. The strength of particular specimens avail little and often mislead, and we believe a common source of error is to rely too much on tests, and too little on the combination of the pieces in the actual structure. It would be impossible to test every bar of a bridge, yet it is a fact not generally known, that steel made from the same ingredients differs greatly in its strength. Under such circumstances it cannot be denied that ductile qualities of steel are more to be depended upon than high tensile kinds, and, according to Mr. Chanute, an engineer engaged in the Erie Railway, the success of American bridge-building largely depends on the use of soft elastic metal, especially in the tension members. By a fair amount of elasticity, any bar which first becomes loaded, yields till the other bars come into play, but with non-elastic members, the structure comes to grief from the want of elasticity in perhaps a few of its members. From experiments made by Mr. Chanute, and recorded in the *Transactions* of the American Society it appears that steel plates showed an ultimate strength of from 50,950 to 62,310lb. per square inch, and an elastic limit of 29,340 to 42,350lb. per inch. He thinks that as regards steel it would not be advisable to increase our customary working strains used for iron bridge, more than 50 per cent. With regard to compression members, we know less of the capacities of steel; in iron they are often underloaded. If economy is to be the test, both strains should be balanced as far as structural combination and perfection of manufacture allow. It is evident that the greater the elasticity of iron or steel, the less they are subject to become overstrained. We need only add, in conclusion, the great importance of co-operation between manufacturers and engineers, and the necessity for a qualified commission on tests.

THE PRINCIPLES OF HOUSE-DRAINAGE.

AT the Parkes Museum of Hygiene, University College, on Saturday afternoon, Mr. Rogers Field, C.E., delivered a lecture on house drainage before the members of the Institution of Builders' Foremen and Clerks of Works. The lecturer remarked that many men employed in house-drainage and plumbing were known as "practical workmen," because they carried out a job without troubling themselves as to theories, simply working in the manner to which they were accustomed. On the contrary, such men least deserved the name, for unless the principles which ought to govern the removal of refuse matter were thoroughly familiar to a man, it was impossible that he should be able to distinguish whether a given mode of drainage were right or wrong. The principles of sanitation he would simply enumerate, and then conduct the members round the museum so that they might see for themselves how far they were followed in the sanitary exhibits on view. The primary principle of perfect drainage was immediate removal of foul matter. From this it followed that drains should be impervious, and should have as good a fall as could be secured. The best material for drains was stoneware, but in certain cases where this was inapplicable iron might be substituted. All joints should be of lead; clay was a dangerous material, especially under houses, owing to shrinkage, and in all the many cases where he had seen old drains under houses taken up the clay had become leaky. This principle also showed that cesspools violated

the first requirement, as they necessitated the storage of foul matters. Cesspools were therefore being generally condemned at the present day, but many of the traps most commonly in use were nothing better than small cesspools, and of these the familiar D-trap was one of the worst. On the table the lecturer showed specimens of the D-trap and of a siphon trap, each made with glass sides and put into each piece of guttapercha which had the specific gravity and form of fæces. On pouring a jugful of water into a tube communicating with each trap it was seen that the siphon-trap was instantly cleared, whereas unless a violent flush of water was sent into the D-trap the objects remained in the trap. On account of the retention of matter the D-trap generally caused an offensive smell, and was now falling out of favour. Unfortunately, it was still to be found in three out of four London water-closets, although it ought under no circumstances to be used. The pan-closet, as was shown by a specimen, by sections and drawings, was a peculiarly dirty apparatus owing to the facilities with which foul matter splashed and coated itself upon the container and outside of the pan. Far more cleanly articles were the pan and siphon made of one piece of stoneware. A second principle of drainage was the prevention of back currents of foul air. This could be done to some extent by a water-trap, but the water must be frequently changed, for it was continually absorbing foul air from the sewer and giving it off on the other side. Many attempts had been made to obviate this danger by mechanical contrivances, but the only effectual remedy was ventilation combined with disconnection. By an experiment with a tube filled with smoke, the lecturer showed that it was of little use providing a ventilating pipe to house-drain rising to roof of house, unless an inlet were also made at ground level; if the house-drains discharged into sewer under a shaft which freely communicated with outer air by a grating, currents of purifying air would always be passing either up or down through the soil-pipe, and sewer-gas could not find an entrance into the house except in a very diluted form. It was a mistake to make the ventilating-pipe to roof of less diameter than the soil-pipe. There could be no reason for not making each of uniform size. By means of large diagrams, good and bad systems of house-drainage were shown side by side, the latter being demonstrated to be more complicated than the former. A bell trap to sink was objectionable because the water sometimes remained for hours unchanged, and became saturated with foul gases; the bad smell often noticed in sculleries on first entering in the morning were generally due to this cause. Whenever possible, soil and sink-pipes should at the earliest point be taken through the wall of the house and carried outside; drain-pipes beneath the floor were always dangerous. Even then and with disconnection, traps were desirable for the pipes themselves, which in time became foul; the great point was to effect a frequent change of the trap-water. It was obviously wrong to allow the waste-pipe of cistern to pass into the w.c.; it should be carried at a higher level into the soil-pipe. The difference between disconnection with ventilation and the old pan-closet and D-trap system had been aptly put by Dr. Buchanan, who had said: "In the one case you lay sewer-gas on to the house; in the other you shut off the house from the sewer." Several questions were put by the audience as to whether the disconnecting air-shaft from sewer would not be a nuisance. The lecturer said it was not found to be so in practice; but he admitted that in many London houses built directly on to streets the system, or any good mode of sanitation, was inapplicable. At the conclusion of the address Mr. Field conducted the visitors in a tour round the museum, describing many of the drainage exhibits, and showing how the two principles he had enumerated could be applied to their criticism.

SOUND-PROOF FLOORS.

In Sir Edmund Beckett's new edition of his "Book on Building," he gives some advice on rendering floors sound-proof. He says "the only way to prevent" the noise of people in rooms overhead being heard, "is to have ceiling-joists distinct from the floor-joists above them. They may, and almost must, be fixed to the same great beams over a wide room; but that transmits the sound very much less than when floor and ceiling are fixed to the same joists. A still more complete floor, when the room above is likely to be very noisy, is to lay something of a loose kind over the ceiling, on thin boards. Sawdust, straw, and shavings will all answer, but they are all dangerous, on account of the risk of fire from a match or a cinder falling through the floor. Gravel is still better, and I always recommend it over belfry ceilings, when there is not a room between the belfry and the bell-chamber, but it is too heavy for ordinary house-ceilings." Speaking of "pugging," or plaster upon laths, Sir Edmund says care should be taken that it is quite dry before the floor is laid, or it will be spoilt. He also recommends felt, either the common felt, or the new "slag-felt," though the last is expensive. The author says wooden, or lath-and-plaster, partitions between rooms should be filled with shavings, if it is wished to keep them sound-proof, and single doors are inefficient for the purpose. We find the same writer recommends "slag-felt" for protecting pipes from the frost, a material made by blowing steam into the slag of iron furnaces. It is said to be better than anything else for "jacketing boilers," and is incombustible. As regards the suggestions made to render floors sound-proof, we think the most perfect system is that of having separate ceiling-joists—in fact, a double ceiling. The best plan is to felt the ceiling-joists above, and plaster them below, and this we have tried, with success. Pugging, if laid dry and loose, well-comminuted, prevents the passage of sound to a large extent, and it is quite fireproof, and all large rooms should have floors above them well "pugged"—a precaution which, however, is very seldom taken, or, if taken, not carefully carried out.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Royal Society of Antiquaries.—At the meeting of this society, held last week, two papers were read by Mr. William C. Lukis, the one being a report on the "Prehistoric Remains of Cornwall and Devon," and the other on the "Obelisks and Monoliths of Western Europe and of Egypt." The former paper was illustrated by a very extensive series of diagrams, explaining the structure of many hut-dwellings, cists, and sepulchral monuments of the two south-western counties. In the second paper Mr. Lukis compared and contrasted the obelisks of the East with those of Brittany and Finisterre, and with the few smaller specimens still existing in England, claiming for the latter in most cases a monumental character. Lord Carnarvon stated to the meeting his regret that the Bill of Sir John Lubbock for the preservation of ancient monuments had been lost, for the present at least, in the House of Peers.

COMPETITIONS.

Cardiff Library Competition.—We understand that a meeting of the plans committee was held on Monday last at Cardiff, when it was determined to award the first premium to "Reference," and the second to "Thoughtful," so that "A Local Effort," which stood with the other two before the final selection, is now thrown out. This decision has not been made public, but will be brought before the council meeting, held to-day, after which, it is thought, the designs will be exhibited. The authors of "Reference" are Messrs. James Lenard and Thomas; of "Thoughtful," Mr. W. W. Frame (an assistant of Mr. W. Burges's, working at Cardiff Castle) and a London architect, named Ellis. "A Local Effort" is, we hear, by Mr. Henry C. Harris, of Cardiff.

Chorlton.—At the weekly meeting of the Chorlton Board of Guardians, held on Friday last, the plans for the new union offices were again brought under the consideration of the board. The building committee recommended that the plans by "Economical" should be adopted. It was accordingly resolved that the plans of "Economical," sent in by Messrs. Mangnall and Littlewood, should be adopted.

Hull Borough Lunatic asylum.—A meeting of the Asylum Committee of the Hull Corporation was held on the 11th inst. Mr. Peyton, architect, Bradford, had forwarded his report on the plans for the new Asylum submitted by "Lucidus Ordo." These plans were amongst those selected for final competition by the Committee of Visiting Justices, and would, if carried out, involve an estimated outlay of £46,500. The Committee of Visiting Justices, however, made a final selection of the plans by "Argus," which were estimated to cost £58,000. The Asylum Committee had since sought to induce the Justices to accept the less costly plans of "Lucidus Ordo," and it was with this view that they agreed to refer them to Mr. Peyton, to ascertain if they could be carried out at the estimated cost, and whether they satisfied the requirements of the Lunacy Commissioners. The gist of the report forwarded by that gentleman showed that the total number the asylum, built under the plans, could accommodate was 412, instead of 420, as stated. The total cost, he estimated, would be £48,679, which, however, could be brought down to the original figure by making several minor alterations. With regard to the requirements of the Lunacy Commissioners, Mr. Peyton said the requirements were not fixed, but were an unknown quantity. He, however, reported that the general arrangement of the buildings and plans was good, and they were such as the Commissioners might approve of without being under the necessity of making any alterations.—The report was ordered to be entered on the minutes, and it was resolved to obtain an interview with the Commissioners in London on the subject.

Leeds Architectural Association.—At a meeting of this society, held on Thursday week, a paper on "The Adornment of Towns" was read by Mr. F. Linn Somerville, of Manchester, honorary secretary of the Manchester Architectural Association. Special reference was made to the work of a society existing in Stuttgardt, the capital of Wurtemberg, whose professed aim is to aid and promote efforts for the adornment and improvement of that city. Among many of their projects successfully carried on, may be mentioned the erection of a club-house, and large recreation grounds, with a lofty prospect tower, commanding extensive views over the surrounding neighbourhood; the planting with avenues of trees of the roads of the city and suburbs; and also the provision of seats, in great numbers, for the use of pedestrians. The numbers of the association were last year 1,472, and the work is carried on by means of, comparatively speaking, small subscriptions. The lecturer urged the plea, "Why, if a small German city is public-spirited enough to carry out so many improvements, cannot we, the inhabitants of large, wealthy, manufacturing towns, follow their example, and endeavour to give a charm and interest to our uninviting-looking thoroughfares and public squares?" Something has been done in the right direction, it is true, but much still remains to be done by well-directed efforts.

Sheffield.—A short time ago the Sheffield Church Extension Society invited the local architects to send in competitive designs for the Langsett-road district church. Thirteen sets of designs were accordingly sent in, and the committee, on Monday last, unanimously selected the one submitted by Mr. J. D. Webster, of Sheffield.

Sheffield.—The trustees of the Carver-street Wesleyan Circuit, being about to erect a new chapel and schools, have selected in a limited competition, the design of Mr. J. D. Webster, of Sheffield. The chapel will seat 900 adults, and in the schools accommodation is provided for, at least, 650 children.

The City Engineer and Surveyor (Mr. William Haywood) reports that the improvements effected by the Commission of Sewers during 1879 include the widening of portions of Gracechurch-street, Fenchurch-street, Ludgate-hill and Upper Thames-street, and the setting back by 7ft. the whole eastern side of Cloth-street. It is in contemplation to make a street 25ft. wide on the eastern side of the Metropolitan Railway, connecting Harrow-alley and Stoney-lane. During the year 528 fire hydrants have been fixed by the Gas and Water Committee of the Corporation, the total number in the City being now 818.

In the handsome Perpendicular parish-church of Dedham, North Essex, have just been placed a new reredos, in Bath stone, of four panels, surmounted by canopies, and a new pulpit, octagonal in form, and of Caen stone, enriched with carving; the cost was respectively £170 and £70, and the architect was Mr. Woodger, of Guildford.

Building Intelligence.

Stockbridge.—The parish-church, built some years ago from the designs of Mr. John Colson, of Winchester, consists on plan of a nave, aisles, transepts, and chancel, and is cruciform. Its style of architecture is Decorated Gothic; the stone used for the dressings is Bath, and the roofs are of steep pitch. Funds have been collected to complete the internal decoration of the church, and the work has just been brought to a successful termination. The chancel-roof has been painted and decorated, and the purlins and ribs picked out with gold. The pulpit, which is of stone, has been restored. New stone has been substituted where necessary, the cornices, capitals, &c., have been beautifully carved, and the various panels on each of the five cants have been filled with foliated crosses in polished marbles, alabaster, and gold tesseræ. The pulpit is now an exceedingly ornate feature. The whole of the large capitals in the arcades are carved with bold foliage of a naturalesque type. The decorations have been carried out by Mr. Harry Hems, of Exeter.

The New City Fruit and Vegetable Market.—The foundation-stone was laid on Wednesday of the new London Central Fruit and Vegetable Market. The site is to the west of the present Poultry Market, fronting four streets or roads—viz.: Charterhouse-street, Western Roadway, New Southern Roadway, and Farringdon-road. In general the principles adopted in the arrangement of the plan are to make the main floor of the new market as nearly as possible level with the Poultry Market, so that the entire range of markets shall readily communicate one with the other. The plan of the new market shows an area of 44,000ft. devoted to wholesale market purposes, encompassed by 41 shops. The general area will be approached by three vehicular entrances, and by two further entrances for pedestrians, from the Farringdon-road corner of Charterhouse-street and Southern Roadway. In the market itself there will be a series of 33 shops, having in front pitching stands for goods and waggon stands, the whole being approached by a roadway 18ft. wide. There will be, adjoining the roadway, clerks' offices and residences, refreshment rooms, and other necessary accommodation. Externally, the general appearance of the building is much the same as that of the already existing Smithfield Markets, and will be built of Portland stone and red Fareham bricks. The total cost, including the estimated value of the land, is set down at £300,000. The City architect has designed the plans, which will be carried out by the builders, Messrs. J. Mowlem and Co., Westminster.

CHIPS.

The plan of connecting the Baltic Sea and the German Ocean by a canal navigable for sea-going vessels at length assumes a more definite shape. Herr Dalstrom, a civil engineer of Hamburg, has obtained the requisite concession for making surveys.

The Hunstanton Pier Company are now erecting some ornamental toll-houses, shops, and shelters, at the entrance to their pier, from the designs of their architects, Mesers. Adams and Son, of King's Lynn.

The Folkestone Town Council have appointed Mr. A. W. Conquest, C.E., at present town surveyor of Ramsgate, as borough surveyor, in succession to Mr. W. Springhall.

The Charity Commissioners have authorised the governors of Blundell's School, Tiverton, to proceed immediately with the erection of the proposed new school.

The Rural Sanitary Authority of Cardiff have instructed Mr. Waring to report on the water supply of the city of Llandaff.

The Dawlish Local Board have appointed Mr. Crowe, of Sevenoaks, Kent, as clerk of works for the new water supply undertaking. There were over one hundred applications, and the salary offered is £3 per week.

The completion of the new central station of the Great Western Railway Company, in High-street, Newport, Mon., was celebrated on Thursday week by a public dinner given in the Albert Hall, of Newport.

The governors of the Caerleon endowed schools, at their meeting on Tuesday week, appointed Mr. Jackson, of Gloucester, as their architect.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. Passmore Edwards.

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Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

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GOOD FRIDAY.

Next week the Building News will be published on Thursday, March 25. All advertisements and other communications for that number, therefore, must reach the office by 5 p.m. on Wednesday.

Received.—B. and C.—T. H. C.—D. and Co.—W. M. and Co.—J. F. B.—B. S. and H.—J. and J. B.—D. Bros.

Argonaut. (Yes, 2s. each. See notice above.)—H. B. and T. B. (Write the Secretary of the R.I.B.A.)—R. K. F. (Received, but we saw no sufficient reason for reopening the question. The competition seemed to us fairly conducted and decided.)

Correspondence.

THE DESIGNER OF THE ROYAL PALM-HOUSE, KEW GARDENS.

To the Editor of the Building News.

Sir,—Mr. Maurice B. Adams, in a paper on Conservatory Buildings recently appearing in your columns, attributed the design of the palm-house, at Kew, to Mr. Decimus Burton, architect. I had always understood that the credit of the design was due to Mr. Richard Turner, of Dublin, a man of singular inventive genius, in whose acquaintance, in former years, I felt some pride. Many middle-aged architects will remember Mr. Turner in his vigorous days when he was ubiquitous, with a stock of daring and original projects always on hand, remarkable for his rough-and-ready powers of illustration of them, and sanguine belief in them, and his eloquent, plausible, and humorous advocacy of them. Among the many projects which he was wont to bring before architects, governments, public bodies, and crowned heads generally, I believed that he was successful in one instance, in devising and carrying into execution the Royal palm-house, at Kew. As he is still extant and vigorous, although advanced in years and retired, I have obtained an authoritative statement from him, that the palm-house was not only erected by him, but was solely his design, although carried out under the supervision of Mr. Decimus Burton. Mr. Turner states that, having many years ago heard that the Government were about to erect this palm-house, he interviewed Sir William Hooker in the first instance, and submitted his proposals, obtained Sir William's concurrence in them, and submitted an estimate which went with his plans before the Board of Works. Subsequently, he says, the Board thought it necessary that an architect should intervene, and under the auspices of Mr. Burton "a most absurd set of plans, the singular production of a civil engineer, whose aid was called in by Mr. Burton," says Mr. Turner, appeared. "I had nothing for it," he adds, "but to tender for it, hoping that if my tender was accepted, I could prevail in convincing the parties how discreditable and unwise it would be to carry it out." Further on, through the interest of Mr. Sidney Herbert, then at the War Office, Turner obtained the ear of the Duke of Newcastle, and, that accomplished, with his usual powers of persuasion, brought about a reconsideration of the matter. He was permitted, at his own risk and expense, to submit a portion of the structure full size, which was accordingly done and submitted to test in the yard of Messrs. Grissel and Peto; the result being a triumph for Mr. Turner, who was permitted to carry out his own design. "This decision," Mr. Turner adds, "gave Sir William Hooker, and Mr. Decimus Burton as well, and the Board of Works, the utmost pleasure and satisfaction, being then convinced of the sad error they were saved from, for anything more foreign from Mr. Burton's design it would be difficult to imagine." Mr. Turner's relation of the facts, gives credit to the candour and good taste of Mr. Burton in freely acknowledging the superiority of his (Turner's) design, over that prepared for him by a civil engineer, more versed in the then novelty of iron and glass construction than he was himself.

Mr. Turner, it seems, liberally offered, at Sir William Hooker's request, to erect the house in any part of the gardens he might prefer to that first allotted to it without extra charge, and the site was changed to where it now stands, to gain the reflection of the building in the water. Turner was not aware, until he then found it out, that George III. had filled up a great portion of the lake at this place, and in the quantity of concrete buried under ground for foundations, in consequence, his profits on the scheme vanished. It seems right that Richard Turner, whose brilliant, inventive, and constructive genius did not bring him the financial successes he deserved, should have, at least, the honour and glory attaching to his connection with this notable achieved work.—I am, &c.,

Thomas Drew, R.H.A.

6, St. Stephen's-green, Dublin, March 14.

HARBOUR WORKS PAST AND PRESENT.

Sir,—Mr. Dobson, in his letter which appeared in your last number, seems to think that the remarks in the article of the 20th Feb. last were intended to disparage the engineers of the Holyhead Breakwater. There was no such intention, as the remarks made were for the purpose of contrasting works, which may now be considered obsolete in character, with those springing out of the latest advance in hydraulic engineering. I have not, I think, misstated any of the facts of the case, and indeed, your correspondent admits the chain tinkering, and the "ominous looking-blocks," intended to "stop the run round the head of a certain amount of small deposit." I am pleased to hear that there are those in charge of the breakwater "who have a care for their own engineering reputation, as well as that of this country," and that one of the M.I.C.E., "associated with the work for more than a quarter of a century," has recorded the details of the structure.

A stranger would hardly think there was any particular vigilance, on the part of any one, to judge from the appearance of the seaward face of the wall. It is very clean, no doubt, for the waves are incessantly washing it.

Has it ever occurred to these authorities (historiographer and engineer in charge), that the iron imbedded as a guard against degradations, may become softened or "plumbagised,"

and the concrete blocks, as now prepared, shivered into pieces on being launched from their present aërial site, or afterwards reduced to fragments by sea action. I would be more hopeful of future protective measures if a system of concrete block-making was organised on shore, to make blocks twice the size of those now hanging up until dry enough to be launched, and deposited by pontoons in a position where they would really assist in checking the run round the head. I can readily estimate the violence of the storm-wave, for during the last 35 years I have crossed the Channel several hundreds of times, and in such weather as I am certain Mr. Dobson could not have stood on any part of the breakwater, either before or since its completion. There can be no discredit attaching to any of the engineers connected with the Holyhead Breakwater, for the original scheme only contemplated tumbling the mountain into the sea, and sometimes at the rate, it was said, of four or five thousand tons a day, with a yearly expenditure of 300 tons of gunpowder. It was a great work of its kind, and I trust that my remarks may avert any future outlay in such a direction. Donaghadee harbour, another Government work of a similar kind, is less satisfactory even than that at Holyhead. Dover, Dublin, and Milford Haven harbours or docks, built of concrete blocks and monolithic masses, may not be so gigantic in character, but they are successful examples of the new system which, while protecting the storm-imperilled ships, and also provide commercial advantages from the facilities afforded for loading and discharging vessels alongside their walls. There are, I have no doubt, substantial contractors who would be glad to construct a vertical double wall of the extent of the Holyhead breakwater, at £164 per lineal foot. The cost of the Dover harbour has been excessive, for it was one of the earliest of its kind, and may be regarded as of an experimental character, at least in its early stages.

The Holyhead breakwater is a huge structure, erected as a barrier against, and intended to control and overcome, natural forces. The sheer force of man's utmost efforts, however, when thoughtlessly pitted against Nature, must surely fail. The violent measure of disturbing mountains and throwing them into a sea bed was not assuredly an easy task, but it was a costly and destructive one. It is the result, however, of man's construction, faculties, and intellects, but it cannot be compared to the breakwater of the coral-forming "polypipers" or polyps, who increase the slope of their lagoon harbours in the exposed direction from which the destructive wave approaches. This is the ocutcome of natural instinct, and these pigmy engineers not only provide against the swell of the ocean by accommodating the surface of their structures to the line of greatest resistance, but they also leave a smooth face, on which the wave may harmlessly expend its violence. Nature must be respected, and all great engineers scrupulously pay her the utmost deference. In such manner Smeaton arrived at the truer lines for the Eddystone, but the engineers of the Holyhead breakwater disregarded all natural laws, and in the end no one need feel surprised at their being worsted.

There can be no apologists, we think, for those who would now insist upon a rubble mound being the best for breakwaters or harbours. The conditions attending the construction of even such a primitive work are unfavourable, for during violent storms much destruction of plant is unavoidable. To make large concrete blocks is a comparatively easy task, and may be prosecuted at all seasons, while their deposition may be deferred until the most favourable weather, where they may be accurately placed in the shortest time. The Dublin harbour blocks are deposited (including the time during which they are picked up and carried to the site), in from six to eight hours.—I am, &c.,

The Writer of the Article.

ANCIENT PROCESSIONAL CROSS.

Sir,—Thecross described in your number of the 12th inst. is evidently of Abyssinian origin, and the characters used in the inscription are, in all probability, Ethiopic. I have, however, more than one specimen of this kind brought from Magdala after the late Abyssinian war. The description of the subjects engraved beneath, or under the cross, appears to me to be somewhat capricious. That under the cross is simply the "Blessed Virgin and Child," and not the "Nativity." Nor can I make out why the others are called, by Mr. Cresswell, the "Temptation" and "Transfiguration."

If your correspondent will send a "rubbing" of the inscription to Professor Wright, of Cambridge, who is particularly well-versed in the various Abyssinian dialects; I feel confident that this eminent Orientalist will favour him with the translation, as he has so kindly done in other cases of a similar nature.—I am, &c.,

Ghent, March 15. M. P. Clifford.

NEW HALL AND SCHOOLS, ST. PETER'S ROAD, LEICESTER.

Sir,—The subject of competitions has so often been the theme of correspondence in your valuable journal lately, and as it has always been in favour of fair-play, I trust space may be found in your next issue for a few remarks concerning the above, which I think may be interesting to the profession, as it to some extent touches upon the value of a professional referee being employed to assist in the selection of a design.

Noticing the illustrations in your issue of last week, of the selected designs by Messrs. Goddard and Paget, of Leicester, for the proposed new hall and schools, and the comparatively small amount of the builder's tender for such an extensive block of buildings, I made inquiries into the matter, and find the competition was limited to local architects, and that the sum to be expended was £4,500, exclusive of the school block at the rear, shown on the plans; but this sum was to include all fittings, heating apparatus, boundary walls, architect's fees, and clerk of works' salary; moreover, that sum was *not* to be exceeded.

I say nothing about the excess of the builder's tender over the sum allowed; but having carefully cubed up the building, taking from the top of the concrete to half-way up the roof, I find it contains rather over 386,000 cubic feet (without taking any notice of the school-block) which, according to the tender, is just over threepence per foot cube, which, of course, as the particulars were so clear on the point, includes all fittings and heating apparatus.

That a building containing the work shown on the drawings, including all fittings, &c., could be executed at such a price, seems to be an impossibility and only two things can be inferred, viz., either a considerable amount of work must have been omitted in the working drawings, which would be manifestly unjust to the competitors, or else the selected architects are gentlemen of the most exceptional ability, to be able to erect such an extensive building containing, as your description says, "moulded jambs, strings and cornices, terra-cotta enrichments, and tinted lead-lights," for about one half the cost other architects would be able to erect a building of the same dimensions.

The committee in this case, actuated by a proper spirit, appointed a professional referee in the person of Mr. T. Roger Smith, a gentleman of undoubted ability and sound judgment, and his report has appeared in your columns.

The sum of £4,500 was to have been expended, including all fittings, &c., as before mentioned. As the frontage requiring boundary walls is, as shown on ground-plan, 217ft., they could not have been erected with the railing and entrance-gates for less than £150. Clerk of works' salary, £3 for one year, say £150; architect's commission, say £200, leaving only £4,000 for the building and fittings, or under 2½d. per foot cube, or about the price of a range of cattle-sheds, for a picturesque building, and not by any means inexpensive work.

Mr. Smith, in his report, said he had examined the plans submitted, and had found none could be put aside on the ground that they could not be executed for the cost named. How could the calculation of cost have been made? I do not for one instant doubt but that it was very carefully gone into, but that such a conclusion was arrived at is not only to be wondered at, but deplored.

Such results as these are bound to give great dissatisfaction to competing architects, especially when none ought to exist, a professional referee having been called in, and if so, I am afraid architects, as a rule, will prefer running their chances with a committee to having their designs submitted to a referee.

Of course, Sir, I may be entirely wrong in my surmise, and it may be possible for such buildings to be erected at so low a cost. I strongly doubt it, and I am sure the majority of architect will share my opinion; but should such be the case, I cannot but think it would be a graceful act on the part of Messrs. Goddard and Paget to forward to you for publication the contract drawings and details, which I am sure would be an inestimable boon both to architects and the general public, as it would show them how to erect handsome buildings at one half the ordinary price.

As the opinion of Mr. T. R. Smith would be also extremely valuable in regard to cheap work, perhaps he also would not object to give information on the point.

I should add, I have no interest whatever in the work in question; but as the subjects of competitions is being so greatly considered at the present moment, this question I have only brought forward in the hope of seeing them placed on a much better footing than they now are. I inclose my card.—I am, &c.,

Observer.

ROTHERHAM CHURCH AND ITS ORIGINAL FONT.

Sir,—"Someone has blundered" was the mental note that I quietly made to myself when reading the paragraphs which appeared in your issues for the two last successive weeks, relative to an "old font of black oak (?) evidently made at the same time, and in harmony with the magnificent black oak carved pulpit"—which said oak font, some good people had just discovered to have been removed to a neighbouring church, from where it ought, by good rights, to be got back again immediately.

Now it so happens that I know something of the grand old Perpendicular church of All Saints, Rotherham, which, it is interesting to record, was the very first church—so I have heard him say—that the late Sir G. Gilbert Scott ever made measured drawings of. It was whilst kneeling at its altar-rails that, during the latter part of the last century, my grandfather and my grandmother were made man and wife; and, much more recently, when one of their grandsons, just emancipated from the thraldom of being a cutler's lad in a big factory in the midst of the neighbouring smoke of Sheffield, tried his 'prentice hand at carving; it was some detail upon a transom of its chancel-screen he first assayed to copy. That boy was myself. Further, I remember it must be nearly a quarter of a century ago, making a model of one of the crockets on the spire, which the thrifty Rotherham folks at once cast and went on multiplying, and then forthwith restored the said spire by inserting these iron imitations wherever crockets were missing. And I knew Archbishop Rotherham's rich chapel (the south chancel aisle), and recollect a Jacobean font-cover that used to stand upon a Purbeck marble altar-tomb at its extreme eastern end; and the old round Norman font, that, as far back as ever anyone living can recollect, stood in the churchyard, just east of the south transept door. So long did it stand there, that the very transept door itself was known locally to every small boy and girl, as the "round stone door." Further, I recollected the grand old oak pulpit, full of ornate and curious detail on every cant, and surmounted by a flat crown-like canopy. This pulpit was erected in 1620, and holds its own to-day, as it has done any time during the last 250 years, for being one of the very finest Jacobean pulpits in the country. Indeed, in my mind's eye, I could see all Rotherham Church pretty clearly; but for the life of me I could not make head or tail of this curious story of the "old font of black oak" which your correspondents seem to think they have unearthed. And so, happening to be in the neighbourhood of Rotherham a day or two ago, I went to see for myself. Here are the actual facts. The old original font is still at Rotherham Church. Save that, for many years, it stood in the churchyard, near the transept, door just alluded to it has never been removed from the building since our Norman forefathers put it there; and it now stands in the western corner of the north transept. It is made of the soft local sandstone, and long exposure in the churchyard, as much as age, has worn the bowl, in one place, quite through, so that, although it is now most lovingly and carefully cared for, it is too worn to be utilised for baptismal purposes.

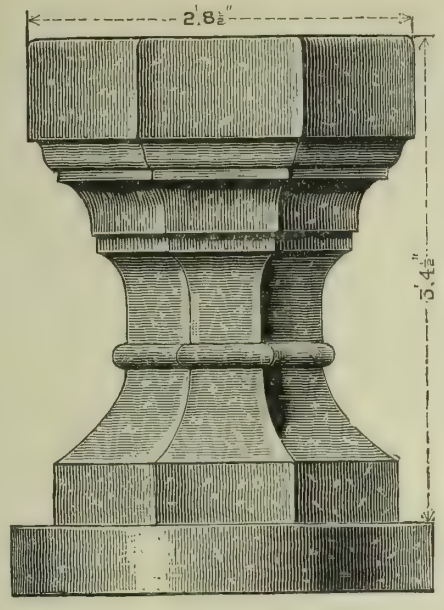
It appears that, in due course, an octagonal Perpendicular font took the place of the old round Norman one. This did duty for many years, until some time ago it made way for a new one, a very poor copy of the ancient Norman original, and this latter is the font now in use, and which the late popular vicar, whose untimely death is most deeply deplored by every Rotherham man, was so anxious, to almost the last day of his life, to have removed, and substituted by something more seemly, and in character with the majestic surroundings of his glorious old parish-church. A somewhat curious Jacobean font-cover, before referred to, used to stand in the south chancel aisle. It had no affinity whatever with the noble pulpit, and was a weak-looking affair, with bastard flying buttresses and turned pinnacles. This cover was removed, at the late restoration, to St. Mary's Church, Greasborough, which used to be the chapel of ease for Rotherham. It remained there until the recent letters upon the subject appeared, when it was at once most courteously sent back again by the vicar of Greasborough. It now stands where I remember it used to stand, on the old altar-tomb—all, at least that is left of it, for when at Greasborough it was found to be too high for use there, and the bottom parts were cut away. It present height is 5ft. 2in., its diameter 3ft. Guest, in his very exhaustive "History of Rotherham," does not allude to the Perpendicular font, nor does he to this Jacobean cover either, but he gives a good illustration of the old Norman font, and I also have a drawing of it in an old print I possess of Rotherham Church, dated 1815.

The next question that arises is, Where did the Perpendicular font go to? There is no mystery about that: removed from the church, when not wanted any longer, it was utilised for many years by Mr. Churchwarden F. Parker, of North Field House, Rotherham, as a flower-pot in his garden. In it geraniums bloomed and faded season after season, until, some 15 or 20 years ago, the good churchwarden left the neighbourhood. At that time the existing font at Greasborough was of wood (deal), a curious material for a font perhaps, but not more odd than were the rest of its surroundings, for Greasborough Church is a modern production of not altogether elegant design. It was built, perhaps, 30 or 40 years ago, and not having any chancel or aisles, is altogether devoted to congregational purposes. Further, it has a stained glass (!) east window of coloured paper—clever in its way, no doubt, but altogether at variance with our preconceived ideas of correct taste. So Mr. Churchwarden Parker, taking pity upon the wants of Greasborough, made a parting gift of his tree-pot, I mean the font, to the vicar. By the latter it was set up in the north-west (or what ought to be the north-west, for the orientation of the building is incorrect) corner of the church, and there it still remains. The original wood font at Greasborough was then cut down, Roman-car-like diagonally across the bowl, and converted into a lectern, which duty it seems to do, to the good villagers' satisfaction, to the present moment.

Now, it is altogether improbable that any living soul could mistake this particular deal font, the only wooden one in Greasborough Church, for "an old font of black oak" (see Building News, March 5, p. 295). And still more unlikely does it seem that the uninteresting and clumsy stone Perpendicular one, now in use at Greasborough, and of which I give a rough sketch, could be defined by the most ideal enthusiast (see Building News, March 12, p. 308), as "of black oak, although opinions differ as to whether it be of the date" (Jacobean) "or later than the magnificent black oak carved pulpit of Rotherham Church"!

I have little more to add, save than to sum up what I have said, by assuring your readers that the original old font has never been removed from Rotherham at all, and that the font which, by a most extraordinary mistake, has been taken for wood and of Jacobean date, is of nothing of the sort, but simply a plain matter-of-fact, every-day-to-be-met-with, Perpendicular stone one; which is doing, and for many years has done, useful duty in Rotherham's chapel of ease, and which, if it is removed, must be replaced by another.

The whole matter, I take it, resolves itself into one question, and that query answers itself—Does the grand old church at Rotherham, with all its historical associations, or Greasborough's atrociously designed and barnlike conventicle, best deserve the beautiful new font that Mr. Seddon's artistic brain has conceived, and for which loving hearts are prepared to contribute in kindly remembrance of one whose name will ever



be mentioned with affectionate respect, and who was known in his life as the Rev. William Newton, vicar of Rotherham?—I am, &c.,

Exeter, March 15. Harry Hems.

Intercommunication.

QUESTIONS.

[6070.] — **Orientation of Churches.** — Will some kind reader tell me which of our principal churches (and cathedrals) are set out irrespective of this detail, and also the reason why it should be observed? Merlin.

[6071.]—**Entasis of Spires and Columns.**—What is the amount of this, which is just sufficient to furnish the required optical correction? In spires, which is the most usual way for builders to set out their work, and how do they keep it true during its progress?—G. W. C.

[6072.]—**Letters in Monumental Work.**—Will some reader kindly inform me what is the best description of black to use for letters in monumental work, or give receipt how it can be made, and state if it be equally applicable to stone and marble?—Inquirer.

[6073.] — **Mathematical Question at the R.I.B.A. Exam.**—Will some one be good enough to explain the method of working this question, given last year at the preliminary examination of the R.I.B.A., in the mathematical paper—Subject B., algebra (4th question)? "A rod of brickwork is found to weigh 44,064lb. This is composed of bricks 9in. long, and weighing 142lb. to the cubic foot, and of mortar weighing 80lb. to the foot. How much is there of each?" Here the rod of brickwork weighs 44,064lb. Taking 306 cubic feet in a rod of brickwork in mortar, and supposing each foot (bricks and mortar together) to weigh 142lb. per cubic foot $306 \times 142 = 43{,}452$lb. which is less than 44,064, and if a certain number of cubic feet is to be taken at 80lb. per cubic foot, it will weigh less still.—Two in a Fix.

[6074.]—**Oriel Window Shutters.**—Having to fix shutters to an oriel window, would any correspondent please inform me of the best way to fix them, and best fastenings for back folds.—Kanyaka.

REPLIES.

[6030.]—**Timber-Measuring.**—The printer has made a mistake in adding the points in my last reply. Note rule 1, you print $\frac{40 \times 60^2}{2{,}304}$. It should be $\frac{40 \times 60^2}{2304}$

The figures 2304 are divisors.—William Jackson.

[6035.]— **Perception of Beauty.** — I am glad "Student at Home" has again come forward, and I would thank "G. H. G." for his able reply. It is evident "Student" desires to see his way clearly to a theory of beauty he can practically apply to our common profession, architecture, and if I can help him I will. If "Student" will carefully peruse the able work of Mr. E. L. Garbett, "The Principles of Design in Architecture," I think he cannot fail to gain the clear insight he desires; but, in addition to this, I would like also to add my own conclusions, the result of as much careful thought as I am capable. I do not think the "association" theory of Lord Jeffrey, Mr. Alison, and others, is worth the trouble of refutation, for were it true, the beautiful in nature would be one thing, and that in art quite another. Beauty I would distinguish from the beautiful, the former being an assemblage of certain parts, and the latter the whole. The beautiful is illimitable, immeasurable, infinite, because it is a community of parts which we cannot enumerate entirely; it is a consummation, of which we are sensible, yet cannot define its limits. Beauty is an attribute and stands in the same relation to the beautiful as do the facets cut upon a diamond to the jewel itself, being those faces which we see, and we may in a single glance see many. The constituents of the beautiful observable by us I would enumerate thus: Form, order, light, reality, magnitude, enjoyableness, truth, sentiment, repose, intelligence, motion, stability, strength, tenderness, expressiveness, ingenuousness, contrast, variety, simplicity, temperance, and harmony. Our perception of beauty is purely sensuous; its channels being our physical faculties and mental sense and feeling. I do not mean by this the intellectual faculties merely, although they help in a subsidiary way, but that fine and indefinable element in our nature ever sitting in judgment within us and which in other relationships we call conscience. The constituent parts above enumerated when found in various combinations, either in the works of nature or art, excite pleasurable emotions within us, and we intuitively call the object beautiful. Our perception of beauty is not merely taste, but something totally different. Taste is certainly entirely dependent upon an association of ideas and previous sensations, and sometimes favours beauty and at others the reverse, as we plainly see in the various fashions or tastes in architecture, gardening, dress, &c. It cannot be denied that men of all ages and climes have been unanimous in acknowledging the beautiful in nature. All have seen beauty in the glowing sunset; in the smiling fruitful valleys, revealed in all their varying aspects by the first bright rays of the summer's morning sunshine; in the ever rippling countless wavings of the forest trees, or a harvest-ready field of corn: in the deep and wide sea in its murmuring peacefulness; in the winding brooks and rivers flashing their silvery sparkles in the life-giving day, or breathing out their speechless restfulness under the peace-bringing shades of night; in a fine horse; and the perfection of form in a well-made graceful woman. In art we perceive beauty only in proportions in which it accommodates to itself some of those characteristics observable in natural objects and scenes which we call beautiful, and of which I have enumerated many as constituents of the beautiful. A building to be beautiful, therefore, must contain in it some of these characteristics, and the more of them it has, the more beautiful will it be; but there is one other atttribute indispensable to some classes of buildings, which is picturesqueness, and this I would define as a form of fitness, a certain relation of parts which presents the whole in the most easily enjoyable aspect. Such building should have a clearly-defined form, and possess order, which will include congruity. To build a Gothic basement surmounted by an Ionic entablature and a Renaissance superstructure, would be to build disorder and incongruity. A building to be beautiful must have light in and around it. The human mind and heart cannot enjoy darkness. This element may, when allied with some of the elements of the beautiful, approach the sublime, and so elicit our admiration. Fitness to its purpose and subject must be observable, and also a reality and genuineness; the building must have an actuality, must clearly be a dwelling-house, shop, warehouse, barn, or church, and not seem to be one thing while being used for another; in its parts, and, as a whole, it must have size or magnitude, not be pigmy or mean, for things when viewed in relation to the purposes for which they are intended, having littleness stamped upon them, are not beautiful. There must be a tone about the whole which will render it enjoyable and produce within us a sense of pleasure. The presence of other qualities also, such as sentiment, the telling, as it were, of some feeling which we can appreciate as relative to the structure and its intended uses, general expressiveness and intelligence, or meaning, ingenuousness, or speaking in its own natural character and functions, tenderness, simplicity, or a want of obtrusiveness and ostentation either of form or colour, temperateness, or an avoidance of extremes, and a harmony of parts all assist in producing a sense of pleasure in our minds. Stability, strength, and repose, contrast and variety, are necessities to a building, for without the first three it would fail to impress us with any sense of its truth or suitableness for man's use, and the two last are requisite, that there may not exist in it monotony, which is in itself destructive of beauty. Each class of building must maintain its distinctive character and identity, and this is obtained by carefully disposing these various elements in proper proportions, as, for instance, a warehouse or shop will need less of the passive and more of the active qualities; a public building more of the impressive, and a church all those which tend to produce awe, reverence, and sublimity. The dwelling-house requires much consideration; it is the home of man, a temple in itself, and the throne of a monarch, and as such has a peculiar sacredness that should never be disregarded. Man, the strength of humanity, builds it strong by his genius, and by his valour keeps all wolves from the door; while woman, the beauty of the race, enriches it within with her love, and by her reverence and tenderness makes home a holy of holies. The house-place is kept beautified for the house-band, and not garnished specially for the stranger. The interior of a dwelling in particular should maintain this aspect, and not be frittered and burlesqued by the light-minded frivolities of mere millinery, or the effeminate coxcombery of unnecessary ornamentation, such as is but too often seen. In my last reply, in the 54th line, the word "or" was put instead of "and." The sentence should read, "and paint their likenesses."—Jas. Perry, 7, Grove-terrace, York.

[6048.]—**Wall and Gable.**—Will "C. M.," who appears to be so well acquainted with the law of this case, kindly state where the "case on record" is reported? In what law-report, or in what court it was tried, and what action the Metropolitan Board of Works took in the matter in the "case on record?" It is a most important question to have ventilated, and, if possible, decided by some good authority, legal or otherwise. According to "C. M.'s" rather vague reasoning, nearly the whole of the Building Act relating to party structures would be useless, and could be avoided.—Delos.

[6048.]—**Wall and Gable.**—"C. M.'s" question, to which he invites a reply from me, is a rather knotty one. On the first glance it certainly seems that, provided B. does not trespass on A.'s property, he cannot be called on to build a wall or purchase a part of A.'s wall. If the external walls of building form the enclosures of them, as stated in the Metropolitan and most Building Acts, B. would be compelled to build a wall or use half the wall of

A., but I do not know what Act "Beardmore's" question comes under. If B. can build in the manner described, the sooner the Act is amended the better, as it would allow every one who builds a house to use his neighbour's walls. It has been ruled, I think by Lord Denman, that the external parts of premises form the inclosures of them, beyond which no part of them extends, and that a wall in not the less an external wall because another house adjoins it. In a case, Green *v.* Eales, a Corporation pulled down an old inn, and in so doing exposed the wall which had divided it from an adjoining house. It was contended that the wall pulled down was not an external wall within the meaning of the covenant. But the Court ruled otherwise, and considered the wall was an external wall before the inn was pulled down, and certainly was so afterwards. This case does not bear directly, but it points to the conclusion that every house should have its own external walls. Though the Act may not be clear, it was never contemplated that one party should place the timbers of his floor and roof and also his gutters close to his neighbour's wall.—G. H. G.

[6060.]—**Stable Floors.**—Concrete may be advantageously substituted for brick paving, but it would be advisable to finish 6in. thick, to stand wear and tear. A strata of broken stones well rammed and consolidated laid under would be necessary to insure solidity. The concrete when deposited and brought to a level surface should be tapped with a piece of flat board. This will cause the cement to rise to the top, when it can be finished with a hard float in the usual manner. As a finish, this is much more durable and economical than plastering in cement. —M. Hawney.

[6061.]—**Fountain Basin Lining.**—If "Nemo" would work his basin in same manner as described for stable flooring, with the addition of using a little neat Portland cement in the hand-floating, so as to produce a perfectly even surface, his work will have a face that the frost will not injure.—M. Hawney.

[6063.]—**Granite.**—"A Mason" wishes to know what granite is best for monumental and other work? Such a question is so pointed that it would obviously be unfair to answer it in any other than general terms. If "Mason" resides in England, and wants gray granite, he will find those of Peterhead and of Cornwall of almost equal quality and price. Hence it becomes purely a matter of locality, and he will probably do best—i.e., save in carriage—by ordering at whichever of these extremities of Great Britain he may be nearest to. If he wants red granite, I would certainly recommend the Shap (Westmoreland) granite, which, whilst much cheaper than the Aberdeen, as nearly resembles it as Corsehill stone does Red Mansfield, or Boxground does Combe Down. An Irish mason cannot do better than choose from amongst the many beautiful granites his own country offers, whilst those who live in the Channel Islands have local granites at their command, quite equal to any found elsewhere in the rest of the three kingdoms. Indeed, the great difficulty in getting captains to take granite as freight, in preference to light cargoes, such as potatoes, fruit, &c., without doubt is the sole reason why the excellent granites of Jersey are not better known, and more largely used than they are in this country.—Harry Hems.

[6064.]—**Architects and Local Authorities.**—The Board is certainly liable to A. unless the terms of his appointment preclude him from receiving fees for works under the local authority—that is, in the event of B. not being able to pay.—G.

[6064.]—**Architects and Local Authorities.**—The duties of a surveyor to local boards are found in the definitions of the Public Health Act—viz., "Surveyor includes any person appointed by an authority to perform any of the duties of surveyor under this Act." It would be exceedingly unjust on the part of a Board to allow A. to hold an unfair advantage over his fellow architects and surveyors, which he would do if the Board were liable to A. under the circumstances stated in the question put by "Ventilator." In my opinion A. must make roads and sewers for a Board without any percentage. If A. is not satisfied with his salary, that is another thing.—William Jackson.

[6066.]—**Scales on Tiles.**—I have asked the same question of an eminent firm of tile makers without receiving any satisfactory reply. Thinking over the matter, however, I have observed that glazed tiles set on an old wall do not scale. I have also noticed that if a new wall be covered on both sides with cement, whether Portland, Parian, or Keene's, the cement will peel off on one or both sides. From these circumstances I infer that the probable cause of the many ugly examples we have in London of scaled glazed tile coverings to walls is to be attributed to the fact that the walls are rendered inside with some hard cement which, with the outside tiling, effectually prevents the evaporation of the water contained in the mortar or cement with which the wall is built. The natural result would be that the vapour formed by the water would permeate to the inner surface of the glazing, which it would burst in consequence of the pressure of the vapour being greater than that of the atmosphere. The opinions of your readers on the subject would be interesting. I think that if the inner surfaces of the walls were left unplastered or were covered only with ordinary plaster, the scaling would not occur. —H.

A Local Government Board inspection into, and inquiry about, the drainage of Methley and Micklefield, near Wakefield, were made on Tuesday week by Dr. Parsons, inspector, in consequence of serious outbreaks of scarlet fever in various parts of the districts. The Inspector stated as his opinion that the water supply was neither good nor sufficient.

Messrs. Measures Bros. and Co., engineers and iron contractors, Southwark-street, Red Crosss street, and Worcester-street, have just issued their revised sheet of sections of joists, &c. Several improvements are visible, and the sheet cannot fail to be of service to all builders, engineers, and contractors.

Our Office Table.

We have been requested to state that, owing to the Easter Holidays, Mr. Seddon's next lecture at the Royal Architectural Museum, Westminster, will be postponed from Tuesday, the 30th inst., to Tuesday, April the 13th. We have just published Mr. Seddon's first two lectures of the present series termed "Caskets of Jewels," and we hope to continue our reports. These addresses are in every way admirable, while the beautifully-executed and large photographs, thrown by means of a dissolving-view apparatus on to the canvas at the end of the large gallery of the museum, by Mr. Bedford Lemere, the photographer to the Institution, afford the best possible means for illustrating Mr. Seddon's descriptive and critical remarks. The last lecture, under the heading of "Oriental Caskets," embraced Egyptian, Assyrian, Indian, and Chinese architecture, and photographs from all parts of the East, and from the remains in the British Museum, were shown, together with those taken from the casts and specimens of Indian art in the Architectural Museum. The last lecture was very numerously attended, and as the regulations require admission only by ticket, we would advise all those who intend to avail themselves of the next lecture, the subject for which is "Classic Caskets," to apply to the curator of the museum, 18, Tufton-street, Dean's-yard, S.W., for tickets. These are to be had free, but there are reserved tickets also to be obtained for 2s. 6d. and 1s. each. Mr. Seddon is bearing the expense of these lectures himself, so that it is to be hoped that the reserved tickets will be taken in preference to the free ones.

A machine for the distribution of sand, salt, and gravel upon asphalte paving in bad weather, was tried publicly in Pimlico, last Friday, before the district surveyors. The distributor (patented by Messrs. Hornsby and Sons, Limited) has a rotary barrel, with projections arranged spirally throughout its whole length. These projections have each a scraper, to remove from them the sand, or other material, as they carry it from the hopper, or box, into which the material is loaded; but each scraper acts independently, so that if any one presses lightly on the barrel it can be set closer, without necessitating any alteration of the adjustment of the remainder. The barrel is fixed on the main axle, and can be very easily regulated by the driver. The material falls upon a rotary distributor, and is thus evenly spread over the road. One load of sand or gravel is sufficient for a 6ft. width of roadway, either of asphalte or any other substance, for a distance of about two miles.

On Saturday last, died Henry O'Neil, Associate of the Royal Academy, a painter in former years of great reputation. Mr. O'Neil was born at St. Petersburg in 1817. He entered the Academy in 1833, and was a pupil there with Elmore, with whom he became so closely connected that, in 1840, they travelled together in Italy. On his return home, he rose quickly into repute. Among the pictures by which he is known, may be named, "By the Rivers of Babylon," "Catherine of Aragon," "Ahasuerus and the Scribes." Then, in 1857-1858, followed the two by which his name is best known, the "Eastward Ho," of 1857, and the "Home Again." After that came "The Wreck of the Royal Charter"—the best picture that he ever painted—and "The Death of Raffaelle." Portraits and landscape painting have since occupied him, but not by portraits and landscapes was he ever destined to win more than bread. The pictures named above are those by which he will live in the memory of those who love English art. Among the works from Mr. O'Neil's pen, are "Modern Art in England and France," published in 1869, and "The Age of Stucco: a Satire in Three Cantos," published in 1871.

A number of ancient documents were recently discovered in an old almshouse in the city of Wells. The oldest of these manuscripts dates back to the 13th century, and continue down to the 15th century. The seals are unusually perfect, and the caligraphy exhibits wonderful skill; in some of the MSS. the ink looks as fresh as if it had been written only a few months. The Rev. J. A. Bennett, of South Cadbury, has partially examined these archives, and has selected about 300 of the most interesting of the manuscripts for special examination, with a view to reporting to the Master of the Rolls, in order that they may be published, if found desirable, by the Historical Manuscripts Commission.

According to the last documents submitted to the Paris Municipal Council, the illumination of the Paris streets costs the city about 4,240,000 francs. The number of burners lit is about 38,400; of these, 4,000 are extinguished at midnight, so that there remain 34,400 which burn the whole night. The longest time of illumination is during the three consecutive nights, 23-26 Dec. The lighting commences at 4.45 p.m., and extinction takes place at 7.15 a.m., giving a duration of 14 hours and a half. From 15 to 26 June occurs the shortest time of illumination; this commences at 9.5 p.m., and terminates at 2.30 a.m.; giving five hours 25 minutes illumination. The above figure for public lighting is increased by 405,100 francs for the coming year. Besides various improvements thus renderd possible, the authorities will be enabled to extend the time of normal lighting; that is, the extinction of the 4,000 burners will be at 1 a.m. instead of midnight. A second credit of 200,000 will be devoted to placing candelabra with several burners at certain crossings where the present light is found insufficient.

The Council of the Royal Institute of British Architects issued, yesterday, a circular to members, announcing the House-list of nominations of Fellows for the offices of President, Vice-President, Secretaries, and other Members of Council for the ensuing official year from May, 1880, to May, 1881. The nominations are as follow, asterisks denoting those at present in office:—President (one name to be returned), *John Whichcord, F.S.A. Vice-Presidents (three names), *Thomas Hayter Lewis, F.S.A., *Horace Jones, and *Ewan Christian. Ordinary members (fifteen names), *John Macvicar Anderson, *Arthur William Blomfield, M.A.; *David Brandon, F.S.A., Past V.-Pres.; James Brooks; *Arthur Cates; *Joseph Clark, F.S.A., Past V.-Pres.; *Henry Curry, Past V.-Pres.; Thomas Newnham Deane (Dublin); *John Gibson, Past V.-Pres.; *Octavius Hansard; Charles Francis Hansom (Bristol); Charles Forster Hayward, F.S.A.; *John Honeyman (Glasgow); *Edward I'Anson, F.G.S., Past V.-Pres.; James Thomas Knowles; *John Loughborough Pearson, A.R.A., F.S.A.; Frederick William Porter; *George Vulliamy, Past V.-Pres.; *Alfred Waterhouse, A.R.A., Past V.-Pres., and *Thomas Worthington (Manchester). Honorary Secretary (one name), *Thomas Henry Wyatt, F.S.A., Past Pres.; Secretary (one name), *William Henry White. The present treasurer and solicitor are re-nominated, but the two auditors' names are left blank. A second issue of this list, showing any alteration that may be made in the mean time, in accordance with the by-laws, will be published on Monday, the 19th April, together with the annual report of the council, and the revenue accounts and balance-sheets for 1879. The election will take place on Monday, the 3rd May.

Annexed to this balloting list is the annual report and balance sheet of the Architects' Benevolent Society, of which Mr. T. H. Wyatt is president. The report of the council is of a hopeful character. Although, during the last few years, the affairs of the society have been in a depressed state, and the successive appeals disappointing in their results, the council trust that the worst has passed, and that the society will ultimately occupy the same relative position to the Institute, that the Benevolent Society of the Institution of Civil Engineers does to that body. During twenty-eight years, the Architects' Benevolent Society had but two legacies, and these only for £220. In the last two years £1,100 was bequeathed to it. In 1878 an appeal was made to the profession, which resulted in a gain to the funds of £489 12s., and last year, acting on the generous proposal of Mr. George Godwin, an attempt was made to raise £1,500, in fifteen donations of £100 each, and it has been so far successful that £1,616 10s. has been received and invested. Thus, during the last two years, £3,206 5s. has been added to invested property, and the society stands possessed of £5,249 13s. 4d. New Three per Cents., which will be dealt with as capital. Since the last report was issued, there has been a gain of seventeen new subscribers, and six subscribers have doubled the amounts given.

THE BUILDING NEWS.

LONDON, FRIDAY, MARCH 26, 1880.

THE CARDIFF LIBRARY COMPETITION.

ON perusing the instructions for the above, and examining the site, any practical architect must be convinced that the amount of accommodation required to be placed on a piece of land about 109ft. deep, with two frontages of 53ft., a portion of this being required for separate staircases of communication to the several departments and connecting corridors, leaves little space at the competitor's disposal for the six rooms required on the ground-floor. The sum given (£8,000) is too small. It is to be regretted that a large seaport and borough like Cardiff, with 90,000 inhabitants, did not take a more liberal view of the requirements of such a group of educational buildings, and build more for future requirements, as the site and money are only sufficient for the proper housing of one of the proposed departments. At present there are 120 pupils attending the Science and Art school, and the accommodation seems small for this number, without considering the annual increase that will come with increased population. The want of a large lecture-room for popular lectures on art, to the students and the general public, and for occasional exhibitions of loan or other works of art, seems to have been overlooked. We are led to make these remarks by finding, in many of the best plans, all sorts of makeshifts and dodges to get the accommodation on the ground and first floors. In many of the plans no water-closets, or similar conveniences, are provided on these floors for the large numbers of people using them, and there is a marked deficiency in all the plans, without exception, of any private w.c.'s for the officials. The site shows no difficulty. It is open on the north the whole depth, and is bounded by streets at each end; the south side is available for light 10ft. above the ground, in the centre 40ft. of its depth. The conditions and instructions to architects give the floor-level at 3ft. above the ground, and this appears a great disadvantage, as it prevents the use of a sub-basement or mezzanine. The instructions also stipulate that the cornice must be not more than 50ft. from the ground, but this was qualified in supplementary instructions stating that parapet and roof might be above this. Of course this left no real check on competitions, as a main cornice, if made large enough, may be any height in the building, and many of the competitors have nearly as much building above their main cornice as below, as an attic story, while others are immensely over-roofed. This is especially noticeable in the second prize design "Thoughtful." Many of the competitors do not appear to have read the supplementary instructions to divide the rooms on ground-floor, by partitions, into six rooms, and have taken the plain English of the instructions to mean three rooms, and are disqualified in consequence. The difficulties seem to have culminated in the ground-floor, to get the requisite accommodation in the confined space, and fairly well lighted. No doubt the problem is best solved by those who have planned only two staircases, and these at the south-east and south-west angles, with the lending-library on the south side, in the least-lighted portion of the site. The librarian's room should also overlook the reference library, and all the reading-rooms should be grouped on the north side to get a good light. Some of the competitors may be reminded that, even in competition drawings, fireplaces shown on ground and first floors should be dealt with in some way on floors over, and not allowed to cease and disappear. Many of the competitors seem to have forgotten the science section entirely, and only provided for the art section, and one places the laboratory under the reading-room—a pleasant prospect for readers in case of explosion.

The plans (127 sets) are exhibited in the Town Hall Assembly Rooms, and it has seldom been our lot to see such a number of well-finished drawings, many of them quite equal to contract drawings in every detail. After a careful examination we have no hesitation in placing first in order of merit, *as a whole*, the artistic and practical design "Magna est Veritas et prevalebit." The perspective and elevations show a charming artistic Free Classic building, in red brick and terra-cotta, very refined, the roofs not obtrusive. The front is relieved with a good oriel window going up the two stories. There is a ½in. scale elevation of the main front, which is one of the best drawings we have seen for some time past; it is, indeed, a thoroughly artistic conception. The plans are, on the whole, fairly good, and as free from faults as any. All the rooms are of good shape and well lighted, and this is one of the competitors who provides w.c. arrangement on the ground-floor. There are some pencil-notes on the plan indicating disqualification for making the news-room and magazine-room one room instead of two, for giving a committee-room more than was asked on ground-floor, for making a door of communication between Working-street entrance and Trinity-street on ground-floor, and for neglecting to separate the science and art departments. These defects in the eyes of the committee have lost them the opportunity of building one of the most artistic buildings they could possibly have had.

"Reference," the first prize design, certainly comes next in order of merit. This design is illustrated by *seven* perspectives in different styles or varieties of style, from Gothic to French Classic. The Queen Anne perspective in pen and ink is by far the best architecture, and is an admirable composition. The French Classic would require a great deal of refinement in detail to look at all passable when executed, more especially the tympana of the semicircular windows of the first-floor elevation. The centre of the composition is carried up as an attic story above the main cornice, and the sides left down, and this would enable the laboratory to be placed with nothing but the roof over it; but this does not seem to have been noticed. In their plans the authors seem to have struggled hard to overcome the limited space, and they are certainly more successful than many other competitors. There are two staircases to the school of art, one for males and one for females—a needless refinement, we think, on so small a site. The staircase to the museum is placed in the centre of the south side; this is the weakest part of the ground-plan, as the readers frequenting the reference library, borrowers of books, and visitors to the museum must all meet in the confined space at foot of staircase. There are no water-closets or lavatories on this floor, the one for males being close to the foot of stairs in the basement, but no provision for ladies—a great oversight. The basement is well planned, but appears to have little light provided. The staircases are geometrical on plan in each case. The first floor is fairly well planned, the sexes are divided and the science school separated from the art section. The centre corridor appears to require some light, and the two small w.-c.'s seem few enough for 120 scholars. The laboratory should be moved to the balance room, as an explosion would do great damage to the small art specimens proposed to be stored over it. The museum is well planned, except the landing. As all the traffic would meet here, and the space is small and the stairs circular, an accident is very probable. A doorway from the art to science museum would remove this objection, and enable visitors to pass through the rooms without returning into the passage. The section shows this room too much up in the roof to be a satisfactory room; this should be amended in the contract drawings. There is no water-closet or lavatory on this floor, and the curator or visitors would have to descend to the basement. Altogether the plans show a great amount of ability, and the authors' ideas of making no communication between the two streets on the ground-floor seem to have been adopted by the committee, to the disqualification of those that have done so.

If the competition had been for plans alone, the 2nd prize design, "Thoughtful," would have taken the place assigned to it by right; as it is, we cannot see how the selection of the committee can be justified. The elevations and perspectives show a plain Modern Italian structure, having large semi-circular-headed windows, with an immense mansard rising high and starting from the main cornice, and a second lantern-lighted roof capping this. The roof seems to rise equal to two-thirds the height of the main walls. The plans are very good. There are two staircases, one in the angle (S.E.) of Working-street, and one in the S.W. angle of Trinity-street, filling their proper position in the site where least light is lost by readers. There is a ladies' retiring-room and lavatory on this floor. The librarian's room is in a good position, and the lending-library is in the centre. The reference library is on the Working-street front. There is a mezzanine over part of this floor. The first-floor is fairly well designed, but only one w.c. provided for all. The laboratory is placed on the second-floor, in a gallery next the roof. The museum is very good, and a gallery is provided to a portion of it, thus giving more accommodation than any other plan. The author states the cost to be 5d. per foot cube—a low price for this class of building, and suggests Lascelles' concrete blocks as a material. There is an alternative Gothic design, of no particular merit.

"Tintern" is a fairly-designed plan and elevations, in Domestic Gothic. The plans show much merit, and the perspective is good. An error occurs in placing the lending-library to the north, and reading-room where little light can be obtained, fatal to the success of this plan.

"Study" is a well thought-out design, illustrated with good, carefully drawn, and refined elevations, in line and tinted, and a coloured perspective of a German-Gothic character, reminding one of Cardiff Castle. The elevations are not overdone. The plans show a variation from previous types. The staircases are placed in the same position as "Thoughtful," but the lending-library is better planned, and the reference-library is put in the Trinity-street front. There are objections to this on account of noise of passers; but, being the quietest street, most people would select this side, as there is a tramway in Working-street. There is a lavatory, w.c., and urinal on this floor. On the first floor there is a ladies' w.c. and cloak-room, and the sexes and classes are well separated; all the rooms being well placed, and science and art divided.

"A Local Effort's" elevation and perspective show a Free Classic building, in good proportion. The ground-floor is well planned, but the staircases small, and no water-closets on this floor. The first floor is provided with all necessary rooms, and separate water-closets, but centre corridor is badly lighted. The museum-floor is

fairly well designed, and has a water-closet for curator.

"L. S. A.'s" design is a charming Free Classic building in red brick and terra-cotta, beautifully drawn and tinted, not overloaded with ornament; architecture good. Plans very good; but no w.c. on ground-floor, and the science and art sections not separated. "Soe Mote it Be" sends fine pen-and-ink perspective of a Queen Anne building, with charming pediments enriched with sculpture. Plans well thought out, but science and art not kept separate. Laboratory on second floor.

"Practicable" is well designed; Free Classic treatment, in black-and-white elevations; a refined economical building; plans fairly good. School of science not separate from art.

"Cardiff in a Circle" shows good Classic elevations, all the drawings well worked out, and plans very good.

"Plan" is a Free Classic design of a different type, the centre corridor dividing the ground-floor; librarian in wrong position and science and art sections not separate.

"Science and Art's" perspective is good, showing a Free Classic design, with a decided French feeling. Plans very good; staircases brought into centre of the south side.

"Economy" is a Queen Anne design, well planned and drawn, but not mounted; and too much economy has resulted in plans not being fairly shown.

"Not for an Age, but for All Time," is a very nice elevation; but the plans are weak.

"Forward's" perspective is good, but the plans are indifferent. "Alma" exhibits good Gothic architecture; plans not good; drawings carefully prepared. "Point within a Circle" is a Venetian Gothic design; well-designed elevations, and plans fairly good; but science and art sections not kept separate. "Western Shore" is an Italian design; good perspective, with square tower and spire. "Red Star," refined but plain Queen Anne, with elliptic-arched windows; elevations good; plans not so good. "Simplicity," Venetian Gothic; nicely-drawn and tinted elevations; no separate school for science. "Argus" is a Free Classic design; good pen-and-ink perspective; architecture good, and plans also; but no separate section for science classes. "Experientia" shows a building with red brick and stone dressings, of Queen Anne design; one general staircase in Working-street; attic story and campanile tower. "Square and Compass" is a fairly-well designed Tudor building, with red-brick and stone dressings, square tower at angle. Passage through from street to street; plans have many faults. "Practical" is a Decorated Gothic design, good pen-and-ink perspective. The author does not appear to have seen the supplementary instructions, and only provides three rooms on the ground-floor, instead of six. "Carefully Studied" is a Modern Italian design, with balconies, somewhat resembling an hotel. "Ich Dien" is a Queen Anne design, simple and plain; plans good. "Lux" is a Gothic design, fairly drawn and planned. "A. R." is Italian in style. There is a charmingly-drawn and tinted perspective to a large scale of part of the elevations, but the plans are not so good, and ignore the supplementary instructions. "Labor Ipse Voluptas" is Venetian Gothic, with a tower and spire (all for £8,000), a good pen-and-ink perspective. "Thorough" is Free Classic; the plan too much cut up. "David Copperfield" is Modern Italian in style, and fairly designed. "Nihil" is Gothic, of a Florid type, with stepped small gables, in the Scotch Baronial style; architecture good, but plans weak. "As You Like It" sends a Gothic and alternative Queen Anne design; the latter not as good as the former. Plans simple and fairly good. "Truth" is a Heavy Italian design, but good careful plans. "1880," No. 1, Free Classic in style, and well-drawn pen-and-ink perspective; architecture good, plan too much cut up. "Minerva," Free Classic in style; good architecture and good plans, but library-room in wrong position. "Museum" is fairly well planned, and the elevations tolerably good. "Haut et Bon" is Classic, of a French character; good architecture, fair plans, but librarian in the wrong position. "1880, No. 2," is a Modern Italian design, of no particular merit. The following have, some of them, good perspectives, and, sometimes, good elevations, but can hardly be said to have been in the competition.

"Fac et Spera," Perpendicular Gothic design.
"Esse Quam Videre," Italian.
"Geu," architecture not known.
"Tudor," a Gothic (Tudor) design.
"Imperium et Libertas," architecture not known. 3 large ventilators spaced on ridge, and a 3rd floor to building.
"Learn," Italian, fairly designed elevations, nicely-tinted, plans not so good.
"Ars et Scientia," Domestic Gothic. Plans fairly good, elevations good.
"Ἐφ' ἥμεσον," architecture uncertain.
"Experience," Free Classic.
"New Year," Venetian Gothic.
"Spero."
"Museum No. 2."
"Past and Present."
"Cross."
"Dato Lucem."
"Penarth."
"Calenig."
"Experience No. 2."
"Cardiff No. 2," Free Classic.
"First Foot."
"North Light."
"Cost before All."
"Pensez Vous."
"Aurola Borealis."
"Alpha."
"Veritas Secundis."
"Carboniferous."
"Slip Shod."
"Exelcisor."
"Lux."
"Light and Air No. 1."
"Light and Air No. 2."
"Simplex Manditus."
"A.D." 1368."
"Museum No. 2."
"Σ."
"Maltese Cross."
"Mark Well."
"1880 No. 3."
"Light."
"Museum No. 4."
"Sub Judice."
"Φ."
"Rex."
"A. Z."
"Lux No. 2."
"Onward."
"A. D."
"Valoriem."
"Cardiff No. 3."
"Experientia Docet."
"Roy."
"Museum No. 5."
"K."
"Cum Marte Minerva."
"Summer."
"London."
"No Motto."
"Cardiff No. 4, 1880."
"Libertas."
"Light and Air No. 3."
"Utility."
"Cardiff No. 5."

The foregoing form what sportsmen call the "field." It is rumoured that one competitor tried to make a lottery of his chance, but failed to obtain subscribers! It is a saddening reflection that the drawings in the room have cost competitors double the amount of the commission and premiums—that is, if the building is ever erected for the sum fixed, which we hardly think probable.

FINE ART EXHIBITION AT THE ROYAL ALBERT HALL.

THE Council of the Albert Hall have extended their arrangements. An exhibition of architectural drawings organised by the Institute of British Architects makes a prominent display in the *salon*, while a collection of much interest in wood-carving, comprising the works of ancient and modern carvers and cabinet-makers, occupies a portion of the balcony floor. Beginning at the *salon* behind the great organ, we find a few fine pictures have been lent by the Queen, H.R.H. Prince Leopold, &c. Sir F. Leighton's grand picture "Cimabue's 'Madonna' carried through Florence," by Sir F. Leighton, P.R.A., occupies the most conspicuous position. The length of the canvas cannot be much less than 15ft. Sir F. Leighton has in it displayed the full strength of his power as a master of composition, balance of colour, and refined ideal conception. The subject is the "Madonna" of Cimabue, being carried through Florence. The Madonna which is said to have been so honoured is the one painted by the great art-reformer, and preserved in the church of Santa Maria Novella, and which was considered a miracle of painting. Mr. J. E. Millias's picture, the "Good Resolve" is as remarkable for the fine expression of countenance, as the "Carnival," by A. Jebens, is a type of womanly beauty; "Clearing the New Forest," by R. Burchett, is a spirited composition founded upon an historic fact. The struggle the artist depicts makes a pathetic appeal, and the colour is Titian-like in its splendour. The same artist's "Sanctuary" is equally touching, and both subjects have been suggested by passages from the graphic history of Lingard, the Roman Catholic historian. We must note, also, a fine water-colour painting by Lewis Haghe, showing the funeral of the Duke of Wellington passing Apsley House, lent by the Queen. Among the general collection of oil-pictures, we may particularly call attention to a decorative, Classically-rendered figure of "Athyrtis, the Divine Daughter of Sesostris" (No. 9), by Mme. I. de Steiger. Landscape-painting is represented by a few admirable examples. No. 15, by R. Harwood, may be mentioned for its truthful rendering, as A. Schoeck's large canvas of Cape Mabou, Nova Scotia, impresses by its grandeur of desolate rocks and heavy sky. A. de Leeuw is represented by a fine Winter Scene (No. 30). "Loch Tulla" (41), by W. H. Paton; "A Sunset," by L. Leroux (42); "The Town and Harbour of Cyprus"; "Warwick Castle," by W. C. Way; a fine landscape effect by Chris. Potten; "Titian's Mountain in the Italian Tyrol," by R. C. Saunders; and several fine views of scenery by R. Elmore, Leroux, A. de Biseau, Meyer, F. R. Miles, McIntyre, are all excellent works, of more or less power and truthfulness. Among works of a poetical kind, we may single out No. 31, "Alkestis before Persephone," by Margaret Hooper, taken from Browning's "Balaustion," powerful and dramatic in conception. A. Morgan's humorous picture (86), "A Dressing Performance," and his equally clever study, "Counsel for the Defence" (90), are both inimitable as close renderings of human nature in their comic and serious aspects, and for finish of detail, as instance the chest of drawers in the first-named picture. Two cleverly-painted studies of moonlight effects are F. A. Hopkins's "Returning from School Treat," Early Moonlight," and F. W. Meyer's "Misty Moonlight" (Nos. 99 and 104). Portraiture cannot be more admirably painted than in No. 118, "Adelaide," No. 130, "Carmen," and 131, "Nellie," nor can we pick out more charming studies of still life than Miss Alice Daintry's, J. W. Harnett's, or W. H. Knight's "Fruit," Nos. 142, 143, and 145. The stoneware pitcher, the bronze bowl, with fruit in the latter, is a perfect concord in colour, so is No. 196. Amusing and natural is P. H. Miller's "Bookworm and Idle Cricket" (146); and the admirer of the manners of the eighteenth century will find a pleasant study in No. 167, "Fate in a Teacup," by W. Oliver, showing three interesting damsels diverting themselves with an old superstitious pastime. The embroidered doublet of the young gallant and the quilted petticoats and farthingales of the ladies are introduced with taste. J. C. Danby's "Sunset View of Salisbury Cathedral" is clever, and W. H. Paton's "Decay of the Forest," a powerful picture of dark shade and moonlight. No. 198 is a fine historical incident, from the brush of A. B. Donaldson, painted with considerable power. We may also glance in passing at Nos. 190, and 193, 179, 202, 213, 218.

The water-colours are not numerous. Margaret Ravenhill's "Interior of Old Castle, Stuttgardt"; G. Truefitt's "Old Ware" (466), are clever. "Studies of London Architecture" (491, 499), by G. F. Clarke, are carefully drawn and coloured. A. C. H. Luxemore contributes a pleasing study of Rouen (497), and the fine Norman apse of Leuchars church, by D. Anderson, and St. Lawrence, by E. J. Duval (515) are interesting sketches. "The Globe Room, Reindeer Inn, Banbury" (538), a quaint Elizabethan relic, and Mr. E. George's "Notre Dame" are masterly studies; we note also Nos. 508, 527, 545, 567. The architectural drawings

include many subjects that have before appeared in the Academy, and competition designs, some of which we have illustrated, are plentiful; but we cannot understand on what principle of selection some of the drawings have been admitted, as we find a few designs of no merit whatever, and others made for Gothic churches, and other buildings, a quarter of a century ago, and in quite a defunct style. The drawings of the late Edward M. Barry, R.A., take a deservedly prominent place, and among them we find a few works of interest, characteristic of the style in which he was most at home. Of these, the great hall and staircase of Crewe Hall, Cheshire, Nos. 399, 400; the fine Indian-ink drawings for the New National Gallery; the drawings showing the proposed conversion of the House of Commons into a Commons' lobby, and the design for a new House 63ft. square (418), the restoration of St. Stephen's crypt, the drawings for the Cannon-street and Charing-cross terminus hotels, Italian Opera House, the design for Cobham Park in an Italian style, the Birmingham and Midland Institute, the Bristol Corn Exchange, the interior of chapel to the Hospital for Sick Children, and the new buildings, Temple Gardens, may be chiefly noted as displaying the large and varied practice of Mr. Barry in Gothic, Elizabethan, and Italian, and the marked difference of manner in his later work. These drawings are chiefly in water-colour. His brother, Mr. Charles Barry, contributes a few of his works. We may particularly name 255, St. Stephen's Church, S. Dulwich; his competition design for the City Liberal Club, Italian in treatment; a view of Bylaugh Hall, Norfolk; and a well-tinted drawing of the Burlington House archway. We notice a fine spire in the Buchanan Memorial Church, Glasgow, by Mr. J. Honeyman; and some admirable coloured elevations of the Manchester City Police and Sessions Court, by Mr. Thos. Worthington; also a well-grouped brick and stone mansion at Didsbury, by the same gentleman (268), the Wigan Infirmary, and a collection of photographs (292). Several old faces meet us. Mr. Waterhouse sends his fine sepia drawing of the Clock Tower, Manchester Town Hall. Mr. Horace Jones is represented by Nos. 276, 277, "Bascule Bridge," proposed across the Thames below the Tower. One view shows the platform raised for the passing of sea-going vessels. The design consists of riveted iron ribs of semicircular shape springing from masonry towers, the circular ribs supporting the horizontal platform which is suspended from beneath it, and which can be raised or lowered. The design has more merit architecturally than the one proposed by the engineer to the Metropolitan Board of Works, and the drawings are carefully tinted. A few of the designs for the church at the Oratory, Brompton, are exhibited; we come across the fine interior view of Mr. Gribble's design, which has been illustrated by us; we also notice Mr. Carpenter's design for Manchester Cathedral (390). Mr. A. Peebles shows his new buildings in Rood-lane (326), and Mr. Thos. Porter his design for Wakefield Town Hall. No. 340, a Renaissance building with high roofs and dormers, and disengaged columns below, shows Messrs. Salmon and Sons' design for the new club buildings, Glasgow, a freely treated structure. No. 380 is the excellent drawing of Denton Hall, Grantham, by Mr. Blomfield, we reproduced lately; and this reference brings to our notice the very carelessly compiled catalogue, as we find 380 numbered under the head of Photographs, in which category several drawings appear. No. 383, Design for Side-chapel, by G. G. Scott, junr., is another mis-entry under Photographs. No. 386 is a finely-coloured interior for the Corn Exchange, Mark-lane, by G. G. Scott.

Rather unsatisfactory is the split pediment in the drawing of "Bull's Head," Tottenham Court-road, by Messrs. Perry and Read. In the photographs we may just mention a fine series, under the title of "The Stately Homes of England," contributed by Bedford, Lemere, and Co., in which the Marquis of Hartington's seat, Hardwick Hall, Chesterfield, and Hatfield House, Herts, appear. Nos. 364, 368, 556 are very fine photographs, and the Woodbury Photograph Printing Company send other choice specimens of their prints, and Dr. Phené selections from ancient stone and earthworks.

Turning to the wood-carving, we find a fairly complete collection of representative furniture and carving. Messrs. Gillow and Co. send a few choice examples; we note more particularly a carved oak cabinet, of Elizabethan design (3), Italian carved jewel-casket, and a pair of doors in satinwood of two shades, relieved by gold Italian arabesques and carved plaques in the panels (13), a very sumptuous piece of workmanship. Messrs. Crace and Son send a rich inlaid cabinet in Late Gothic, rather over-carved, but with good brass grilles on the panels, and several excellent specimens of carving in the Italian and Gibbons style are contributed by Mr. G. Alfred Rogers. We notice especially a few carved frames, a chimneypiece in oak rather redundant in foliage, and several fragments of Gothic panelling and carved work from Bruges and Nuremberg.

In another bay a very representative collection of the furniture of the Renaissance, from Louis XIV. to Chippendale and Hepplewhite, may be noticed, sent by Messrs. Wright and Mansfield. No. 110 and a few other carvings are the work of the National School of Wood Carving, and the examples by Sig. Bulletti are wonderfully crisp and elaborate in finish as specimens of handwork, though we cannot commend the naturalistic style of some of the exhibits. Mr. T. H. Kendal's carving of an owl in limewood is exquisite as a specimen of laborious and skilful carving: the minute finish of every feather is truly surprising; but is it art in a true sense? We notice also a carved panel, with hare, pheasant, and holly, too naturalesque in treatment. Messrs. Trollope and Sons send a well-designed cabinet in walnut, an Elizabethan chimneypiece of massive design (247) in oak, a clock-case, and a beautifully-carved Venetian frame and mirror, by Mark Rogers; bold, but refined in the scroll-work and ornament. Messrs. Gillow and Co., Jackson and Graham, Johnstone, Jeanes and Co. contribute also a few good specimens of cabinets and chimneypieces, as 123, 124. Among specimens of modern work we may mention a carved oak coffer in Perpendicular Gothic style, carved by Mr. Harry Hems, of Exeter, awarded a medal at Philadelphia and honourably mentioned at the late Paris Exposition; but his collection of old West Country wood-carvings are of extreme interest. We notice, for instance, the fragments of Late Gothic bosses, figures, rood-screen ornaments, &c., Nos. 268 *et seq.* in this selection, all from Devonshire and Somersetshire. One word of complaint. The same want of principle in admitting subjects is conspicuous in the wood-carving that we have noticed as regards the pictures and architectural designs: there are a great many of them that we have seen elsewhere, and the council, we think, should follow some definite rule—either admit everything that is offered them, or confine their space to strictly old and modern examples of art.

THE SOCIETY OF BRITISH ARTISTS.

THE present exhibition opened to the public last Monday is full of good works. Figure compositions seem to be in the ascendant this time, though there are not a few landscapes and studies of striking merit. There are two classes of painters whose works are eminently represented in the Suffolk-street galleries. We have first those who look at Nature through a magnifying glass, who paint every feature, stone, and blade of grass with consummate minuteness and elaboration of finish, and whose pictures require to be viewed within the short focal length of their own canvas. These painters look at and represent everything with realistic precision; their pictures are miniatures to be admired for dexterous handling of detail, and the works of these artists are always most sought after by the general visitor, who estimates the value of a painting to be in direct proportion to the literal rendering. Next we have a class of artists who look at Nature with their own eyes, who can produce a poem where another can only reproduce an everyday landscape, who can paint imaginative and historic themes with grandeur and effect, where his less-gifted brother is content to portray the incidents of common life, and paint only figures and stones, leaves and ripples. The former class are always more numerous, as their works are far more conspicuous on the walls of galleries. In much of the work of the former kind we have described we seem to lose harmony and composition, good grouping, or modelling; while we are equally sensible to an affected coarseness and crudeness of handling and colour in some of the works of the latter. We need not go farther than mention Mr. Gadsby's "Toasting" (No. 60), in the large room, as an example. Mr. W. Holyoake, in a composition study, shows us a possé of feminine beauty in his picture "The First Night" (4), a galaxy of dark and fair faces at the opera; but we must pass to the grand landscape of Mr. A. F. Grace, "The First Load; Clouds Clearing off for a Fine Day" (9), as one of the leading pictures in the great room which call for notice. The artist has well given us the hazy light of a fine summer's morning in his meadow scene; the shifting shadows of the clouds and the busy haymakers recall with admirable force and truthfulness, the country scene. There is a vigour of touch, and a charming quietness of tone in the colouring also, and it is a sort of landscape that one can sit and admire at a little distance. Over it is a poetical composition by Mr. Frank Hyde, who has, with his accustomed power, painted a sleepy-eyed dark beauty, in a recumbent position as "Ione." Mr. B. G. Head's "Cupid's Bower" is a sentimental-looking girl, attired in pink dress, seated in a bower, and has more the touch of the Valentine spirit in its composition, than any merit of a high order. We turn to a pleasing study of hospitality in No. 20, "Good Folks are Scarce," by Mr. Jas. Hayllar. The scene is the entrance of a wayside inn, or cottage; the door, ajar, discloses a blinding snowstorm, from the inclemency of which a benignant and hale old man has taken refuge. He is represented adjusting a red scarf, and is, with good-humour on his face, about to regale himself with a glass of ale, which the good-natured hostess has in her hand. Mr. Hayllar has happily rendered the features, and the picture tells its own tale truthfully. "Footsteps" (No. 24) is a large, solidly-painted wood. Two girls, and their faithful companion, a large dog, are enjoying the gloomy stillness; the dog has scented the approach of distant footsteps, and is intently watching. The painter, Mr. Yeend King, has displayed much skill in the mood of suspense of the girls and dog. "Gathering Flowers for a Bouquet" is prettily and brightly painted, but lacks repose in colour. One of the most conspicuous studies of animal life is Mr. J. Noble's "Keeper's Assistant" (35). A keeper's nag is tethered to a gate, awaiting

his master with the true instinct of his nature. The game on the ground, and the dogs at the feet of the horse, are painted with wonderful fidelity, and the picture well sustains the artist's reputation for conscientious study of Nature. Mr. Jas. Gow has endowed his picture, "A Quiet Afternoon," with a sentiment in strict keeping with the title. The old-fashioned room, with its air of neatness and homely comfort, the chimney-piece, bureau, the corner-cabinet, and the carpet, all in the Late Stuart taste, are in excellent harmony, and exhibit the same care and finish of detail Mr. Gow bestowed upon his clever winter contribution to this gallery, if not equal to it. A place of honour is well given to Mr. J. Morgan's very striking and touching picture, "The Assizes" (122). The painter has represented a scene in the "Experiences of a Barrister." It represents the outer hall, or vestibule, of an assize court, filled by a throng of earnest litigants, and dejected and sorrowing relatives. Mr. Morgan has chosen the incident where Mr. Ferrett, an attorney, accosts a barrister leaving the court and solicits him to undertake the suit of a widow and her son "cruelly deprived of their estate." The little attorney is made the central figure in the sombre group. He is dressed in a drab suit, with breeches and gaiters to match, and is eagerly endeavouring, brief in hand, to obtain the services of the lawyer in gown and wig. The figure of the widow in deep mourning, and her little boy, are touchingly delineated, while the other figures, the elderly lady in brown silk, and the sobbing woman with her children leaving the court, are singularly pathetic and truthfully painted. Mr. Morgan has also imparted an animated look to his group; the people in deep converse, the expectant and excited witnesses have an appearance of movement and business that is not always a gift of the artist of figure subjects. Just above this picture, in happy contrast, both of subject and sentiment, is a fine scene of a "Willowy Brook" (123), from the brush of Mr. T. Huson, quiet and natural in colour; while on the same wall the admirer of marine subjects will appreciate for its rich tone of mellow light, the sea-piece of Mr. G. S. Walters (128), "Market Boats on the Maas, Holland." We must not pass over some clever genre pictures by A. Ludovici, senior and junior, remarkable for the usual spirit and handling of those masters. Whether in high or low life, Mr. A. Ludovici is equally at home. Let us take the fine picture, "Le Bal des Pauvres" (98), in which he has depicted, with all its squalor and gloom, a dingy court in London, with a lively throng of urchins, who are dancing to an itinerant musician; "Cracking the Last Nut" (140), a gaily-dressed group of guests after dessert are carousing in a stately apartment, with furniture and costume characteristic of the time of the French Consulate. This is by Mr. Ludovici, jun., and is rich in costume and colour. The swallow-tail coats of coloured silks, and the tight stockings and knee-breeches are skilfully handled, and the draperies, though bright, are not distracting.

One of the few architectural subjects is a fine interior view of the "Basilica of St. Mary and St. Mark, Venice," by Mr. Wyke Bayliss (175), whose admirable works last year drew a note of admiration from us. The artist has sought to embody the poet's frenzy of this "jewelled casket" of the Queen of the Sea. The drawing and detail are equal to Mr. Bayliss's skill as an architectural delineator, and he has invested the interior with all the soft richness of colour of this shrine of marble and mosaic. The sea of colour is softened by the radiance which streams from the great eastern window, though the effect of mingled tints is due chiefly to the glazing and peculiar manipulation of the artist. Over this picture is a bold sea-piece by Mr. John Finnie (176), vigorous and bold in the drawing and colour of the swelling waves and the island rock known as "The Bass." Very fine in delicate handling is Mr. W. L. Wyllie's view of "The Alps" (182), in which the artist has conveyed the line of the poet—

"The moon is up, and yet it is is not night."

The melting of water and mist obscuring the base of the Alps, whose crest is faintly seen against the sky, is clever. The only great imaginative work in the principal room is Mr. A. J. Woolmer's large picture (191) entitled "The Isle of Prospero: Effect of Sunset and Moonrise." Mr. Woolmer has not produced anything so grand as his "Primeval Forest," which was the great work of this gallery last year, but has embodied the scene in "The Tempest," Act V., beginning—

"Ye elves of hills, brooks, standing lakes, and groves,
And ye that, on the sands with printless foot,
Do chase the ebbing Neptune . . . ."

The effect of sunset and moonrise, the water, rocks, and grottoes, with the iridescent hues, in which Mr. Woolmer so delights, impart a phantasmagoric appearance to the ideal scene. Vigorous and broad is Mr. J. White's "Falling Leaves" (197); and exceedingly clever in the accessories is Miss Jane Humphrey's pleasing genre subject, "A Confidential Chat" (201). Two girls, in the short-waisted dress of the Georges, perched on stools, are seated chatting together in front of a comfortable fireplace with drawn fire-screens. The carved chimney-piece and the brass fender are in the style of the Adamses, and the reflection of fire through the pink curtains is cleverly drawn. We may name a fine crisply-painted sea-piece (No. 170) by Mr. A. J. Stark; and a humorous bit, "A Sumptuous Repast," by Mr. Horatio H. Couldery, in which some mischievous dogs have taken possession of the dinner-table, and are busily engaged devouring a fowl. In the south-east room we note a few meritorious works; a large picture by Mr. Stuart Lloyd, called "A Deserted Mansion," in which an old dilapidated house of the time of the Stuarts, surrounded by wildly-grown and vernal-looking foliage, appears; a clever study of a girl's face by Mr. A. Ludovici is chiefly noticeable for its pretty, Classical features, light-golden hair and a rich, prune-coloured hat; one or two admirably-painted subjects by Mr. Jas. Hayllar, especially Nos. 214 and 266, the latter a large view of a beautiful river-bank, tender in the handling, with well-studied trees and reflection. Sir Robert P. Collier's "Spring-Time in Essex" (273) is thoroughly natural in manner; and Mr. A. Bevan Collier's "Salisbury" (284) is a fine subject, but weak in the outline of spire. Mr. L. C. Henley sustains his reputation as a painter of life in his well-painted picture, "A Good Title" (290); but Mr. A. Martinetti's piece, No. 291, "Reciting an Ode on Mamma's Birthday," is too ambitious in design and colour, although it affects the sumptuous splendour of Louis XV.'s time. Crisply drawn in the detail is a small interior of Dixmude Cathedral by Mr. Wyke Bayliss; worthy of being recorded are one or two works by Mr. Andrew B. Donaldson, in his usual key; a clever bit, by Mr. A. H. Burr (246); a rather stiffly-painted study by Mr. W. H. Bartlett, who has done better; a piece by V. F. Wainewright (263); two pleasing studies by Mr. G. S. Walters (301, 302); a realistic study by Mr. W. Luker (295), and a few clever works by J. E. Grace, H. Caffieri, J. R. Reid, Eleanor Bell, and E. J. Cobbett (308, 309, 312, 319.) In the South-West room we can only pass in review Mr. A. Ludovici's "Zitania" (331), Mr. E. J. Cobbett's bright-looking view in North Wales (345); a fresh blue-looking seascape, by E. Ellis, in his usual style (359); a feeling study (364) of old boats; a pretty conceit by Mr. J. Morgan (368); a wonderfully clever bit of masonry and carving from the Church of St. Lawrence, Nuremberg, by Wyke Bayliss (399); Mr. J. Aumonier's "Cornish Orchard" (406); Mr. G. E. Cook's "Cornland by the Sea" (412), and a clever study from Burnham Beeches by H. Caffieri (419). In the North-West we note Mr. Morgan's laughing maiden in his frolicsome piece "The Haymakers" (456), Mr. Lionel P. Smythe's "Summer Twilight" (470), a clever study of a fashionable London promenade; Mr. Helmick's "China Hunter" (504); "Ripening Corn," a pretty pastoral view (500); another vivid study of a pasture, by Mr. Tom Lloyd; and a fine landscape by Mr. Geo. Cole (528). Mr. J. W. Buxton Knight's piece (532) is heavy in colouring; and Mr. Henry's large view of Northumberland House (467) does not bear inspection, and there is a lack of animation in the scene, the vehicles and horses looking more like toys. We note also with commendation No. 537, a careful study with a touch of humour.

In the water-colour room a few masterly sketches are to be seen. Perhaps Mr. J. Jackson Curnock's "Pool on the Glaslyn" (540) is a trifle too naturalistic, but the foliage is boldly massed and the touch sharp and clear. Mr. David Law sends two clever studies—one a moonlight scene from Whitby Harbour, a favourite theme of this artist (575), the sky and harbour are broadly and truthfully drawn; and the other an equally skilful rendering of a hazy atmosphere, with a boat in a bay of the Yorkshire coast (763). Mr. R. H. Nibb's drawing, "Limehouse" (578), is forcible and spirited in execution, and the grouping of houses and craft masterly. A similar subject is Mr. Jules Lesson's "Building Yard, Southwark" (594); body-colour and vigorous handling are characteristics of this artist's work. A fine effect obtained by the same treatment is Mr. Roffe's "Penmaenmaur," N. Wales (601). Mr. W. E. Brown (632) sends an unfinished sketch of the Bruges belfry; and Mr. A Shelly has cleverly painted the warm sunny glow, and distant town in his view of "Exeter" (638); while close to it we notice a charming old Venetian staircase from the pencil of Mr. A. H. Haig with some good detail in brick. Usually Mr. Donaldson's work is heavy and harsh, but his "Canal, Dordrecht," is less offensive, and is rich in colour. Mr. Bellhouse, in his "Interior of St. Jacques' Church," is faulty in perspective. Praise is due to Mr. W. J. Muckley's "Flowers" (652); they are crisply painted and well grouped. Mr. Anelay's imaginative picture, "Leaving Paradise" (650), is strong as a composition. We can also award praise to Mr. Phené Spiers' sketches (673), "The Parthenon, Athens," and his crisply-coloured "Study of An Old House, Rochester" (756), subjects, though wide as the poles apart, yet equally clever as water-colour studies. Mr. B. Fletcher's "Sketch in Brittany" (669) is crude in colour. We may also notice a clever study by Mr. L. Pinhorn Wood (707) "Cæsar's Tower, Warwick Castle," and "A Village in Herefordshire," by Mr. J. H. Baker (702). Mr. Benjamin D. Sigmund has shown resource as a painter of striking effects in his study of a "Knotted Tree Bole" (716), and Mr. Skeats sketches very truthfully the "Platform, Southampton" (740). We cannot pass by Miss Kate Sadler's lovely study of "Irises," nor a feeling study (764) by Mr. Jas. E. Grace. Mr. Gilbert's "Iphigenia" displeases by its harshness, but is clever. Some carefully-finished work is to be found on the screen. We may note with special commendation "Roses" (No. 774) by Jessop Hardwick; No. 772, by M. P. Lindner; six beautifully finished and feeling miniature sketches by Mr. G. S. Walters (787, 788, 797, 804, 805, 806), all of marine subjects and characterised by a masterly

touch. A pleasingly-designed decorative study is No. 789, by Mr. Jno. Eyre. A truthful sketch of Christchurch, Hants, by Mr. W. Paris, is to be seen near the floor (794), and we must not overlook a fine study of "Chrysanthemums," by W. Suthers, as one of the choice flower subjects in the room.

THE INDIAN VITRUVIUS.—II.

THE ninth chapter of Mānasāra gives directions for laying-out the streets of villages and towns, and the allotment of suitable sites for temples, piazzas, and halls. The extent of villages and towns is declared to admit of forty varieties, consisting of from five hundred to twenty thousand *dandas* square. There are eight sorts of villages or towns, viz., 1, *dandaca* (resembling a staff); 2, *sarvatob'hadra* (completely happy); 3, *nandyavartta* (abode of happiness); 4, *padmaca* (like a lotus); 5, *sivastica* (resembling the mystic emblem of Siva); 6, *prastara* (conch shaped); 7, *carmaca* (like a bow); 8, *chaturmuc'ha* (having four faces). We can only describe one or two of these. The village called *dandaca* is quadrangular, and surrounded by a square wall. It consists of from one to five parallel streets, running in one direction, generally from east to west; and of two or more streets forming right angles at both extremities of the five parallel streets, and also of a third crossing the middle of them. This village is particularly intended for the residence of Brahmans, and may contain 12, 24, 50, 108, 300, or more houses. The village called *Sarvatob'hadra* is also quadrangular, containing a principal temple in the middle. It has four streets of equal length on the four sides within the wall, meeting one another at right angles, and two more crossing each other in the middle; and the whole is surrounded by a quadrangular wall and a ditch around it, with four large and as many smaller gates in the middle of the sides and at the angular points. In this manner, but with greater amplitude of detail, the author goes on to describe the form and arrangements of the remaining sorts of villages; but the above extracts are quite sufficient to show the general style of treating the subject, and that order and system prevailed in all the arrangements.

In the same chapter directions are given as to the proper situations and aspects of the various temples; but as they were regulated solely by sectarian or religious considerations, the minutiæ would be scarcely interesting to architectural readers of the present day. It is, however, quite as well for British architects, who may have to design buildings, or to lay out sites for the natives of India, to take very serious notice of the fact that the very smallest matters are, with them, frequently the subject of real and earnest religious prepossessions, inherited from their forefathers for thousands of years, and that they should not be needlessly shocked by carelessness or wilfulness.

The following directions are given respecting private dwelling-houses:—"Private houses or mansions may consist of from one to nine stories; but this is to be determined according to the rank of the persons for whom they are built. The lower class of people must on no account construct their houses of more than a single story, or ground-floor; and the height of the buildings should correspond in every street, as far as practicable, and in all structures of the same number of stories." Mānasāra gives no directions as to the *ground plan* to be adopted for private dwellings. We find, however, in another ancient work, said to have been written by Rājā Bhoga, of Dhar, the *Raja-martanda*, a mention of sixteen different forms of ground-plan, and the following very curious summary of their respective merits:—"The oblong insures success everywhere; the square brings in money; the circular promotes health and prosperity; the rectangular, with a courtyard, fulfils all desires; the lunetted-wheel causes poverty; and the unequal winged, bereavement; the triangular makes the owner a king; and the cart-shaped leads to the loss of wealth. Cattle die away if the plan be staff-like, and vision is lost by the *panava* shape. The *muraja* shape causes the death of the owner's wife; the wide front, loss of wealth; and the fan-shape, loss of situation. The tortoise leads to theft; so does the bow-shape; while the horse-shoe form causes loss of wealth." These reasons would certainly not commend themselves to any European builders, and they are only worth quoting for the purpose of showing how utterly childish were many of the so-called "principles" which guided the architects of India. But, among all the childish absurdity, it is remarkable that the fourth kind, the rectangular with a courtyard, which "fulfils all desires," is really the best that can be designed for comfort, convenience, light, and ventilation in the warm climates of India. Its technical name is *Chadrasana;* it forms the ground plan of almost every Hindū house of any pretensions, and is, in fact, so common, that *Chadrasana* has become the ordinary name for a dwelling-house in the present day. The superiority of a house in India is now always denoted by the extent of the courtyard, or by the greater number of courtyards it contains.

In the thirteenth and three following chapters Mānasāra gives a technical description of the forms and proportions of columns and their appropriate decorations. This is the most decidedly Vitruvian part of the work, as to general style; but the difference between the Hindū and Classical "orders" is amply sufficient to stamp the Mānasāra as a perfectly independent and original work.

A short account, however, of the several mouldings used by Hindu architects, and a comparison of them with Western forms, is a necessary preliminary to any account of the Indian "orders." There are twelve principal varieties of mouldings used in the Indian styles, the first eight being rectangular, and the remainder curved: 1st. The *upana*, which corresponds exactly with the Vitruvian "plinth." 2nd. The *campa*, which answers in every respect to the "fillet." 3rd. The *cantha*, *gala*, or *griva*, &c.—literally, the neck—when employed in pedestals is made very high, and resembles the "dado," but everywhere else it serves as a sort of neutral member, from which the projections of the rest of the mouldings are measured. 4th. The *uttara* is sometimes the whole architrave, and sometimes a particular member of the pedestal and entablature, corresponding to the "corona." 5th. The *vajina* differs from the *campa* only by having a greater projection. 6th. The *prativajina* in pedestals answers to the vajina, but when placed in cornices is externally a little more inclined to one side than the other, and very much resembles the "cavetto." 7th. The *pat'ta*, or *pat'tica*, signifies a band, and in pedestals and bases has usually the same height and projection as the vajina, but in architraves and friezes its height and projection increase considerably. 8th. The *alinga*, generally altitude as the fillet. 9th. The *antarita* has the same height with the "ālinga," but as much recession as the latter has projection. Both these members are placed alternately together, and when used are always thus inseparably connected. 10th. The *cumada*, literally *nymphœa esculenta*, is a semicircle projecting from a vertical diameter, and corresponds with the "astragal," "bead," or "torus." 11th. The *padma*, literally *lotus*, is supposed to resemble a petal of that flower. This moulding is distinguished into greater and less, and forms one of the principal ornaments of Indian architecture. It is generally employed in detached pairs, in bases and cornices, one facing the other in opposite directions, and is formed upright or reverse according to its situation, either as a crowning member of the former, or the supporting ornament of the latter. In some situations it looks very much like the Classical "apophyge," and is sometimes made exactly in the form of an "ovolo." 12th. A *capotam* is a section of a moulding made in the form of a pigeon's head, from which it takes its name. It is a crowning member of cornices, pedestals, and entablatures, and frequently also serves the purpose of a spout to throw off the water falling on the cornice. In this office it resembles in some measure the "corona" of the Grecian orders.

We now come to the account of the Hindu "orders" as described by Mānasāra. According to him, they consist of four principal parts, viz., the *Upapitha*, or pedestal, the *Athisthana* or base, the *Sthamba* or pillar, and the *Prastara* or entablature, and although the Hindu writer, in common with Vitruvian architects, includes both base and capital in taking the height of the pillar, and even considers the pedestal as a necessary part of the order, he nevertheless invariably treats of a pedestal and base as separate bodies, because they are sometimes employed without pillars.

Of Pedestals and Bases.—The *Upapitha* and *Athisthana* derive their names respectively from the Sanskrit words *Upa*, under, with *pitha*, a seat or bench; and *athi*, upon, with *stha*, to stand. They are for the most part composed of the same mouldings, the most remarkable feature of difference being a square die, which is peculiar to the pedestal. The pedestal is frequently employed, either by itself or in conjunction with the base, as a pavement for porticos and temples, over cornices, as a platform for thrones, and as seats for statues, and in these latter situations especially their ornamentation has exercised the utmost skill of Hindu artists. Mānasāra describes three principal kinds of pedestals, each with four subdivisions, making twelve in all. The following are the three principal kinds, viz:—

(1) *Vedhicabhadra* The height of the *upapitha* being divided into 21 parts, let 5 be given to the *upana* (plinth), 1 to the *campa* (fillet), 12 to the *cantha* (dado), 1 to the *campa* again, 4 to the *pat'tica* (platband), and 1 to the *campa* above. (2) *Pratibhadra*. Divide the height of the *upapitha* into 26 parts, and let 3 be given to the *upana*, 1 to the *campa*, 2 to the *padma* (cima reversa), 1 to the *campa*, 11 to the *cantha*, 1 to the *campa*, 2 to the *padma* (cima recta), 3 to the *capota*, 1 to the *alinga*, and one to the *antarita*, (3) *Manchabhadra*. Let the height of the *upapitha* be divided into 30 equal parts, give 3 to the *upana*, a half to the *campa*, 3 to the *mahambuja*, a half to the *campa*, 2 to the *candhara*, a half to the *campa*, a half to the *Kohudra-padma*, 2½ to the *capota*, 2 to the *prativajina*, 8 to the *gala*, 1 to the *uptira*, a half to the *campa*, a half to the *padma*, 3 to the upper *capota*, 2½ to the upper *alinga*.

The projections of the highest and of the most prominent parts of the pedestal, &c., are thus described:—

The projection of the base or *upana* is equal to its height, or 2, 3, or 4 times as much more than its height. That of the *padma* is also equal to or twice as much as its height and that of the *capota*. The *cumada* is always equal to, or something less than, its own height. The *padma* should be ornamented with the petals of the lotus, the square fillets with forms of gems, blossoms, foliages, &c., and the *cantha* with figures of *vyalas* (fabulous animals), *sinhas* (lions), or of leaves, flowers, and the like.

The height of a base is equal to either a half, three-quarters, or a whole diameter of the shaft. When placed under pillars of an inferior sort, in porticoes and the like, and without a pedestal, its height is stated to be one-fourth, or one-third of that of the whole pillar. To bases, or rather basements, raised under pilasters in *vimanas* (temples), &c., Mānasāra gives twelve different heights, to be used in so many different stories, one above another; the first height consisting of thirty *angulas*, and the last of four *hastas*, each of the intermediate ones being increased in proportion of six *angulas*. He also gives with great minuteness the relative proportions of the component parts of no less than sixty-four different sorts of bases. Those

who may wish to study the composition of this member will find a large number of them very accurately and beautifully drawn, according to the directions of Mānasāra, in the work of Rām Rāz, before mentioned.

Of Pillars.—The height of a pillar, says Mānasāra, when placed on a base only, or both on a base and a pedestal, is measured from the plinth of the former up to the lowest part of the entablature; that is, from the base to the capital inclusive. The following he gives as the rule for diminution of the thickness towards the top. Let the height of the pillar be divided into 12, 11, 10, 9, or 8 parts, and one be taken for the breadth of the foot of the shaft, and the same divided again by the number of parts of which the height of the pillar may consist; let the upper extremity of it be diminished by one of these parts respectively. Pillars, it is also said, may be of various forms: square, circular, and with 5, 6, 8, 16, or any other number of sides; and the whole shaft may be of the same form, or the bottom, middle, and top may be quadrangular, and the intermediate spaces of other forms. In this respect the Indian architecture differs materially from the Classical, in which the columns are always round. Minute technical descriptions are also given by this ancient author of the various ornaments with which the several sorts of pillars are adorned, drawings of which, partly taken from his descriptions, and partly from models found in purely Hindū temples and porticos, may be studied in the work of Rām Rāz. Pillars are divided into seven sorts, according to their dimensions. The first sort is a column six diameters high, which is rarely used except upon a high base and pedestal. The entablature is more than half the altitude of the column, measured from the architrave up to the corona, and the inter-columniation generally four diameters. The capital is equal in height to the upper diameter of the shaft, and its projection is equal to its height, and its breadth may be either one, one and a quarter, half, or three-quarters of the diameter. It is called by a native name which signifies literally "flower-headed capital." The second kind of column is seven diameters in height, and is placed in most examples upon a base and pedestal, although sometimes upon a pedestal only, equal to half the height of the pillar. There are two kinds of capital described as appropriate to this pillar. Of the first kind Mānāsāra says, "it should be decorated with *tarangas* (*i.e.*, waved or undulating lines) and other appropriate ornaments; the height of the capital being divided into 12 parts, let the form of tarangas occupy 3 of them; let the *bodhica* (capital) which should resemble the cobra-di-capello, occupy 6, and adorned with flowers and the like," and the other 3 parts to ordinary mouldings. The projecting part of the *bodhica* should be fashioned like the stalk of a plantain-flower. The other form of capital has projecting ornaments on the sides, made either in the form of an inverted apex or of a wheel or circle. It is one diameter in height, and projects but three-quarters of the diameter. The third sort of column, with its base and capital, is 8 diameters high, with a diminution of the shaft at the top of $\frac{1}{8}$th of its thickness at bottom. The base occupies half a diameter, and its whole projection is half of its height. Mānasāra directs the base to be ornamented with the lotus, and figures of demons, lions, and the like. The height of the capital, which is of the form called *phalaca*, is $\frac{3}{4}$th of the lower diameter of the column, and its projection one diameter, or about $\frac{1}{8}$th beyond the lowest part of the base. The height of the entablature is a quarter of that of the column. The fourth sort of column is nine diameters high, the base is one diameter in height, and it is without a pedestal. The upper ornaments occupy two diameters, and the capital $\frac{3}{4}$th of the diameter, consisting of various mouldings ornamented with strings of pearls. The fifth sort of column is ten diameters high, including the base, which ought to be three-fourths of the diameter. It is sometimes erected on a high pedestal, which is about a third part of the height of the pillar. The height of the capital is equal to the upper diameter of the column; its projection on the sides is equal to its height, and the middlemost square is ornamented with the petals of a lotus. The sixth sort of pillar is eleven diameters high, with a base composed of plinth, cima-recta, and torus with their fillets one diameter high. The same pillar, including the base, may also be taken as an example of the seventh sort, which ought to be twelve diameters in height. At the foot of the shaft, a space equal in height to the hypothenuse of the lower diameter, is made quadrangular, around which are sculptured images of the deities and the like in bas-relief. In about half a diameter above this is a moulding made in form of a serpent, and the remainder of the shaft, about three and a half diameters, is made to consist of eight sides, including some strings of pearls, occupying three-fourths of a diameter, which have the appearance of being suspended from the fillet of a lotus-shaped ornament which takes up half a diameter. Next above this is the *calasa* or waterpot, about three-quarters of a diameter, and above this with the same height three other mouldings peculiar to the style, and above these again the lower collarino a quarter of a diameter, then a projecting ornament called *cumbha*, next the upper collarino, next a projecting moulding called *a phalaca*, then the third collarino, and last of all, a flower-headed capital. This is the most elaborate of the several kinds of pillars described by our author, but in later days the style developed into still more complicated and elaborate forms, examples of which may be seen in a portico at Tiruvanamalei at Madura, and at Canjeveram, where are sculptured in alto-relievo, lions and horses, standing upright, the full length of the columns, the former treading on elephants, and the latter mounted by armed knights, representations of which may be found in Mr. Fergusson's "Eastern Architecture," and careful outline drawings in the work of Rām Rāz. The diminution at the top of the column seems to have been regulated by the same principle, though not by the same rule, as the Grecian. The general Indian rule is that the thickness at the bottom being divided into as many parts as there are diameters in the whole height of the column, one of these parts is invariably diminished at the top. The taller the column, the less the diminution, so as to allow for the greater *apparent* diminution by perspective, and that this scientific principle should have been independently taught and practised in India from time immemorial is highly creditable to the native architects. The *entablature* of the Indian orders admits of little variety, and its massiveness presents a striking contrast to the lightness of the Grecian, but its richness of ornamentation may be said to be unrivalled.

Vimanas.—Of the remaining portion of Mānasāra, twelve chapters are occupied with rules as to the proportions and dimensions of as many sorts of *Vimanas*, or pyramidal temples, consisting, according to him, of from one to twelve stories, but according to Kāsyapa, another writer, of from one to sixteen stories. These rules it would be impossible for us to follow here, and we must again be content with referring to the treatise of Rām Rāz, before named. However, not to omit some technical details of the subject, we give an account of the principles upon which the native temple-builders of Benares work in the present day, as communicated by one of the most eminent of them to Rajendrāls Mittra, premising that there is no great difference of principle between them and our ancient author:—

Temple Building at Benares.—"The body of the temple is the module upon which the rest of its parts are to be calculated. The length, breadth, and height of the body should be the same, and its steeple should vary according to the size of the temple and the number of pinnacles it is intended to bear, from 1¼ and 1½ to 2 and 2½ lengths. The practice is to divide the temple into three parts;—1st, the plinth or *kursi*; 2nd, the body or *janghi*, including the cornice and the base mouldings; 3rd, the spire or *chuda*, comprising base-mouldings, spire proper, turrets, pinnacle, trident, and flagstaff. The plinth is to be one-ninth of the total length. In small-sized temples the door is generally one-fourth of the cube. The first member above the spire is a thick square plate named the *Ramarekha*, from certain denticulations on its edges, having some resemblance to the sectarial mark of the followers of Rama, a common ornament for the upper edge of projecting stones. In a temple 9 yards in height it should be 12in. in depth. It is intended to cover the vent of the spire, and from the basement of the *kalasa*, or crowning member of the spire. Above it is placed a small compressed ribbed dome, 15in. thick, the *amra* or *amlasila*, so called from its resemblance to the fruit of the emblematic myrobolan. It is surmounted by a ribbed conical construction called *mora*, and having very much the appearance of a ribbed, inverted funnel, or a lotus reversed, 9in. long. It has been by some called an umbrella. Then follows the neck, *gala* 2½in., serving as the support of a rounded moulding, *kangani*, 3in. thick. A neck then follows, and on it is placed a vase, or jar, named *gagri* It should be 18in. high. Upon it stands a second jar, 9in. long, and sometimes a third of a smaller size, which supports the metal cap and the trident, or the discus, each of which should measure 18in. in length. The steeple is generally slender, having straight sloping sides, but occasionally its outline is curvilinear. In its simplest form the steeple rises from above the cornice without any basement; but generally it has four little turrets or pinnacles, *khwkibhadras*, on the four corners. In ornate forms the turrets are ranged in tiers, and their number is multiplied till, in the most elaborate specimens, there are as many as 108 of them, arranged in six tiers. The most perfect specimens of this style are seen in the temples of Visvesvara, and Kedara at Benares. Views of them may be consulted in James Prinsep's 'Illustrations of Benares.'"

Gopuras.—The last purely architectural portion of Mānasāra consists of descriptions of the proportions, &c., of *Gopuras* or gateway towers. These are perhaps the most peculiar features in the whole range of Indian architecture, and the utmost artistic skill which the country can command is expended in their over-profuse ornamentation. They are pyramidal in form, and rise to a height of from 1 to 12 or more stories. They are placed somewhat irregularly round the outer walls of temples, and at the entrances of every one of the many courtyards by which a temple of the first-class is surrounded, the tallest being outside and the others diminishing in size as they approach the most sacred part of the temple in the interior. This principle of a descending scale of height is vehemently condemned by Mr. Fergusson, and rightly so, if Indian architects were to be rightly judged by our own canons of taste. But nothing could be more unjust. The Indian symbolism demands that the nearest approach to the deity should be physically and materially small. The whole aim and tendency of Indian religious thought is to minimize the influence of matter, and approach as closely as possible to a pure spirituality. Hence their innermost temple is called the *garba griha*, that is, "the womb of the house," and to have erected a range of buildings rising pyramidally to such a place would have been incongruous and out of place, however much it may have suited the æstheticism of a Western critic, educated in quite another school. With this remark we must close our notice of this most interesting work. We have been anxious to call our reader's attention to the almost forgotten fact of its existence, and if in doing so we shall have excited the curiosity of some to study Indian architecture as much as possible from an Indian point of view, our end will have been answered. We cannot help adding one word to the effect that it would perhaps assist the study of native architecture very much, if the Government of India would undertake the collation and publication of the original, with English translations, of the MSS. of this and other architectural works, which remain to this day unedited, in the Government Library of Calcutta.

W. H. R.

THE FORMATION OF RURAL ESTATES.

IN the following paper we propose to offer a few remarks on the planning of rural estates.

The purchaser of an estate has frequently to make it, or more frequently still, to undo what has already been done. The aim of the present remarks is to suggest rather than to lay down any precise rules; to hint at what should be attained and what avoided.

The approach to a place is of the first importance. If there is no convenient and decent road already made, its formation should be the first object. Convenience should always be regarded before appearance, and therefore, if there be no insuperable difficulty in the way, the road or entrance to a place should be made with reference to some desirable point or junction with a public road, or proximity to a town, railway-station, or some eligible neighbourhood. To be isolated from the world by the want of some easy communication, is a misfortune which many retiring people make when they choose a country or rural neighbourhood. No mere promise of such a convenience as a road being formed should induce any one to build on land, however attractive in other respects it may be; many have been led into such a trap.

The occupant or purchaser of a place should further consider what extent of carriage-drive is necessary to be made, as any great length, in some districts, would be an infliction of continual road repairing, a process not always inexpensive. Steep ascents are tiring, though a gradual rise to the house is better than a decline. In small places, a carriage-drive is often better avoided, as it detracts from the size of grounds, and cuts up the garden or lawn. A long serpentine drive through a limited area of ground gives an air of pretentiousness that is distasteful, while a wider gravel road than is really necessary entails unnecessary labour to keep in repair. Repton says, the breadth of a road should be in inverse ratio to the breadth of the grass at the sides. Room for two carriages to pass is requisite in much-frequented roads. Roads passing opposite or near principal windows should be avoided, nor should they be allowed to intersect the breadth of turf or garden in front of windows. Nothing is so detrimental as a road cutting a park, or the view from the front of a house, in two. This is particularly obnoxious when a public road runs through one's property, dividing it and making it appear as distinct estates. When unavoidably the case, if the road cannot be sunk considerably below the grounds, so as to conceal it and its traffic from view, an artificial mound—a kind of "haw-haw"—may be formed, so that the line of vision from the house or immediate ground may be carried over the road, and thus conceal it from view.

Some people have a great fancy for straight lines and roads. In small places, as in the suburbs of towns, a circuitous approach is often ridiculous, and, in the words of a poet applied to improvers in his day—

> ——"lead us many a tedious round
> To show th' extent of their employers' ground."

Quite as distasteful is a straight road or path through a park, unless, indeed, it be a central avenue approach, as was common when the Le Nôtre fashion prevailed. It should be remembered interest can only be preserved by continual changes, and in Nature especially we find a constant variation in contour and line. In laying out an approach, then, it is desirable that we so vary its line and direction, that at each step or turn of it some new scenery opens upon the view.

No less important than the main approach to a house is a back access, and a provision for this must be made without its intrusion within the pleasure-grounds. Sometimes a branch off from the main entrance before it is noticed from the house is necessary, unless any back way or lane can serve. In small places one entrance is often desirable, and by the aid of plantations a branch walk or road may readily be got for the accommodation of tradesmen and the removal and supply of necessaries.

The position of the house in reference to level has already been indicated. Prospect must not always be looked for, nor can desirable aspect be secured; other difficulties also frequently arise, such as nearness to unpleasant neighbourhoods, buildings, public roads, &c. The art of the landscape-gardener can, however, do much to atone for such deficiencies. By removing ridges of ground, hedge-rows, plantations, and diverting roads and fences, a very confined and cramped situation may often assume an extent its proprietor or occupier little contemplated. In a similar manner objectionable views, bad aspects, and exposures to wind, rain, &c., can often be shut out or remedied without much expense by the intervention of mounds, clumps of trees, or by excavating slight hollows and other like expedients.

The apparent extent of view, size of and height of objects, or hilliness of ground, depends on a few optical principles, which should be thoroughly mastered by those desirous of making the most of their land or the views from their house. Thus a house situated in or near a depression has an extensive view from the windows, but on a hill the immediate landscape becomes foreshortened. The apparent magnitude or extent of ground as of any object will vary considerably according to the relative elevation or depression. Hence, a hill, when viewed from its base, appears insignificant to the eye compared to the same hill viewed from a point midway on the steep side of an opposite elevation.

Repton, in his "Theory and Practice,"* says that the angle of vision formed below the axis or horizontal line is considerably larger than that formed above it. Generally, he says, the upper angle will never be greater than half the lower one. He concludes, hence, that the distance at which an object appears at its greatest height is when it forms an angle above the axis of vision of about 30 degrees without moving the head. This observation seems to be well founded, though the angle of vision is not always restricted to the limit he mentions. What the eye can comprehend at once without moving has a greater impression than that contemplated by several glances. The existing levels or surface of ground may often be left much as they are, the removal of a ridge or the formation of a slight bank frequently effecting all that is required. In suburban places an objectionable public road or footpath, or the boundaries of land, can always be concealed by forming a hollow and throwing the earth against a wall, or making a bank. In hilly and undulating districts the best position for a house is on the slope of a hill commanding a valley and another rise: the slope should fall towards a good aspect if possible. Undulating ground is always to be preferred to flat, dead levels, which are more difficult to drain and keep dry. In flat surfaces slightly hollowing-out portions may serve for ornamental sheets of water, or for surface drainage, the excavated earth being placed on the higher parts to form a rounded contour. Such variations should be cautiously made, and never overdone, or an appearance of artifice will result, and the general character of the surface of country lost. Undulations ought never to appear abrupt or of regular outline; but the contour lines should agreeably blend or fall into one another without the slightest angularity or harshness being apparent.† The bottom of depressions should never be gauged, as it were, by planting; they are best left with a grassy surface, the planting being reserved for the sides and swelling of surface. Variety and contrast not too great nor sudden is what the eye requires in forming groundwork. In small, contracted places a raised bank to conceal the fences and thereby the limits of the ground, affords an opportunity for the ready disposal of the surplus earth which may be advantageously removed round the house, effecting at the same time a raised platform for the house, the means of draining the surface, and the appearance of extent.

Although these improvements can be made after the house has been built, it is recommended that the rough groundwork and levels should be formed before the operations of building are commenced, as surplus soil is more readily obtained, and the levels adjusted when the excavations for the basement and foundations of the buildings are being performed. At least, such rough groundwork might be done at this time as forming banks or cutting out the approaches, which may be filled in with the rough stone or old dry material, the finishing and sodding of surface and parts near the house being left. It is desirable also that the operations of draining and trenching, and planting the larger trees and shrubs, should be commenced, thereby affording them time to take root and develop the appearance of the place. In bare, exposed places, when planting is left till the house is finished, a bald and miserable appearance results, which often tends to disgust occupiers or purchasers, besides the inconvenience of such operations being performed after the house is tenanted.

Drainage should be the primary operation in a new place, or continual vexation will be experienced. A damp, sodden soil, always saturated with water, cannot be permeated by even the solar influences, the air cannot penetrate it, and it remains cold and ungenial. Air, warmth, and drainage of stagnant water and gases are as essential to health and growth of plants as to human beings. The extent and nature of the drainage will depend chiefly on the nature of the soil and the kind of surface. A retentive subsoil requires deep drainage, and in flat situations large tiles or pipes. A porous, gravelly, or sandy subsoil, and an undulating surface, requires little or no land drainage, although there are exceptions to this rule. Land drainage tiles are generally used for draining, and where placed not too near plants or trees are effectual. Rubble drains, or trenches cut to fall of ground, and filled with large shingle, or stones, or furze, have been found very useful, and such drainage is inexpensive. Care must be taken to cover the upper part of these drains with grass sods, to prevent the interstitial spaces becoming choked. In steep declivitous ground, as on the side of a hill, it is a good plan to lay a network of such drains or parallel lines of them under the house, such lines of drains being intersected by large cross-drains running on each side of the building and carrying off all soakages, &c. Surface drainage is best effected by regulating the levels and inclinations of the grounds and paths; the water being carried away into the nearest outlet, or dry rubble pits may be provided, or such surplus water may be carried into any ornamental lake.

Walks.—These should be formed with care and taste, and not left to any ordinary workman or gardener, as is generally done, with the idea that it is a matter of little importance what curvature or direction a path should take so long as it answers its end. The most agreeable and pleasing lines or curves are those which seem to naturally take the most direct route, winding their way between objects and groups of trees as if their course were naturally turned by them, not as though every turn had no object but its own deviation. Their width should depend on their use, their length, and the extent of ground. Straight paths should be wider than curved, which may vary from 4ft. to 7ft. in ordinary gardens. Paths should partake generally of the level of the ground following its contour, though sometimes the edges may be rounded up to the grass levels or lawn. Sometimes a winding path may be best concealed from the gaze of the windows, or its object may be for privacy; in this case a depressed level is best. Generally walks should not be made too wide, as the extent of gravelled-surface lessens considerably the apparent size of the grounds. A grassy surface is always more refreshing and size-creating than one intersected or cut up by paths. The prim gardens and lawns seen in front of many suburban villas and cottages are particularly distasteful and paltry owing to the numerous ramifications of paths and the formality of flower-beds, planting, &c., attempted, as if the object the gardener or tenant had in view was to make the most of the limited slice of land. The most convenient seasons for groundwork are the summer and autumn, as the soil is more easily moved and worked than in damper seasons. If the soil be heavy it should be deeply trenched, especially in those portions to be planted. Lawns require a lighter and poorer soil than that for plantations, which should have the upper or richest earth, which may easily be obtained in the formation of paths, &c. The application of manures, lime, soot, ashes, leaves, or other refuse, whether solid or liquid, to the soil is required on stiff, poor, and "hungry" ground. Moule's earth-closet system, or the irrigation of the land with liquid manure can easily be adopted in the country and with little or no expense.

Plantations.—If surface and levels do much to alter a place, plantations do more. Improvers and purchasers of property, as a rule, regard this feature with a comparative indifference. The real value of a well-wooded or planted

* "Landscape Gardening."

† The most pleasing contour is a curve of double flexure, as Hogarth's line of beauty, the convexity merging into the concavity.

place is never sufficiently regarded, for it should be considered that it is easy to cut down and reduce to bareness, but not so to create the shelter and beauty of a well-wooded locality. The growth of a century is needed to clothe a naked site. Shelter should be the first object in planting a new place. It must be judiciously done, not by stiff lines or belts, but by groups interposed without measured precision. Unpleasant quarters and aspects may be thus effectively shut off, and such masses of trees answer in flat countries the purpose and shelter of hills. As a screen to hide objectionable neighbourhoods, cottages, and tenements, they are invaluable. Concealment of boundaries is another use in planting, though this must not be carried to the excess of confining and closing in a place by a close hedge of trees, as is sometimes noticed.

Where old trees and plantations exist great care should be taken in thinning them. It is in this, as Repton says, the landscape-gardener shows his knowledge of pleasing combinations, light and shade, and natural landscape effect. Beauty of outline in foliage and pleasing groupings should never be touched, as when two or three trees form a head, become intermixed and their stems interwoven, but by removing others near them their combined beauty will be enhanced. Sometimes aged thorns, maples, and ash, and other specimens, may be left for similar reasons. As a rule thinning should not be done too evenly, leaving single trees, especially such as have grown together. New additions to old plantations should not be planted separately, or a want of connection will be apparent, an intermixture of old and young being necessary. Sometimes thickets are useful to conceal unsightly buildings and objects, while they form an agreeable variation to more open planting, and may be thinned occasionally.

Evergreens, as a rule, are more desirable in a limited place than deciduous shrubs, though an intermixture of the two kinds are both desirable and more effective, the latter by their brighter spring foliage forming a happy contrast to the duller greens. In old methods of planting the dwarf plants are placed along the edges of beds, the larger and higher growths being kept in the centre; but this is contrary to natural variety. Irregularity, though not a studied diversity, should characterise both the groups and the outlines of the shrubs and plants, round-headed being blended occasionally with trees of an upright or spiry character. Repton, who promoted the only natural system of landscape gardening, objects to indiscriminate mixtures of every kind of trees, and rightly thinks that in a park of extent different kinds of trees may prevail—oak in one place, beech in others, and masses of thorns, hazels, maple, and brushwood of small growth in other parts, thus in some degree giving the natural variety of the forest. From the regular equidistant planting of the Romans, the quincunx and other straight-lined and geometrical figures of later fashion, to the picturesque style of Price, the principle of nature, or "variety," has gradually asserted its power, and we have only to study nature and natural landscape effect to produce that pleasing and happy combination of outline and mass in which she revels. The great art consists not merely in imitating Nature's manner, but her *method*, that there should be some reason for every curve and swell, and every mass of foliage.

In another paper allusion will be made to the architectural character of trees and shrubs, or their relation to style in buildings.

In planting lawns, single specimens may be introduced, omitting groups and assisting their folial outlines, but never dotted about evenly, destroying the breadth of grass, as often seen. These specimens and groups should unite and soften the outlying groups and trees with the more finished accessories and gardenesque character of the house and its precincts. Neither should single plants intercept the views from the principal windows; they should rather sustain them. A house should never be buried by shrubs and trees, but masses of them may be placed to hide particular offices and diminish outwards in figure and density, so as to allow good ranges of view from the principal rooms.

In large places, the more formal style of planting may be adopted; terraces and avenues of shrubs and flowers, and other architectural accessories being employed, to give importance and effect to the building. Geometrical laying-out entails labour and expense, and is not adapted for ordinary villa residences. For gardens and lawns the plants best suited are rhododendrons, azaleas, laurels, juniper, cypress, arbor vitæ, cedars of Lebanon and Deodar, with roses, and other flowering plants. Holly, yew, berberry, Norway maple, and other shrubs, are also good as undergrowth plants, and for filling in between others.

The ornamental specimens should always be protected by evergreen trees and shrubs, which should be first planted thickly; and for the value of shelter the indigenous trees of a place or a wood should be sparingly thinned.

For practical hints and details on planting, and list of suitable trees and shrubs, the reader is referred to two useful manuals, one entitled "How to Lay Out a Small Garden," by Mr. Kemp, and the other, "Hints on Planting Ornamental Trees," by Standish and Noble.

CHRISTIAN ICONOGRAPHY.

THE opening meeting of the second session of St. Paul's Ecclesiological Society was held on Thursday evening, the 18th inst., at St. Paul's Chapter-house, when Mr. George H. Birch, A.R.I.B.A., hon. sec. of the London and Middlesex Archæological Society, read a paper bearing the above title. In his introductory remarks the author showed that, free and untrammelled as iconography might be when applied to domestic refinements or requirements, yet when this art became the handmaid of religion its liberty must be tempered by tradition, and its productions should be ruled by precedent. It was to be regretted that iconography did not in our days receive the attention it deserved either from the designers, or the repairers, or the guardians of our churches. In former days it was carefully considered, so that each part should be the necessary corollary of another, type perfectly answered to antitype, and Christian faith and doctrine were so beautifully blended with architectural forms, mural decoration, and stained glass, that the unity of the idea of conveying lessons to the soul through the medium of the eye was never lost sight of. Where a subject was repeated in the same building it was so depicted and surrounded as to convey a fresh meaning in each case. Instances of a complete disregard of all symbolic significance were but too common in modern work. He had seen a reredos in which, instead of one Agnus Dei, there was a troop of them following one another as an ornamental border; and on the principle that you could not have too much of a good thing, there were sometimes devised a multiplication of crosses or representations of the Crucifixion in the window, on reredos, altar, and frontal. Again, as to windows, the stained glass given at different times were filled with subjects continually repeated, according to the whim of the artists or the donors; one window would have full-sized saints under canopies, and another close by would have microscopic subjects in medallions, in many cases destroying all scale in the architecture. The author entered with considerable minuteness into the ecclesiological question of the lawfulness or otherwise of images, arguing from the commands given to Moses to make cherubim on the mercy-seat, and to set up the brazen serpent, that the Divine prohibition was directed not against likenesses of anything in the heavens above, in the earth beneath, and in the waters under the earth, but against the bowing down to and worshipping of these likenesses. The war of controversy had raged for ages around this subject, but iconography itself was coeval with Christianity. For the earliest forms of iconography now existing, one should go to the Catacombs of Rome and examine them carefully, to see how far they could be relied on as genuine specimens of Early Christian Art. Mr. J. H. Parker, C.B., considered that many of these representations, although very ancient, were not quite so old as had been imagined, but the further excavations by Signor Rossi, M. Desbassayns de Richemont, Dr. Kraus, and Messrs. Northcote and Brownlow carried the date of many of them back by at least two centuries beyond Mr. Parker's assigned date. In these subterranean passages, by the fitful light of the torch, one could trace a complete history of the Bible from the Fall to the Redemption; but there was one subject which pre-eminently claimed first attention from the frequency of its representations, and from the lesson intended to be conveyed. Among the beautiful myths in which primæval truth was interwoven like a thread of gold, one was specially selected to decorate these underground vaults. A painting of Orpheus—who was fabled to have made such divine melody that even animate and inanimate Nature was enthralled—to the heathen spy and to the bands of soldiers sent to explore these recesses, would have conveyed no meaning beyond its ordinary acceptation; but to the initiated Orpheus was here as a type of Christ, the maker and centre of the universe, as St. Clement of Alexandria explained, saying, "He calls us to heaven, and He alone can soften barbarity and tame man, the fiercest of animals." But that there should be no mistake as to who was meant by the Thracian Orpheus, this painting was surrounded by others, such as Daniel in the lions' den, Moses striking the rock, Lazarus coming forth from the tomb, David with the sling, and other subjects referring more particularly to the rest of Paradise. Eros and Psyche, Divine love and the soul of man, was another of the classic myths to which a new meaning was given, as was the Shepherd bearing the lost sheep, or in some cases a goat on his shoulders. In the most ancient of these catacombs, that of Lucina, was a beautiful painting on the ceiling of one of the chambers in which the cross was plainly shown. Its presence might be supposed to be accidental, as it was surrounded by arabesques and winged genii of the ordinary heathen character, if it were not that the representation of the Good Shepherd removed all doubt as to its Christian origin. Passing on to those paintings where sacred subjects appear without any disguise whatever, they might, he said, be divided into the Old and New Testament history, and Christian doctrine and practice. In these catacombs, commencing with the Fall, Adam and Eve are represented, with the Tree, around which is entwined the Arch-enemy; and again, after the Fall, the Slanderer is slinking off triumphantly. Then there are Noah and the Ark, the dove's mission and return; Abraham offering up Isaac, Moses receiving the Law on Sinai and striking the rock, David with his sling, Elijah being taken up to heaven, and Elisha receiving his mantle. Even the Apocrypha is not left out, for there were to be found Tobit and the fish, Susannah as a lamb between two wolves (the name inscribed above the lamb), the Three Children in the fiery furnace, and lastly, Jonah and the gourd; which, as St. Augustine told us, had a special significance to the early Christian Church. To the Gentile converts Jonah was a type of the Jewish proselyte, who thought it not meet that the true faith should be proclaimed to the Gentile. Turning to the New Testament scenes depicted in the catacombs, there were numerous representations of events in the ministry of Christ, but for obvious reasons there were none relating to the Atonement. All the subjects portrayed would have passed muster before the eyes of the enemies of the Faith, who might not have seen in them anything more than the ordinary scenes of every-day life; but any picture of the Atonement must have been a certain method to provoke malice and rage, and to insure the total destruction of the paintings themselves. In style and execution these paintings were rude enough, and yet there was a majestic feeling and quiet dignity pervading them all; and a calmness which might in later times have been equalled, but had never been surpassed. The dresses and adjuncts were those of the every-day life of the period, though the holy personages depicted wore the usual dress, a tunic with the chlamys, adorned sometimes with those narrow stripes of purple cloth called "laticlavi;" none of these were shown with the nimbus. Our Lord was usually depicted as young and beardless; His mother as a dignified matron, wearing a veil on her head descending to the shoulders; the drawing of the nude was often very correct, although perspective was totally ignored. The various paintings were interspersed with symbolic signs, such as the fish, dove, stag, peacock, ox, sheep, and goat, and with mystic flowers, trees, and fountains. Sculpture, another branch of iconography, was also represented during these early ages in the Western Church. Many of the sarcophagi now preserved in the Vatican and Lateran palaces, and notably that of Junius Bassus, to be seen in the crypt of St. Peter's at Rome, were contemporary with the paintings in the catacombs, in which the sculptural groups were very fine. An ancient sarcophagus of white marble, brought originally from the

Vatican cemetery, represented Our Lord standing on the mount from which proceeded the four streams of Paradise; in His left hand He held a roll, and behind Him on the mount stood a lamb with the head surmounted by a Latin cross, and below were on either side three sheep; Our Lord was bearded, but still without the nimbus, and in the attitude of imparting instruction. In another sarcophagus found near St. Lawrence without the Walls, at Rome, our Lord was represented as the Good Shepherd in the midst of His twelve disciples; each figure in this composition was attended by a lamb, and the Shepherd caressed the largest, which bore the attributes of the Agnus Dei. The next division of iconography, dating from the accession of Constantine, must be followed in its development, not in subterranean recesses, but in the stately basilicas of the East and West. No longer was it necessary to conceal a meaning or to veil an idea; Christianity had triumphed, and Art took up the song of triumph, and in glowing colours, on a floating sea of gold mosaic, represented the Divine Majesty, the Pantocrator throned in glory, blessing with His right hand and holding in His left the open book; beautiful, youthful, and majestic, with flowing hair and delicate forked head, the head surrounded with the halo marked with the cross, on which was inscribed "O "ΩN. In the Atonement there was still the song of triumph. He reigned from the tree, crowned, and with regal robes and with arms extended. No physical suffering was depicted, as in later portrayals of the Crucifixion. Below and around the figure of the Pantocrator now first appeared those mysterious forms spoken of by Ezekiel and by John: the angel, the eagle, the lion, and the ox or calf. These, when represented as representing either the Cross or Christ, were invariably placed inversely to the order in which they were generally read; thus the eagle of St. John and the angel of St. Matthew were shown at the top, while the lion of St. Mark and the ox of St. Luke were at the foot. In addition to these, the whole Heavenly hierarchy were now placed on vaults and domes in their ninefold ministry; below these on the wall of the eastern apse were the 12 Apostles, and the whole company of the redeemed extended round the church facing eastward and bearing palms of victory. The Church of the Holy Wisdom at Constantinople possessed to this day its costly mosaic decorations, now hidden by coats of paint and yellow wash, and still there could be traced through all this the faint outline of many a saint or angel, and one would only hope that that ancient Cathedral of the Eastern World would one day be purified from its Mahometan abominations and restored to its original worship. As Christianity became a power in the world, Art kept pace with its advancement, and the employment in churches of painting, mosaic, fresco, and sculpture became general, although from time to time the Iconoclasts exerted every means to check it. With this universal adoption, however, there was, technically speaking, a marked decadence, especially in sculpture. This branch of Art was never adopted by the Orthodox Church in the East, who viewed then and now all sculptured representations with dislike while employing the sister-art of painting largely. In the East subjects were represented to day in exactly the same manner as they were represented thirteen centuries ago. In the beautiful Church of San Vitale, at Ravenna, built A.D. 547, were still to be seen the contemporary mosaics in the tribune or eastern apse. In the vault was our Saviour throned between the archangels, a subject still constantly used in the Eastern Church. On either side were St. Vitalis receiving the crown of martyrdom, and St. Eutichius offering a model of the church, the Saviour with the Twelve, and many sacramental subjects. In the Church of San Apollinare Nuovo in the same city, built also in the sixth century, was a fine collection of contemporary mosaics. Scattered throughout Italy were many other early churches, all preserving their ancient mosaics, and in which the iconography of this period could well be studied, as at Monreale, Palermo, Milan, and especially at Rome. For many centuries iconography still kept pace with the gradual progression of Art. From the 8th to the 11th centuries sculpture began to be more largely used, especially in external decoration of doors and windows, but the theme was still the same, and there was not much departure from recognised types and models. As that glorious period of art, the 13th century, was approached, when architecture, especially in Northern Europe, reached its zenith, the sister-arts of painting and sculpture were in no whit behind. The paramount object proposed was the edification of the faithful and the instruction of the people, so that the unlearned might understand, and have brought home to their minds, through the medium of the eye, holy things which, having never learned to read, they could not discern in writing. In conclusion, Mr. Birch described in detail, illustrating his remarks with numerous large photographs, the sculpture and glass to be found in the Cathedral of Our Lady at Chartres, which he described as a mine of iconographic wealth, and the fairest and stateliest of all the fair and stately cathedrals of sunny France; a church so far fortunate in that neither the iconoclastic fury of the Huguenots, the thinly-veiled scepticism of the 18th century, with its Pagan proclivities, nor the rabid, red Republicanism of the Age of Reason, had been able to eliminate, or even to injure to any great extent, its wondrous art-treasures of sculpture and stained-glass, in both of which the same wondrous story of the Fall and Salvation of Man and the History of the Christian Church were told in eloquent language, and in a tongue that the unlettered rustic could interpret and understand.

MR. RUSKIN ON SNAKES.

LAST Wednesday week the theatre of the London Institution was densely crowded with members and visitors assembled to listen to a lecture by Mr. J. Ruskin, entitled "A Caution to Snakes." Alluding to the fact that Professor Huxley had opened the lectures for the season in that theatre with one on "Snakes," Mr. Ruskin said he trusted the seeming antagonism between himself and that distinguished man, to whose genius as well as to that of Mr. Darwin he paid a high tribute of respect, would not be misunderstood. The subject was appropriate to St Patrick's day. Pointing to his diagrams, he singled out one representing the constellation Draco as enlarged from a common celestial globe, to show the smallness of the assistance hitherto accepted by modern astronomy from modern zoology. Mr. A Severn had drawn the head of the same, giving a general type of modern dragon idealism, with which was contrasted a Greek ideal, being the Lernæan Hydra, drawn by Mr. Ruskin himself from a coin of Phæstus. The lecturer observed that the Greek who struck that coin had seen in mental vision the seven-headed serpent slain by Herakles. The names of the snake tribe in the great languages were then vividly explained and illustrated. In Greek, *ophis* meant the "seeing" creature, especially one that sees all around it; and *drakon*, one that looks well into a thing or person. In Latin, *anguis* was a strangler; *serpens*, the winding creature; *coluber*, the coiling animal. In our own Saxon the "snake" meant the crawling creature; "adder" denoted the groveller. In illustration of the Greek terms Mr. Ruskin remarked that, when he sketched from life the head of the rattlesnake threatening, the creature seemed to be looking at him out of the back of its head. The lecturer then proceeded to speak of the nature of snakes. It was important to know what genus, or, as he would say, gens, and species meant. The former was accordingly defined as meaning race, and the latter as equivalent to family. Between such races and families there were always connecting links, for between even the eagle and the trout the penguin looked like a link, just as the bat was between the swallow and the field-mouse. The genera or races of snakes seemed to be four. There was the lizard which had dropped its legs; the duck which had dropped its wings; the fish which had dropped its fins; lastly, some sort of honeysuckle with a head stuck on. These classes were spoken of in detail. Under the last head Mr. Ruskin referred to snapdragon and other flowers, the analogy between which and snakes had been observed for ages; also to carnivorous plants, to climbers, and to creepers, such as honeysuckle, woodbine, and ivy. The principal diagram was a drawing by Mr. A. Severn of part of Giotto's sculpture of the Creation of Eve, whose danger is foretold by the twining ivy above. Another diagram was a sketch of the cranberry blossom by the lecturer. In concluding, Mr. Ruskin, politely crediting his audience with all such wisdom of the serpent as was desirable, advised them not to eat their meat before tasting it, like the boa which swallowed its blanket. On the other hand, they might do worse than stick to wholesome intellectual food with the tenacity of the same animal, which never lets go its prey until it has enveloped it as in a sack.

CHIPS.

A quay which was being constructed at the extension harbour works at Ray Island, near Dovercourt, now being carried out for the Great Eastern Railway Company, subsided on Friday morning, owing to the failure of the foundation, which is of mud. About 250ft. of the loop line gave way, forcing the mud and made earth behind against the iron screw piles, of which sixty, representing a length of 600ft., were forced outwards. The huge balks and piles were snapped like matchwood, but fortunately no lives were lost; the reconstruction will occupy six months, and the contractor will lose several thousands of pounds by the disaster.

A system of sewerage has just been completed in Settle, Giggleswick, and Langcliffe, for the Settle rural sanitary authority.

Mr. J. H. Roberts has been appointed first assistant to the deputy-surveyor of the New Forest, an office rendered vacant by the death of Mr. W. Reed.

The members of the Oxford Architectural and Historical Society made an excursion to East Hagbourne and Harwell, on Saturday week. The parish-church of East Hagbourne, it was seen, contains many features of interest of various dates, the nave being Transitional Norman, the chancel Early English, the north aisle Decorated, and the south aisle Perpendicular. Thence they went to Harwell, 2½ miles distant, where also the church was visited; it chiefly belongs to the Decorated period, with a few traces of work of the Early English period.

Industrial schools are about to be built near Cockermouth, from the plans and designs of Mr. John A. Cory, of Carlisle, county surveyor for Cumberland.

A stained-glass window was last week placed in the parish-church of Lancaster, in memory of the late Mr. William Storey. The window is in the Perpendicular style, and the subject is the Parable of the Good Samaritan. The work has been executed by Messrs. Shrigley and Hunt, of Lancaster.

The Queen has given permission for the statue of the poet Byron, for which upwards of £3,000 was raised by public subscriptions, to stand within the railed inclosure known as Hamilton-gardens, opposite to the statue of Achilles at Hyde Park-gate.

On Monday afternoon one of several houses situated in Princess-street, Drury-lane, in course of demolition, fell in, and buried four men beneath the *débris*. One of the labourers managed to extricate himself, and a gang of men soon got out two other men, who were only slightly injured. One of the men, however, was killed. His body was recovered at three o'clock. It was identified as that of William Wilton, aged 40 years, lately residing at No. 17, Paul-street, Prussian-street, Shadwell.

Professor Donders, the most distinguished oculist in Holland, delivered, on Friday last, a popular lecture on colour, in the rooms of the Felix Meritis Society at Amsterdam. After an experimental analysis of various popular notions on the subject of his lecture, Professor Donders proceeded to demonstrate that green must be ranked with the primitive colours, like red, blue, and yellow. Green, the Professor argued, could not be produced by mixing pure yellow and blue: such a composition would be white. The green colour apparently derived from the mixture of two paints was, in reality, the result of "subtraction."

Infants' school buildings for 300 children, and mistress's residence are to be commenced immediately at Lambeth, upon a site adjoining the principal street and close to the parish-church, granted for the purpose by the Archbishop of Canterbury. The designs are by Mr. John P. Seddon, architect, of No. 1, Queen Anne's-gate; and the contract for the building has been taken by Messrs. Belham, of 155, Buckingham Palace-road.

The parish-church of Long Marton is about to be restored, from the plans of Mr. J. A. Cory, architect, of Carlisle. The works include the rebuilding of the upper part of tower and erection of a staircase adjoining, the building of a chancel-arch, the removal of a gallery in one of the porches, reseating of the church, and erection o new west gallery, pulpit, reading-desk, Commu nion-table, and a wooden reredos. The estimated cost is £1,800.

The Cathedral Church of Bangor will be re-opened, after restoration from the late Sir Gilbert Scott's plans, on Tuesday, the 11th of May next.

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ILLUSTRATIONS.

MR. R. P. PULLAN'S DESIGN FOR TRURO CATHEDRAL.—ARCHITECTURAL MUSEUM SKETCHES.—DESIGN FOR A COUNTRY PARSONAGE.—BOARD SCHOOL AT GATESHEAD.—PEMBROKE COLLEGE, CAMBRIDGE.

OUR LITHOGRAPHIC ILLUSTRATIONS.

DESIGN FOR TRURO CATHEDRAL.

In the preparation of the accompanying design the main object that has been kept in view—after correctness of style and beauty of proportion—has been the attainment of that height in the arches of the nave which gives the cathedral greater dignity than the parish-church. This has been obtained by the substitution of wooden roofs for groining in the aisles, thus the necessity for a triforium is done away with, and a height of 36ft. gained for the nave arches. The style chosen is that of the plate tracery period, as it is solid and simple, and because it admits of the use of Cornish and Devonshire marble in the detached shafts of the piers and windows, which would not be in keeping had a later style been adopted. I have made the design plain, and without much ornamentation, as I suppose that economy must be studied to a certain extent, and it is always possible, if the shell of a building be of good style and proportion, to decorate it subsequently: for instance, in the present case, by a repetition of the marble shafts (now shown in the choir windows only), in the nave and transept, both internally and externally. This mode of decoration is indicated in the perspective view. A system of proportion suggested by the dimensions of the site has been followed throughout, as I consider that perfect unity and harmony of design can only be attained by some such system. The cost of this cathedral, if executed after the drawings, would be £60,000. The drawings herewith submitted are little more than sketches, as they were executed while I was travelling in Switzerland.

R. Popplewell Pullan.

STALL ELBOWS AND POPPY-HEADS—ROYAL ARCHITECTURAL MUSEUM SKETCHING CLUB.

This club still continues to increase in numbers though none of the members as yet has equalled the drawings which Mr. T. Frederick Pennigton contributes. We give one of this gentleman's sheets of sketches to-day, which comprises some exceedingly good specimens of poppy heads and stall-end elbows from St. Nicholas Chapel, Lynn. The drawings were made from the objects in the Royal Architectural Museum, and were finished in ink on the spot. We shall continue the series as space will permit, and the sketches cannot fail to be much valued by our readers. The Saturday afternoon sketching trip in connection with the club will be resumed in May.

"BUILDING NEWS" DESIGNING CLUB—A COUNTRY PARSONAGE.

The design published to-day for a country parsonage is the one which we selected as the best from those submitted by the members of our Designing Club, and the author's motto is "Alfred." The plan is compact, and the elevation is simple, suitable and good; but there are points of considerable want of judgment in the plan, such as the placing of the dining-room where it is, instead of where the study is arranged. The other objections were pointed out when we reviewed the plans generally. "Edwin's" design made a good second place.

DAY INDUSTRIAL AND INFANTS' SCHOOL, GATESHEAD-ON-TYNE.

It may be interesting to note that this building, which we illustrate to-day, is one of the first of its class which has been erected. Since the passing of the first Education Act, it has been found that in many large towns there exists a class of children which it is impossible to gather into the ordinary board schools. These poor unfortunates—the children of worthless and vagabond parents—constitute a residuum, which was dealt with in the last Education Act. Powers have been conferred upon school boards, authorising them to erect a special class of schools called day industrial schools, intended to occupy an intermediate position between the ordinary penal industrial school and the board schools. The children are fed and accommodated during the day from 6 and 8 in the morning till night, and in addition to the usual school routine are taught some industrial occupation, the older girls being taken into the kitchen and instructed in the arts of housewifery, whilst the older boys are taught the rudiments of useful trades. The new buildings are to accommodate 100 boys and 100 girls, and are two stories high. Upon the ground-floor, centrally placed, is the dining-hall for the children, with separate approaches at opposite ends for the boys and girls. Beyond the dining hall, upon the boys' side, are the boys' lavatories, superintendent's office, bath-room, and other conveniences, together with work-room stone staircase to upper floor, covered playground and offices. Upon the girls' side are situated the kitchens, scullery, pantries, and larders, with bath-room and lavatories, and the girls' stairs. Apart from the main building, a commodious washhouse and laundry, placed in their own yard, are provided. At the girls' end of the building is a small house for the caretaker, at the other end, portion of the site is occupied by an infants' school for 200 infants, consisting of school-room and two class-rooms, and the ordinary conveniences and offices. Upon the first floor is the mixed school with three large class-rooms, masters' and mistresses' private rooms and store-rooms. Red brick is the material employed, with stone dressings and green slated roofs, with stone ridges. The entrances, staircases, and corridors will be fireproof, and various portions used by the children will be heated by hot water. Special care has been taken to secure good lighting and ventilation, as the children will be kept much longer hours than in the ordinary board schools. Mr. Alexander Thompson, of Gateshead, is the general contractor for both schools; Messrs. Abbott and Co. have undertaken the contract for plumbing and gasfitting work; and Messrs. Walker and Emley, of Newcastle, the hot-water engineers. The buildings have been designed by Messrs. Oliver and Leeson, and are being carried out under their superintendence, with Mr. Edington as clerk of works.

PEMBROKE COLLEGE, CAMBRIDGE.

We give an illustration of some of the buildings which Mr. Waterhouse has lately erected for the fellows of Pembroke College, Cambridge. On the left is the hall, a much larger apartment than that which preceded it, though erected on the same site. The old hall, about the demolition of which there was so much controversy, had been so altered by the works of successive restorers that there was literally nothing left of the original fourteenth-century building beyond the core of the walls. The building adjoining contains on the ground-floor a combination room, communicating with the hall, and pleasantly overlooking the garden of the college. An octagon staircase leads to the fellows' rooms above. Beyond is a detached building containing on the first-floor a library, and on the ground-floor a set of lecture-rooms, a muniment-room, and an undergraduates' reading-room, which is separated from the first group by the undergraduates' garden. All these buildings have been erected of brick, with a large admixture of Casterton and Ketton stone.

CHIPS.

Last week, four memorial-stones were laid in connection with the new Wesleyan Chapel now being erected at Fartown, Huddersfield. The building, when completed, will accommodate 850 persons. The cost will be about £4,500. Mr. Arthur Smith, of Huddersfield, is the architect.

The new Infectious Diseases Hospital at Biggleswade has just been taken possession of by the sanitary authority. It consists of three blocks of buildings, viz., wards, administrative block, and offices. The whole have been built in cement-concrete, from drawings made by Mr. J. G. Raynes, architect, 14, Great James-street, Bedford-row, W.C., the contractors being Messrs. Wade and Edey, of St. Neot's.

The Brighouse Local Board on Friday accepted the tender of Mr. R. F. Rogerson, architect, to do all the architect's and surveyor's work required by the Board in the district for the ensuing twelve months; the terms of the contract were not stated.

The Dewsbury and Batley-Carr stations of the new West Riding line of the Great-Northern Railway were opened on Monday week. The entire line, giving through connections between London and Bradford, will be opened on the 1st April.

The Newcastle-on-Tyne School Board, on Friday, appointed Mr. A. J. Johnson architect for the proposed new school at the east end of the borough, with instructions to keep the cost below £6 per scholar.

The bridge over Deptford Creek, on the riverside thoroughfare between Rotherhithe, Deptford, and Greenwich, was opened free from toll on Saturday, with public ceremony, by the members of the Metropolitan Board of Works.

At a meeting of the Essex Church Building Society, held on Monday week, when Mr. Joseph Clarke, the diocesan architect, was present to explans, &c., the following grants were made:—Ardleigh, £50; Birdbrook, £30; Great Chishall, £30; Forest Gate, St. James's, £75; Laindon, £50; Weeley, £50; and Forest Gate, iron church, £10.

An inquiry was held at Chard, Somerset, on Saturday week, before Mr. S. J. Smith, Local Government Board Inspector, with reference to an application from the urban sanitary authority for a loan for drainage purposes. Mr. Canning explained the scheme, and Mr. Whittaker, of London, showed the plans. There were no objections, and the inspector afterwards examined the proposed site of the works.

The Ordnance Survey for Gloucestershire is being re-made by the Royal Engineers. The summit of the tower of Gloucester Cathedral is being fitted up as a temporary observatory, and a shed and flagstaff have made their appearance above the battlements.

At a meeting of the general committee for the rebuilding of Hammersmith Church, held on Friday, the 19th March, Mr. John P. Seddon, of No. 1, Queen Anne's-gate, Westminster, was unanimously appointed architect.

A Local Government Board inquiry was held at Cheltenham on Tuesday week before Mr. J. Thornhill Harrison, C.E., inspector, with reference to applications by the town council for provisional orders for the carrying-out of the widening of New-street and the improvement of Devonshire-street, and for power to borrow £8,000 for the purposes of the Ambrose-street improvement, for which a provisional order was granted last year. The inspector expressed his approval of the proposed improvements.

Works of water-supply have been carried out at Swarthmoor, for the Ulverston rural sanitary authority; Mr. Greenwood, the surveyor to the authority, was the engineer, and Mr. McKenzie the contractor. Works of sewerage are about to be carried out at Flookburgh, at Roosebeck, and at Loppergarth, for the same body, from Mr. Greenwood's plans.

A wrought-iron bridge of 66ft. span is about to be built on screw-piles at Aldermaston, within a mile of the railway station. The designs have been prepared by Mr. Joseph Morris, county bridge surveyor for Berks.

A Fine Arts Society had just been formed at Bury St. Edmunds upon the model of the successful Club at Ipswich; the first exhibition will be held in June next.

A new Primitive Methodist chapel has just been opened at Shoreham; it was built at a cost of £1,300.

LIBRARY
UNIVERSITY



MAURICE B. ADAMS

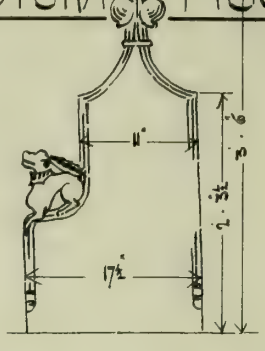
PEMBROKE COLLEGE CAMBRIDGE.

A. WATERHOUSE A.R.A. ARCHITECT

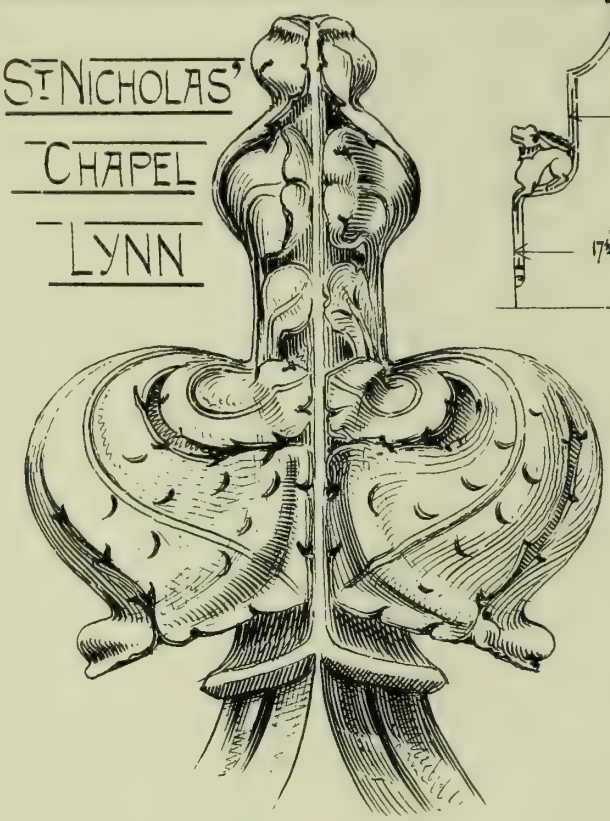
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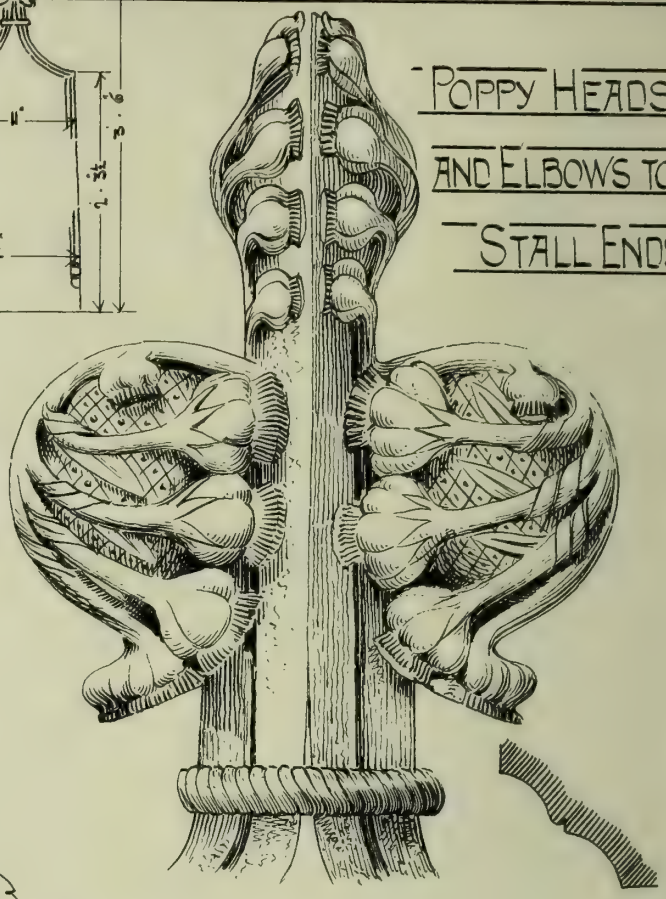
ROYAL ARCHITECTURAL MUSEUM SKETCHING CLUB.

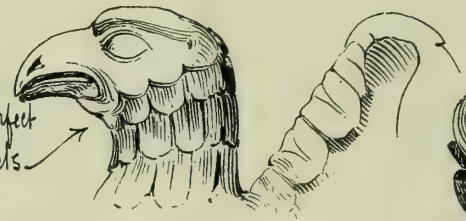
ST. NICHOLAS' CHAPEL LYNN

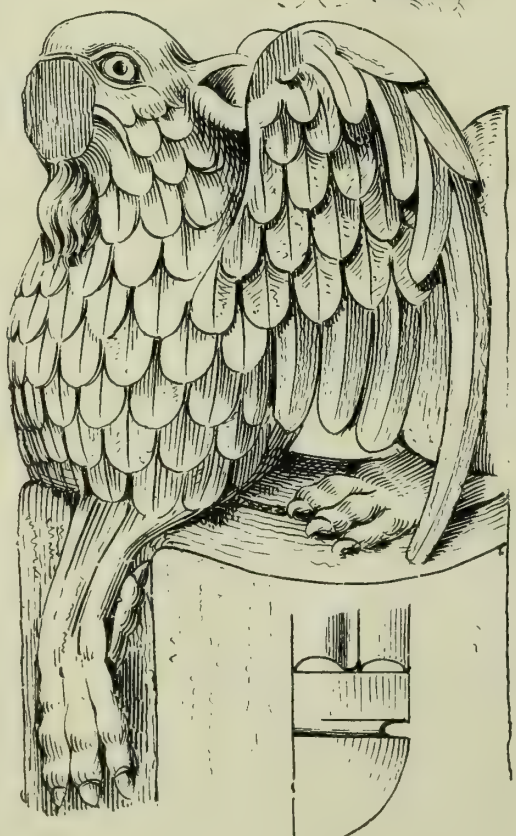


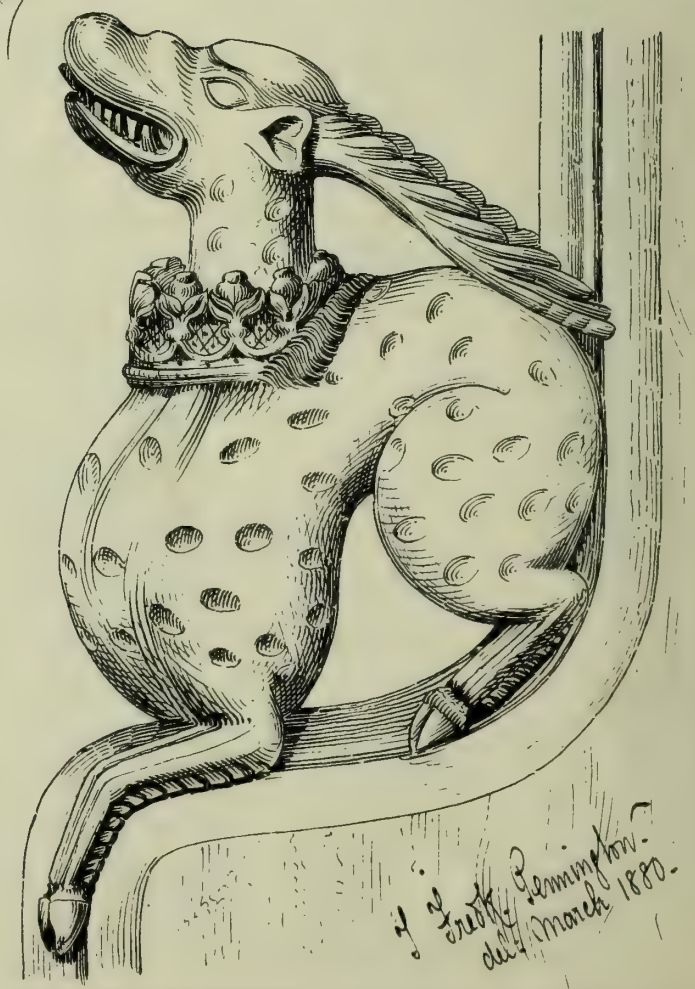
POPPY HEADS AND ELBOWS TO STALL ENDS









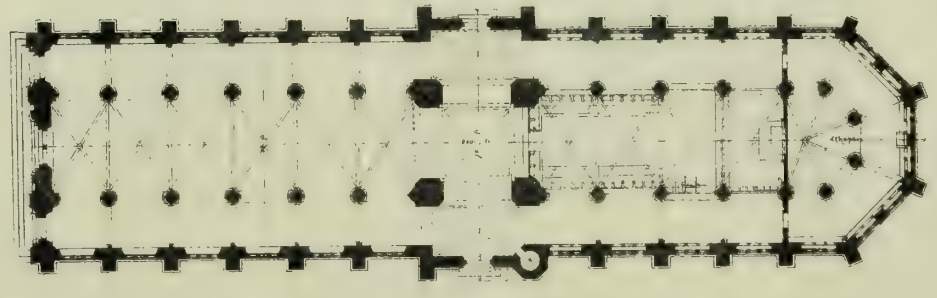


J. Trotter Lemington del. March 1880.

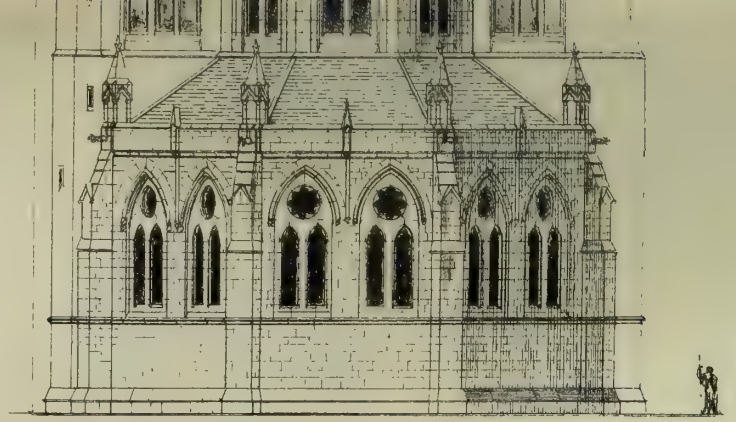
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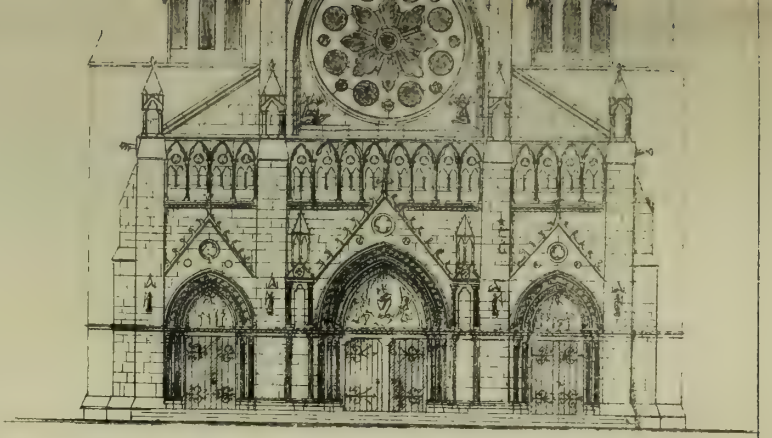
MR R·P·PULLAN'S DESIGN FOR TRURO CATHEDRAL



Ground Plan



East Elevation



West Elevation.

South Elevation.

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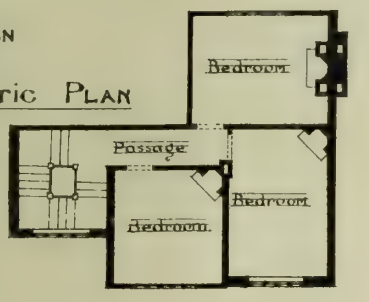
BUILDING NEWS DESIGNING CLUB

DESIGN FOR A COUNTRY PARSONAGE

"ALFRED"

SELECTED DESIGN

ATTIC PLAN





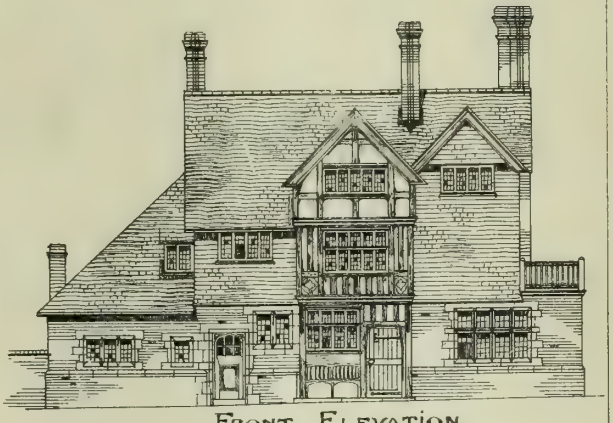
SECTION



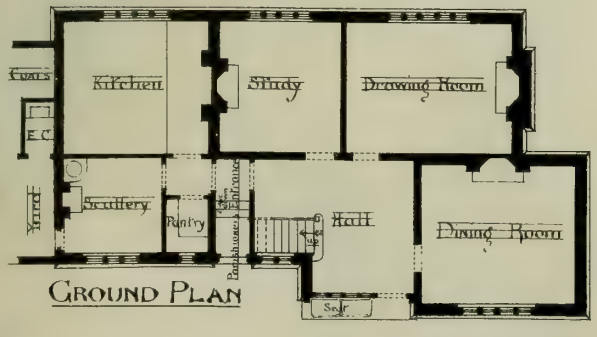
SCALE OF FEET



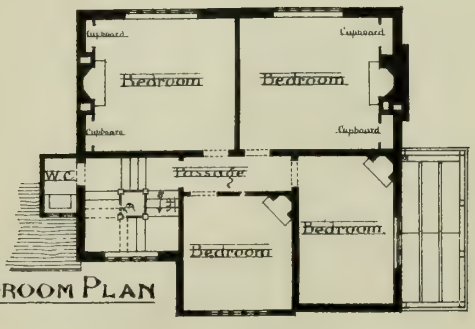
SKETCH



FRONT ELEVATION



GROUND PLAN



BEDROOM PLAN

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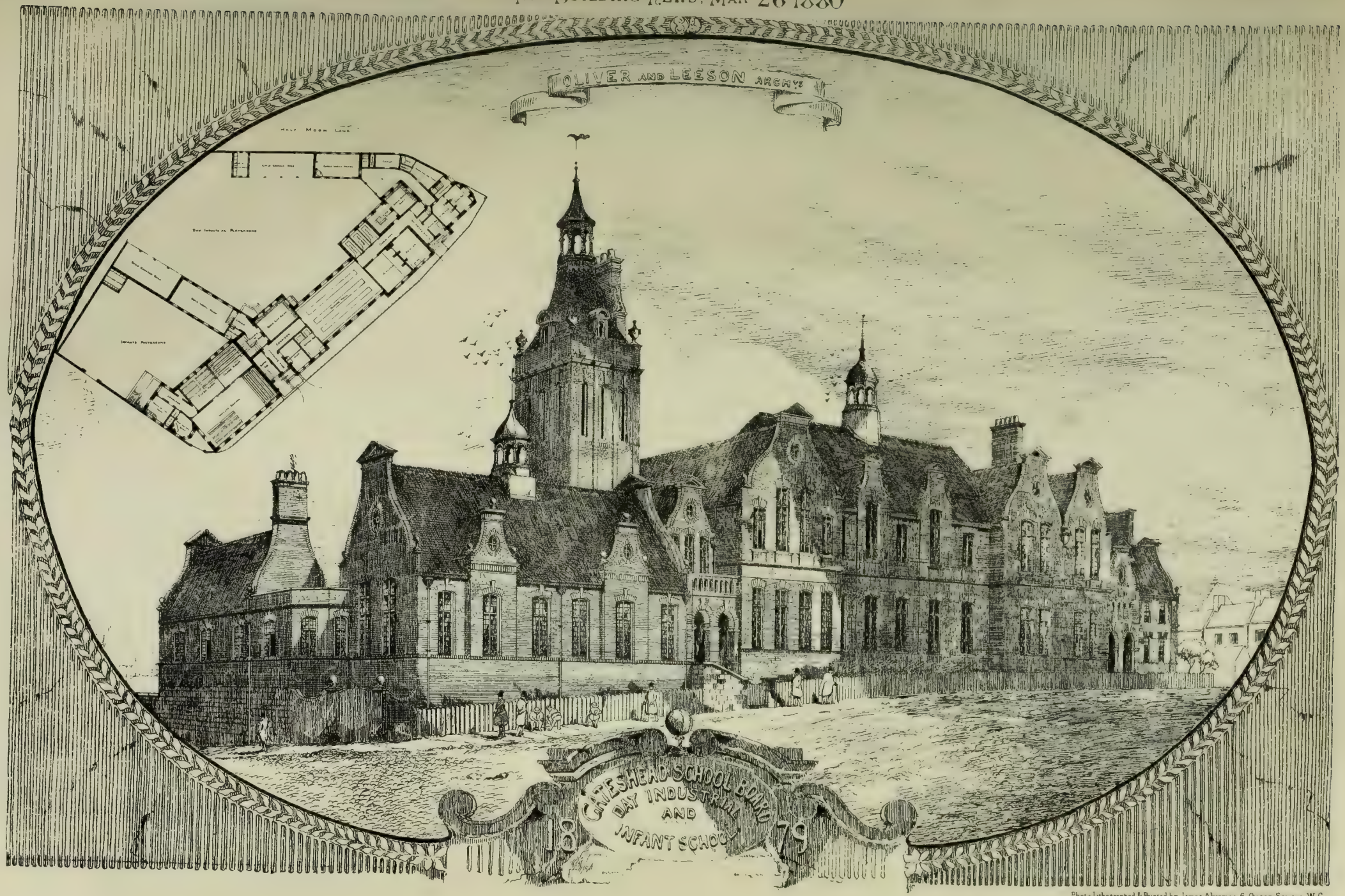


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ENGINEERING GEOLOGY.*

ENGINEERS and architects, from the very nature of their duties, require a knowledge of practical geology. They need to learn so much of the nature and relation of the geological strata as will assist them in the bearing of the different rocks upon practical works. In the right use of materials, the architect ought to know the advantages to be derived from employing certain stones, as he should know the requirements of good foundations and a dry and suitable site for building. Mr. W. Henry Penning, F.G.S., has just brought out a useful summary of geology, in its bearing upon the work of the engineer and architect. The book is, in fact, an expansion of a series of articles that have appeared in our contemporary, the *Engineer*. Mr. Penning treats his subject in something like scientific order. He begins with an account of geological strata, and next proceeds to discuss the methods employed in geological surveys and in making sections, after which, the economics of the subject are considered, such as the practical applications of the different rocks, and their bearing upon springs and water-supply.

The author, in his introduction, truly reflects upon the fruitless and wasteful expenditure of capital in the construction of railway-cuttings, tunnels, and other engineering works, which might have been usefully spent had those who designed them been acquainted with the principles and results of field geology. Such works do not require a knowledge of the pre-historic order of the geological strata in point of time, nor the forms of life deposited in them, but simply rules and methods by which the rudiments of the science, and the nature of the various rocks could be ascertained. Thus in engineering operations there are certain soils, clays, and sands to be avoided in building, others of great importance in the planning of waterworks, and in the construction of sewers. In the 2nd chapter the author gives the following useful information as regards geological formations as shown in maps. "If it be borne in mind that each of the areas thus distinguished represents, as a general rule, the edge and not the surface of a formation, the proper apprehension of such maps is much facilitated. It is evident that were the variously-coloured portion each indicative of an original surface plane, the rocks so depicted would generally be the newest, as overlying those which are hidden beneath. But their edges only being exposed and portrayed on the map, the main planes of bedding must now be either in a vertical position, or inclined from the surface in some direction and the rocks, as a matter of course, must pass in under some of those that are contiguous. Geological maps show that, in this country, by far the larger proportion of the edges, or lines of outcrop, of the rocks, follow a nearly north and south direction; therefore, the beds must dip, if at all, either to the east, or to the west. The general dip of the rocks in these islands, is, on the whole, towards the south-east; consequently, those on the north-west are the oldest, and the lowest in the geological scale; those on the south-east are the highest in the scale, therefore the most modern." After describing the nature and relations of the rocks, the author proceeds to remark upon their practical bearing, Describing the igneous rocks as Granitic, Trappean, and Volcanic, the second great division, the "aqueous," is divided into Argillaceous, as clays; Arenaceous, as sandstones; and Calcareous, as limestones and gravels. These are, of course, the stratified rocks. The character of a country or district gives a good idea of the bedding of the rocks. A list of maps published by Government Geological Survey is appended, with the numbers of the sheets and the price, which will be serviceable to the engineer or architect who may wish to know the rocks of any locality. The kind of rocks may be determined by trial holes, made along a given line of cutting, or railway, but their thickness cannot always be ascertained by this means. "A line of such holes traversing a hill," says the author, "may be almost without exception, in clay, one, or, perhaps, two of them, on the flank of hill, being sunk in hard rock. The inference would probably be that a cutting made through this hill must pass entirely through clay, except at those points where the hard rock was exposed; the reality, that nearly the whole of the work has to be carried on through the harder stratum at a great additional cost." The edge only of the bed may have been touched by the one or two holes, where it comes to the surface, with a narrow outcrop. The author shows that this wrong inference has often happened, and that the engineer may be led by it into serious errors in his calculations as regards cuttings, building materials, and the widths necessary for his cuttings for different "angles of repose," required for various kinds of rocks. In hard rock, the sides of cuttings may be vertical, but in wet clay the angle cannot be greater than 14° to 17°. Knowledge of strata is quite as necessary in tunnelling, where sometimes half the cost might be saved by a slight diversion, and the same may be said of embankments, &c. It is sometimes the case that a railway cutting may be cut in two beds of different character, one a water-bearing sand, and the other a tenacious clay, both dipping at an angle more or less considerable. If precautions are not taken, slips may occur, and this is one of the evils to be guarded against by a knowledge of the relation of rocks to one another. Another element is the cost of material found in a locality, and here the knowledge of geological strata stands the engineer or architect in good stead. Available quarries and lime-kilns might often be opened up to great advantage in growing districts, where building was contemplated. Mr. Penning here gives a succinct account of the different limestones and sandstones, points out their intermediate varieties; some kinds, as the Lower Oolite series, partaking more or less of a different character to that implied by the group name. A table of weight and resistance to crushing is given, and the work of Rankine is largely consulted. Agricultural operations are not overlooked. The soils known as "light," or "heavy," are explained geologically, and those desirable for fattening purposes considered The value of surface-dressing some soils, especially those which have been impoverished by over-cropping, is pointed out. Intimate in relation to the nature of strata, is land-drainage, and the little book of Mr. Penning's indicates clearly the nature of the relationship. Chapter IV enters into the relative position and series of beds, and their bearing upon mining, railway, water-supply, drainage, foundations, and other operations. The author shows the formation of a tunnel through a hill, where the beds dip in a series of concave strata, forming a synclinal hollow; and the necessity of constructing the tunnel to suit the varying pressure of peculiarities of the rocks cut through, and of regulating the gradients, &c., to suit the nature of the faults, or springs, met with. A few useful observations are made upon main-drainage works, foundations, and water-supply. As regards foundations, the writer says "however solid the stratum may apparently be, in which the excavations are made, the calculations as to stability are incomplete, and liable to error—as the works are to unforeseen catastrophe—unless all the relations, as well as the nature of the rocks beneath, have been ascertained, and taken into consideration." The dampness of a locality or a site is a matter of even greater importance to the architect. This condition depends, of course, on the water-bearing beds beneath, and the proximity of the ground-level to the water-line of the district; and it should influence the choice of situation for every building. The relation beeween subsoil and disease is usefully pointed out, and, let us hope, profitably. Part II., the procedure in the field, contains a variety of methods employed in geological surveying, into which we cannot enter. The boundaries of the rocks have to be laid down, and next the angle or "dip" they make with the surface ascertained. The tables for approximate determination of rocks and minerals are particularly full and useful. The field-tests, such as scratching with a knife, and dilute hydrochloric acid, are given, under which are placed the rocks and minerals which can be scratched, and those which effervesce rapidly or slowly, or do not effervesce. A few useful propositions are given in speaking of the mapping out of geological boundaries, such as (1) The boundary-lines of horizontal strata exactly coincide with the contours. (2) The boundary-lines of strata dipping towards a hill are less winding than the contours; and (3) The boundary-lines of strata dipping from a hill are more winding than the contours. Contour lines, as engraved on the 6in. Ordnance maps, are of great value in representing the natural surface and the hills and valleys of a country. The rule for finding the "dip," and a diagram for working it out, are given. Another chapter treats on the levels and filling-in of sections, while in part III. the author deals in a practical manner with the economic products of the different geological formations, and the concluding chapter dwells on building sites, in which many hints are given of special value to the architect. The remarks on selection of site, the relation of elevation above the sea to the mean temperature, and the geological formation of the site are, in the main, well considered, and we recommend Mr. Penning's useful little guide to the student of both professions.

*Engineering Geology. By W. Henry Penning, F.G.S., &c. London: Bailliere, Tindall, and Cox, King William-street, Strand.

OUR COMMON PLACE COLUMN.

MAENHIR OR MENHIR.

AN erection, of Celtic origin, consisting of a long upright stone. The pillar stones are probably of the same origin, and were set up to mark the spot of some remarkable action, as Jacob's pillar, or the grave of a deceased friend. These stones were also set up to mark boundaries, as mentioned in Deuteronomy. The pillar stone was, anciently, a phallic emblem, and Lucian describes two enormous phalli in speaking of the Temple of Surya, at Hierapolis. The Menhir has taken various forms, as the Ortholith, or giant's tooth; parallelith, or stones in parallel lines, circles, &c. (See "Archæologia," XXXI., Brash's work.)

MAHOGANY.

The wood from the West Indies is the hardest and most beautiful in grain, and is called "Spanish mahogany." Hondurus, from the district round the Bay of Honduras, is the commoner kind, but is best for strength and stiffness. The wood, of a golden, or red-brown colour, is of various shades and degrees of hardness; the grain is coarser than that of Spanish. Inferior kinds contain a large number of grey specks. It is durable when kept dry, withstands the dry rot. The market logs are from two to four feet square, and twelve to fourteen feet in length. The varieties known as "veiny" "watered," "bird's-eye," are the most ornamental. Spanish mahogany (from Cuba) is distinguished from Honduras by a white, chalk-like substance which fills its pores. Jarrah, or Australian mahogany, comes from West Australia, and is of a fine, wavy grain, suitable for ornamental purposes.

MAISON DIEU.

This term is literally a God's house, or hospital for sick persons. We may name the following: Maison Dieu at Dover, or Hospital of St. Mary, founded 1201, in King John's reign. The present hall appears to be about Edward I.'s time; it is 127ft. by 30ft. and 40ft. to ridge, and was restored by A. Poynter and W. Burges, in 1859.

MAJOLICA TILES.

In these tiles the colour is applied in the form of an enamel, or coloured, opaque glaze. They are not so durable, therefore, as encaustic tiles. They are made by Messrs. Herbert Minton and Co.

MALACHITE.

Is a mineral, found usually in copper incrustations, which takes a high polish ("Arch. Dict."). It is found largely in the mines of Siberia. In the province of Perm, a seam, 17ft. 6in. long, and 8ft. wide, and 4ft. 6in. high, weighing 50 tons, was found. It is found also at Chessy, in France, Sandlodge in Shetland, Cornwall, and the island of Cuba. Malachite is chiefly used for inlays to cabinets, and other kinds of ornamental furniture.

MANGER.

The fitting in a stable for holding food and water for horses. Modern mangers are often of cast iron, enamelled or galvanised, and divided into three compartments. The upper rack is seldom used in recently-planned stables. In loose boxes, the manger is best placed in the corner. The bottom of a manger should not be placed less than 20in. from the floor. We refer the reader to our designs for stables, given in the "Designing Club."

MANSARD ROOF.

This is really a curb roof, one in which for the purpose of obtaining an additional story the roof is constructed of two slopes, a steep framing of timber resting upon the floor, forming the lower

part, and a low-pitched roof the upper part. The invention has been contested. Some authors say that it was introduced from Italy and used at the Louvre by Lescot about 1550. Krafft, in his work on Carpentry, attributes the improvement to Stierne, but F. Mansart has the merit of being its real inventor, his object having been to give a larger area of flooring. In vaulting, the curb roof became valuable inasmuch as it gave room for the bracketing, and allowed the building to be covered in at a lower level. (See article in "Architectural Dictionary.") In the French Renaissance and Italian styles the Mansard roof is frequently employed, the steeper-sloped faces being relieved by windows or dormers. The student may consult Gwilt's "Encyclopædia," and various examples that have been published in this journal. One peculiarity in the English mode of designing Mansard roofs has been pointed out by a correspondent lately; it is the setting back of the steep slope behind a gutter, the effect of which is to conceal from below a considerable portion of it. The French architects start their steep framing directly from the cornice, and form no gutter and parapet as a rule.

MANSFIELD STONE.

This well-known building-stone is quarried near Mansfield, in Nottinghamshire. It is called, geologically, a siliceous dolomite, and is found in the Permian system between the new red sandstone and the carboniferous series. There are three varieties. The red is considered more durable than the white variety. The red Mansfield is generally uniform in colour and quality; the darkest kind is the best. It can be obtained in blocks from 5 to 6ft. thick. This stone has been used largely in London; we may mention that it was used at the St. Pancras Hotel, at the Albert Memorial, &c. The weight per cubic foot is about 148lb. 10oz., and the labour upon the lower beds is said to be greater than upon the upper ones. White Mansfield has several beds; the top bed has a coarse grain, the second and third beds supply a good fine-grained stone; the lower bed is hardest, and is fit for staircases and paving. The white Mansfield contains less iron, and is therefore whiter in tint; the town-hall, Mansfield, is built with it. The labour is about equal to that on Portland stone, and large blocks may be obtained. The stone of the Mansfield Woodhouse old quarry is of a lower formation, being magnesian limestone, and was reported on favourably by the Commissioners on Building-Stones, 1838, under the name of Bolsover stone. Southwell Minster was built with it. We refer the student to the series of articles that appeared on the subject of "Stones" in the Building News; also to "Notes on Building Construction," Part III., "Architectural Dictionary," &c.

MARBLE.

In scientific language a marble is a pure carbonate of lime, compact and hard enough to take a polish. It is found in all great limestone formations. The veined appearance and colour of marbles is due to metallic oxides and other agencies. In some called "encrinal or shell marbles," the figure is due to embedded fossils, &c. The principal marbles are Brocatella from France, Carrara, from Italy (a white marble, used chiefly for statuary and chimney-pieces), the Giallo Antico, a yellow marble, found largely in ancient works of art, not now found in quarries; Noir Antico, a black marble; Carian (Greece), a cream white, preferred to Carrara for statuary; Rosso Antico (Egypt), a reddish-brown, deep blood-red and veined with white; Rouge Royal (France and Belgium), red and brown, used in this country for chimney-pieces; Sicilian (Italy), a white-like Carrara, used for the Marble Arch; Sienna (Italy), yellow, with veins, and Verde antique (near Genoa and Florence), mottled with light green, dark green, and black—really a serpentine. The best English varieties come from Devonshire of various colours; black and grey from Derbyshire, Purbeck marble from Dorsetshire, and a variety of different coloured marbles come from Ireland, as the Galway (black), dark grey and Sienna from King's County, white from Donegal, red from County Cork. A list of the marble quarries in Great Britain and Ireland is given in "Notes on Building Construction, part III., Materials," published by Rivingtons, from which some of the above information is culled. We may also refer the reader to various articles in the Building News, Vols. XIII., XVIII., &c. Statuary marble is called a saccharine limestone, from its resemblance to loaf-sugar in texture. Breccia marbles are chiefly siliceous. For results of experiments on the strength of marbles, the reader is referred to the sessional paper 1863-64 of the R.I.B.A. In the "Architectural Dictionary," the following mode of taking port wine or other vegetable stains out of marble is given:—"Rub the marble on both side with sand and water so as to remove the polish; then lay it exposed to the atmosphere in a bed of clean wet sand from a quarter to half an inch thick, the sand to surround the marble up to its thickness so as to be level with the upper surface. It is to be sluiced with water two or three times a day until the stains have quite disappeared, which will probably take ten or fifteen days; the marble is then to be repolished. White marble is so very delicate and so easily stained, that great care is requisite in the above process, that the article on which the sand is laid will not impart an additional stain; the best material is new stone of any kind, or new deal boards." Another good recipe is to mix pumice-stone, very finely powdered, into a paste with verjuice, let it stand for two hours, then with a sponge rub it over the marble and allow it to dry, then wash off with clean water and dry with soft linen. Scagliola and Marezzo are imitation marbles; the former has been extensively used, and its great durability and strength, combined with the advantage it possesses for encasing iron pillars, has made it a valuable substitute for real marble. See articles in the Building News.

MARKET CROSS.

These structures are generally of stone, and were erected in market-places for shelter, or otherwise, as observed by Milner, in his "History of Winchester," to "inspire men with a sense of morality and piety amidst the ordinary transactions of life." Examples of market crosses remain at Salisbury, Winchester (recently rebuilt), Malmesbury, Chichester, Coventry, Gloucester, Stourhead, Leighton Buzzard, Cheddar, &c. Many of these are described and illustrated in Britton's "Architectural Antiquities," and some in this journal.

MARQUETRY.

(French, *marquetterie.*) This kind of inlaid work consists of thin plates of ivory, hard and precious woods of different colours, fixed upon a framed ground to represent figures, flowers, and other devices. It is usually employed for ornamental furniture, cabinets, tables, &c. The pattern is sometimes marked by thin lines of silver or ivory let into the wood. (See article in Building News, 1856). According to Hunt's "Tudor Architecture" the custom of inlaying was very general in England at the end of the 16th century, and he mentions that at Hardwick, in Derbyshire (1570), the woodwork in the principal apartments is of oak inlaid with ebony, on the panels and stiles, and the doors of Mary, Queen of Scot's room, as it is called, are decorated with panels of light wood inlaid with profiles of the Cæsars, &c. A. C. Boule and Son were celebrated inlayers.

MEZZANINE.

(Italian *mezzano, Fr., entresol.*) One story of small height introduced between two higher ones, and generally showing on the outside of the edifice ("Arch. Dict."). We refer the reader to a recent article on "Entresol." Constructive necessity gave rise to the mezzazine. The large hall or state room being loftier than other rooms in the Italian palace, necessitated the space over the latter to be occupied usefully, hence the introduction of a low story, which should always be treated as an integral portion of the main story, and not separately, as a distinct external story.

MEZZO-RELIEVO

signifies *half* or *low relief*, and has a similar meaning to *bas-relief.*

MILLS.

For plans and details of mills we may refer the reader to Sir W. Fairbairn's treatise on "Mills and Millwork," reviewed in these pages in 1878. Many plans and sections are given of executed mills, and some remarks on mill architecture. The Saltaire Mill, near Bradford, is described in Fairbairn's "Application of Iron to Building Purposes." Much has to be done to make these buildings architectural; but the best course for the architect is to thoroughly study the practical operations of the particular kind for which a building may be required before he attempts an artistic treatment. It is the neglect of this that has made mill-architecture so complete a failure.

MINSTER.

A term used for large monastic churches. The term is now applied to churches formerly connected with eminent monasteries. We may mention that the name is annexed to Wimborne, Southwell, Ripon, Beverly, Sherborne, Westminster, York, and Lincoln—to the last two by custom. We refer the reader to "Bingham's Origines," and Walcott's "Sacred Archæology," and articles in the B. N. by the last-named gentleman.

MINUTE.

In architecture, this term is applied to the 12th, the 18th, or the 30th, part of a *module* (*q.v.*), the latter being equal to the semi-diameter of the column at its base.

MOAT

Usually means the ditch, or fosse, round a fortification, separated by a bank from the inclosed area. Moated mounds are to be seen at Cambridge, Towcester, Old Sarum, Wilts., Tempsford, Stoney Kirk, Co. Wigton, Glencairn. Strictly, a moat (Lat. *Mota.*) "is a heap or hillock, the *dune* on which a tower was built, forming the original castle, around it grew the fortifications." ("Arch. Dict.")

MODULE.

The module is a measure of proportion used by architects in determining the relative proportions of the various parts of a columnar ordinance. The semi-diameter of the column was sometimes taken to represent the module, and this is usually divided into 30 minutes (vide supra). The whole diameter of column is now generally preferred as a module for proportion. —See Vitruvius, iv. 3.

MOATED HOUSE.

A manor-house, or other large residence, which had a moat round it filled with water. Access was obtained by a drawbridge. Many examples of moated houses remain, as at Beckley (Oxfordshire), Ightham (Kent), Haverill (Essex), and at Great Bealing (Suffolk). The moat continued from the 14th century till Elizabeth's time.

MODULUS OF ELASTICITY.

This term designates a constant number, or the weight required to draw asunder an elastic body, as metal, to a certain length without destroying its elastic power. It is so frequently used in treatises on the strength of materials, that we quote the definition given in the appendix to "Notes on Building Construction":—"A modulus of elasticity is a number representing the ratio of the intensity of stress (of any kind) to the intensity of strain (of any kind) produced by that stress, so long as the elastic limits of the material is not passed. The modulus of tensile elasticity is found by dividing the tensile stress in lbs. per square inch of sectional area by the elongation (produced by that stress) expressed as a fraction of the length of the body. Thus, if a weight of 1 ton hung from an iron bar produce an elongation of 1-12,000th of the length of bar, the modulus of elasticity will be 2,240lb. ÷ 1-12,000 = 26,880,000lb. This is rather lower than the modules of average wrought iron." In most building materials the moduli of tensile and compressive elasticity are practically equal to one another. (See tables, also Rankine's "App. Mechanics.")

PASTORAL STAFF.

Under "Crozier," we directed the reader's attention to the pastoral staff, which is frequently confounded with the former. "In ecclesiastical costume," says Fairholt, in his "Dict. of Art Terms," "the pastoral staff of a bishop or abbot has a crook head. The pastoral staff is delivered to a bishop at his investiture, and borne by him in all solemn functions, as an ensign of his jurisdiction. Its form—that of a shepherd's crook—is an apt emblem of the pastoral care; it is carved at top and pointed at bottom. There is no difference between the form of the pastoral staff used by an abbot and that of a bishop; but the abbot is represented carrying the curved part of his staff turned backwards, to show that his jurisdiction was limited to his monastery. Dr. Lee, in his "Glossary of Liturgical terms," gives the following words as synonymous: Cambuca, Pedum, Crocia, Ferula, Baculus, Pastoralis. (See critical article on the above book in the *Penny Post*, p. 103, 1877.) In the "Industrial Arts," article, "Ivories," we read: "The heads of pastoral staffs and croziers of the middle ages were very often made of ivory; and two examples annexed: one, probably English, and the other French. We see

in the volute of the latter how cleverly the mediæval artist managed to arrange different subjects on the opposite sides; on one is the Crucifixion, on the other the Virgin and Child. In monumental brasses, Fairholt tells us, the staff itself is frequently encircled by a scarf or *vexillum*, the origin of which is probably due to the famous cross-banner of the first Christian emperor, the labarum of Constantine. Consult De Caumont's "Architecture Religieuse," p. 340 and 576; *Penny Post*, p. 249, 1878.

C. F. W.

KNIGHTSBRIDGE BARRACKS.

LAST Saturday afternoon the Architectural Association paid a visit to the new barracks at Knightsbridge, and we took the opportunity of visiting the buildings. Those who remember the miserable, stable-like structures which formerly occupied the site, will be surprised to see in their place, three blocks of palatial appearance and magnitude, and even the well-founded objections raised at first against the appropriation of such a site to barrack accommodation, now appear to lose somewhat of their force. We may briefly describe the arrangement as consisting of two parallel blocks of considerable length, with a parade-ground between; one block faces the Knightsbridge-road, and the other to the park, while a third block, further westward, is appropriated as officers' quarters. The block fronting the Knightsbridge-road is set apart for the married soldiers, and the ordinary offices. It has an imposing appearance externally, faced with a fine red Suffolk brick, pointed with black mortar and relieved by Portland stone dressings. Mr. T. H. Wyatt, the architect, has produced a façade of dignified simplicity, broken in its main length by projecting blocks in the centre and at the extreme ends, these being carried up an additional story and crowned by steep slated roofs. The basement, jointed to represent rusticated work, is a series of segment arches of bold section, while the windows immediately above are plain square-headed openings with broad massive architraves of Portland stone. Above these a series of long narrow windows occur, having architraves and pediments. The stories are divided by horizontal bands of stone, and the main façade is finished with a plain cornice and stone balustrading. In the centre of the façade, between the projecting bays, is an arched entrance of stone, leading to the yard, with pediment over. The monotony of so long a façade is well relieved by the projecting piers or pilasters of rusticated brickwork, which divide the building into bays; these have stone caps under the entablature and are carried up as chimney-shafts above the parapet. We find the front block is made up of a basement for stores, stabling, which form the external podium of the structure, and four stories above. These stories contain the married soldiers' quarters, the orderly-rooms and recreation-rooms, and laundries in the roofs. Each married private has a large sitting-room, about 15ft. square and 14ft. high, a large bedroom, and a scullery. The sitting-room is provided with a cooking-stove, and has two windows; the rooms are well ventilated by air-gratings in the outer walls, and, in fact, each suite of rooms is a complete self-contained dwelling, on the principle of the model flats. Each set of rooms communicates with an exterior balcony on iron cantilevers, with stone paving; and this principle of external communication is also adopted in the other block, instead of internal corridors. A large laundry is obtained on the upper floor, with hot-air closets lighted by louvres of glass. There is also a children's playground, infant and adult school, and each block has its lifts or hoists for baggage. The park block is appropriated to the single troopers, and contains a set of barrack-rooms and dormitories. The dwellings over the stables are cut off from the effluvia of the latter by floors of iron girders and concrete on the Fox and Barrett system, and the sculleries are paved with asphalte. The stables are 17ft. high, there is a broad gangway between the stalls, and ventilation appears to have been attended to. They are paved with patent cement paving, grooved, and the mangers are of iron. The riding-school is a long one-story block in the west side, at right angles to the main blocks, and divides the barrack-yard from the officers' quarters. It is lighted by a glass ridge skylight in the roof; the principals are of iron, and the walls are finished with moulded strings and coloured. The park front brickwork is of deep crimson Hampshire bricks, stocks being used for the internal faces of the blocks overlooking the parade-ground.

The officers' quarters are placed on the extreme west side. They contain a large lofty mess-room of ornamental character; this forms the centre apartment; it is placed crosswise to the block, and has a handsome stone bay window towards the park, and a large circular-headed window in the Knightsbridge front. The block is further adorned on the street side with a pediment carved in stone, while the park front is broken by wings and a centre, and has a cupola over the latter. There is also a billiard and ante-rooms. The interior finishings are plain and durable, but decoration has not been completely ignored. The floors are of oak laid for dancing, and the dormitories have yellow deal doors and wainscoting. The corridors are tiled. The officers' stables form a low-roofed range of buildings on the west. Along the front is a covered passage-way and private entrance for the officers. Mr. Wyatt's designs have been carried out by the contractor, Mr. G. Shaw, under the supervision of Colonel Scott, R.E., commanding, and Captain Wood, R.E., executive officer of the London district. The members of the Association, who assembled in large numbers on the occasion of the visit, were conducted over the building by the civil and military foremen under whose immediate superintendence the work has been executed—Mr. Parnell, foreman to the contractor, and Sergeant Major Snelling. The locks (over 520 in number) were supplied by Mr. James Hill, of Upper Thames-street, E.C., who also furnished all the door-furniture and latches in the racks.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

British Archæological Association.—At the meeting of this society on Wednesday week, Mr. H. S. Cuming in the chair, a paper was read by Mr. T. Morgan, F.S.A. and treasurer, on "A Charter and Grant of Lands in the Kingdom of Mercia during the reign of King Offa." Mr. Morgan drew out many particulars illustrative of the later rule of the Romans in England and of the earlier Saxon times. Mr. G. R. Wright, F.S.A., also read on behalf of Mr. Douglas Lithgow a paper on the orthography of the surname of Shakespeare, which he admitted to be variously spelt by the poet, by his relations, by his contemporaries, and in contemporary registers, though he inclined to accept the longer and more common form as the best authenticated. Mr. E. Loftus Brock reported several interesting discoveries near Wolvesley Palace, Winchester, including some articles of ancient armour, and the foundations of a bridge of Roman or Saxon date; also, near Bury St. Edmunds, the opening of a British barrow, which had probably been used as a "moot" hill. He also reported that in consequence of the representation of the association some tasteless alterations in the Fratry at Carlisle had been abandoned. Mr. W. de Gray Birch announced several presents of books to the library of the society. Among the articles exhibited were some Anglo-Saxon articles of female use found at Canterbury by Mr. Brent, an Abyssinian manuscript of prayers, with illuminations, some Roman pottery and a coin of Domitian found in Southwark by Mr. Way, a Flemish crucifix and painting on copper of the Holy Family of the 16th or 17th century, and some ornamental articles of jade as well as fibulæ, clasps drinking-vessel, and earrings, by various members.

Norfolk and Norwich Archæological Society.—The annual meeting of this Society was held at the Guildhall, Norwich, on Wednesday week, under the presidency of Dean Goulburn. Among the objects exhibited were a curious little terra-cotta or earthenware cradle, with infant, found near the churchyard at Frenze. Mr. Fitch showed a fine early celt of flint found at Plumstead, near Norwich; and a massive gold seal ring, which was picked off the tooth of a harrow in a field at Sale the previous week; the device on the ring consisted of three natural (not heraldic) roses. The annual report of the society showed that there had been a considerable accession of members during the past year, while the financial position was now very strong, the balance at the bank amounting to £424 13s. 1d. The Dean of Norwich (Dr. Goulburn) was unanimously re-elected as president; Mr. Fitch was re-elected as treasurer, and the Rev. C. R. Manning and Mr. R. Fitch as secretaries. A communication was read from the Rev. C. R. Manning, by Mr. G. A. Carthew, relative to a sealed charter of Sir Thomas de Erpingham, respecting property of Lord de Morley. The charter, with the beautiful seals attached, now belonged to the Rev. Mr. Wright, and was handed round to the members for inspection; it bears date 1428. The Rev. W. F. Cremy exhibited a number of rubbings of large brasses in Belgium, which he had copied while on a tour last year. The last paper was then read by Mr. John Gunn, and referred to Bishop Herbert de Losingo's work in Norwich Cathedral.

Sussex Archæological Society.—The annual meeting of this society was held at Castlegate House, Lewes, on Thursday, the 18th inst., with an unusually large attendance. The formal business having been transacted, Mr. Trower, of London, who has occupied the post of Editor of the Society's journal during the past five years, objected to the statement in the report that the funds of the society would not permit of the further issue of this volume, and alleged that the finances were badly managed. If an editorial committee were appointed, he should resign. An animated discussion ensued, the journal being severely criticised, and in the end it was decided to appoint a general committee, and also editorial and finance committees, and by another motion it was resolved to remodel the rules. It was suggested that the form and style of the books should be altered, and that a complete history of the county, the publication of the Sussex dialect in an enlarged form, and the translation and printing of old manuscripts should be considered. The autumnal meeting will be held in August at Boxgrove, which is close to Goodwood and to the ruins of Halnaker House.

COMPETITIONS.

Cardiff.—At a special meeting of the Town Council, on Friday last, the Town-clerk read the resolution passed on the 10th of November, appointing a special committee with power to obtain plans, enter into contracts, negotiate loans, and do all other things necessary for the erection of the proposed free library, museum, and school of art. The committee, he said, met from time to time, and an advertisement was issued to the following effect:—"Proposed Free Library, Museum, and School of Science and Art.—Competitive drawing.—The town council are desirous of receiving plans for the erection of a free library, museum, and school of science and art in the borough of Cardiff. A printed statement of the requirements and conditions of the plan may be obtained from J. Williams, the borough surveyor. A premium of £100 and £50 respectively will be awarded for the best and second best design, according to the conditions." He believed that 104 plans were received in reply to that advertisement. The minutes of the proceedings of the special Free Library Committee were then read. They contained a resolution to the following effect:—"That design No. 32, marked 'Reference,' be awarded the first premium of £100, on the distinct understanding and condition that the author obtain a definite tender and undertaking from a responsible contractor, to be approved and accepted by the council, that the entire buildings shown on the design shall be carried out in a workmanlike manner for the stipulated sum of £8,000; that design No. 50, marked 'Thoughtful,' be awarded the second premium of £50, subject to the same conditions as the first, and that in the event of the party being unable to obtain definite tenders and undertakings, to be approved and accepted by the corporation, that the entire buildings shown on their designs shall be carried out in a workmanlike manner, then the premiums of £100 and £50 shall not be paid to the author who fails to comply with this stipulation, whether for the first or second premiums, or both of them." Ald. Bowen moved that the minutes of the special Free Library Committee be approved and adopted. He said that the committee commenced their labours by offering two premiums, £100 for the best and £50 for the second best drawings or plans. Certain conditions were laid down, a copy of which were supplied to each architect on application. Upwards of 100 sets of drawings were sent in, and the committee held various meetings for the purpose of examining and reducing their number. The

number was first reduced to nine, then to three, and lastly it was resolved that the two plans now before the council be recommended, "Reference" to receive the first premium, and "Thoughtful" the second, with this proviso, that the authors obtain definite tenders and undertakings from a responsible contractor, that the buildings shown on the design be carried out for the stipulated sum of £8,000. He could assure the council that the committee felt the great responsibility imposed upon them, and that in dealing with the competition they had been careful to select the plans most suitable and most in accordance with their instructions. Some of the architects after receiving the first particulars applied for detailed particulars, and so numerous were the letters Mr. Williams received that he determined to draw up a circular giving a reply to the whole of the questions asked. This was done, and those second particulars did not in any way alter or revise the original particulars. Certain letters had been written, but he denied that the committee had confined their attention to the local plans—the committee did not know who were the authors, and he could asssure the council that from first to last they had been anxious to give to every competitor fair-play, and to select the best and most suitable plans. It had been suggested that the plans should have been submitted to some architect to give an opinion as to which was the best. This might be very proper in some cases, but he thought that the committee were themselves quite equal to the task. The committee consisted of the mayor, who was no mean authority with the experience he had had in connection with the docks; then of Mr. Alderman Jones, who was a practical builder; Mr. D. D. Jones, who was also a builder; Mr. Thomas Rees, who was engaged in early life in building, but who, having had a father before him—(laughter)—had retired into private life, and now gave his time to the endeavour to prevent anybody paying twice, except to the school board. (Renewed laughter.) He might add the names of other members of the committee who, though not builders, knew the requirements of the free library, and were competent to give an opinion. Councillor Bird seconded the resolution. He endorsed what Alderman Bowen had said, and added that the committee were sensible of the responsibility and importance of the duties imposed upon them. It was not an easy thing to select two plans from 104, and their labours were not lightened by certain representations which were circulated, and the reason for which they could not understand. He believed that he was correct in saying that the majority of the committee—he did not know whether he could say all the committee—were totally in ignorance as to who the authors of the plans were. For himself he could say that he did not know who the authors were. He did not know who "Reference" represented or who "Thoughtful" represented, and he was quite confident that they did not bring to bear on that matter any prejudice whatever. They did their best to select the best plans, and he thought the council would endorse what they had done. Councillor Trounce: With regard to these supplemental particulars, were they only sent to those who applied for them? Would it not have been better to have sent them to all? Alderman Bowen: There is a misunderstanding on that point. They were not instructions; they were merely replies to letters sent by querists. Councillor Shackell: Would it not have been impossible to have sent them to all? The committee did not know the names of all. Alderman Bowen: It would have been impossible. Alderman Jones urged that the committee were thoroughly honest and impartial in the decision at which they arrived, and pointed out that out of the 104 plans sent in, only nine complied with the condition that the reference library and reading-room, the lending library and librarian's room, and the newspaper and periodical room should be arranged so that the whole might be under the view of the librarian. In some cases the librarian was put in a corner; and under the circumstances they had no difficulty in reducing the number of plans to nine. He could only say that he had no idea of who were the authors of the plans, and in his opinion the best plan was "Reference," and the second best "Thoughtful." Councillor J. Davies had great pleasure in supporting the committee in what they had done. He hoped the proposed building would be an ornament and a credit to the town. The motion was then submitted to the council and carried *nem. dis.* On the motion of Alderman Bowen, seconded by Alderman Evans, it was resolved that the mottoes be opened. The Mayor opened the mottoes and found that "Reference" was the plan of Messrs. James, Seward, and Thomas, Cardiff. Accompanying it was a letter from Mr. C. Burton, contractor, offering to undertake the contract for the sum of £8,000. The authors of "Thoughtful" were Mr. A. S. Ellis, of Westminster Chambers, and Mr. W. Frame, The Parade, Roath, Cardiff. After a short discussion, it was resolved on the motion of Councillor Trounce, seconded by Alderman Evans, that the whole of the plans be exhibited in the Town-hall for a week.

Building Intelligence.

Ardwick.—On Saturday the Bishop of Manchester consecrated the church dedicated to St. Benedict which has been erected at Ardwick. The edifice, including the clergy-houses, &c., cost over £20,000, and which occupies an area of 4,000 square yards, is mostly constructed with common bricks; the arcades, arches, window-jambs, and other features being formed with specially-prepared moulded bricks from designs supplied by the architect. The style adopted is Early Geometric Pointed. The extreme length of the building from east to west is 135ft., by 58ft. wide from north to south. The nave and chancel are respectively 30ft. by 32ft. and 55ft. by 28ft. The aisles are co-extensive with the chancel. The church contains 700 sittings. The building has been erected from designs by Mr. J. S. Crowther, under the superintendence of Mr. E. Dickinson, clerk of the works. The contractors for the whole of the works, except some of the minor fittings, are Messrs. Cordingley and Stopford.

Bristol.—New city police-courts have just been erected in Bridewell-street, from designs supplied from the office of the city surveyor, Mr. Josiah Thomas. The contract was carried out by Messrs. Stephens and Bastow. The building is an application of Greek principles to modern requirements, and is solid and substantial, the only effort at ornamentation being a series of panel-work and carved friezes. The material used for facing is Bath stone relieved with red Mansfield stone. To Bridewell-street a frontage is obtained of 80 feet, and a depth to Silver-street of 184 feet. The principal entrance will be from Bridewell-street, and on passing through the porch and vestibule on the left is the general clerk's office, a fine, lofty, well-ventilated room, 34ft. long by 17ft. wide. Adjoining is a corridor leading to the magistrates' private room, and on the right is the magistrates' clerk's office and ante-room. The general waiting hall is placed upon the right of main corridor, which runs round the building to the back part of the premises in Silver-street, where the general entrance for the public is situated. From this corridor access is obtained to the two courts, to the witnesses' room, waiting-room, and to the solicitors' and second justices' room. The larger of the two courts is 39ft. by 27ft. A second court is reached by a doorway leading from the larger one, and direct communication is established between both courts and the justices' principal retiring-room. Artificial light is obtained by means of ornamental sunburners and the courts are warmed with hot-water pipes. From the bench access is obtained to the principal retiring room of the justices, 19ft. by 19ft., well lighted and ventilated, the walls being painted and ornamented with a dado extending round. The chimney piece is of carved American walnut, and on one side is a bookcase for books of reference. The second justices' room is fitted up in the same style. In the consultation hall a mosaic pavement is being laid down, with the city arms in the centre. A flight of stone stairs communicates with the first floor, and here is a chamber, which may be used either as a committee room or a third court. The basement is divided into two portions, one part being under the control of the magistrates' clerk, and the other under the control of the chief constable. Under the clerk's department are several well-lighted storerooms and offices, and a fireproof strong room. In the other part of the basement are situated cells, capable of containing 200 persons, and in addition there is a large waiting-room and a warders' room. While the new courts were in course of erection it was judged advisable to provide in the Central Police-station for enlarging and ventilating the cells and dormitories and building premises for the fire-brigade. The contract for this was also entrusted to Messrs. Stephens and Bastow, and the works include a residence for the superintendent of the fire-brigade, baths for the firemen, and a laundry fitted with the latest appliances. At the back of the court the new gas-offices are erected, and here also is the principal entrance to the new fire-brigade station. The interior wood fittings of the magistrates' courts, justices' rooms, clerks' offices, and corridors on the ground-floor are of American walnut. The furniture, desks, &c., in the offices are of pitch-pine, and the desks and tables in the courts are made of walnut and ebony. The furniture for the general offices was manufactured by Messrs. Smith and Co., of St. Augustine's-parade; Messrs. Gardiner and Son, of Nelson-street, supplied the grates and gas fittings; and Mr. Hadden, of Bridgwater, the heating apparatus. The furniture in the courts was made by Messrs. Laverton and Co., of Mary-le-Port-street; and the ornamental hammered ironwork by Mr. Harris, of Marsh-street. The furniture and decorations are from designs supplied by the assistant city surveyor, Mr. W. E. Jones, under whose personal supervision the whole of the work has been carried out. The carving was executed by Mr. Sheppard, sculptor, of Paul-street, St. Paul's, who also carved a large figure of Justice over the portico of the principal entrance in Bridewell-street, out of white Portland stone. The figure, which is from an original design of Mr. Sheppard, is intently looking at the small balance suspended in the left hand, while the right hand rests on the hilt of a sword. Mr. Withycombe has been clerk of the works, and Mr. Stacey general foreman.

Church Extension. — The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels held its usual monthly meeting last week. Grants of money were made in aid of:—Building new churches at Biggleswade, Beds, £150; Bryn-Amman, in the parish of Cwm-Amman, near Llanelly, £120; Etchells, in the parish of Stockport St. Thomas, near Cheadle, £80; Stoke Newington St. Andrew, Middlesex, £150; Victor-road, in the parish of Manningham St. Paul, Bradford, £100; and Wild Duck, Four Lanes, in the parish of Carnmenellis, near Redruth, £100; rebuilding the church at Wells St. Nicholas, Norfolk, £200; enlarging or otherwise improving the accommodation in the churches at Headington, near Oxford, £40; Henley-on-Thames, £10; Luton Christ Church, Beds, £25; New Romney, Kent, £50; Seavington St. Mary, near Ilminster, £10; and Monkwearmouth St. Cuthbert, £20. Under urgent circumstances the grant formerly made towards building St. John's Church, Bromley, Kent, was increased from £100 to £150; and that towards enlarging and restoring St. John's Church, Crawley, Sussex, was increased from £40 to £50. Grants were also made from the Special Mission Buildings Fund towards providing mission churches at Chatham-road, St. Michael, in the parish of Battersea, Surrey, £30; Forest Gate, Emmanuel, Essex, £15; and the Navy Mission, East Grinstead, Sussex, £10.

Glasgow.—The quay-wall of the Queen's Dock having been completed, the ceremony of laying the last copestone was performed on Saturday by the Lord Provost of Glasgow at the south-east angle of the dock, and a public dinner took place in the evening. The area of water space in the dock is 33½ acres, the quay space is 27½ acres, and the length of quays and of wallage is 3,342 yards, which, added to the existing accommodation, affords a total quayage of 11,114 yards, or 6½ miles. The works at this dock have cost £1,600,000. The contractor was Mr. John Jackson. The Clyde trustees have secured land on the opposite side of the river sufficient to form a dock larger than the one just opened.

Metropolitan Board of Works.—At this board, on Friday, a recommendation of the Works Committee was approved that an assistant chief officer of the fire-brigade should be appointed. The board refused a certificate to Mr. D'Oyly Carte, with reference to the construction of a new theatre in Beaufort-buildings, Strand, and also declined to approve a plan for the erection of dwellings in flats, on a portion of disused burial-ground, attached to what was formerly Whit-

field's Tabernacle, Tottenham-court-road. A letter was received from the Paddington vestry, stating that road-slop was being very generally used, instead of mortar made of lime and sand, in the construction of new buildings in the parish, and the district surveyor was instructed to enforce the requirements of the by-laws of the board.

Salford.—The guardians of the Salford Union are, this week, taking possession of the new vagrant wards and workshops now completed and built on a plot of land adjoining the workhouse fronting Regent-road. The front and side elevations of the administrative department are faced with bright red stocks relieved with ornamental bands, and other ornamental brickwork, and the doors, windows, and porches have stone dressings. The basement is nearly all above the outside ground line, owing to the rapid fall of the land, and contains heating-cellar, coal-cellar, storerooms, cooking-kitchen, disinfecting-rooms, and three workrooms, under the cells, each forty-five feet long, and twenty-four feet wide. On the ground-floor in the front part of the building is the administrative department. All the floors, except in the administrative department, are laid with cement concrete. The whole building is heated by hot water. Messrs. Armstrong and Dow are the general contractors for the whole of the works, the contract being £4,840. The works have been executed from the designs of Mr. Henry Pinchbeck, architect, 8, King-street, Manchester, and under his supervision.

CHIPS.

At a meeting of the Directors of the Sutton Bridge Dock, held at Peterborough last week, it was determined to proceed with the extension of the dock forthwith. Both the original dock and an extended area of five acres are to be completed in twelve months.

The tender of Mr. James Matcham, of Plymouth, for the erection of a new public hall at Devonport, has been accepted, and the contract signed. The works will be commenced at once.

An inquiry was held at St. Alban's last week, before Mr. J. T. Harrison, C.E., an inspector of the Local Government Board, with reference to an application from the town council for sanction to borrow money in order to carry out the scheme of sewage devised by Mr. Mansergh, C.E. The application was strongly opposed by the owner of the land proposed to be taken, and also by some of the citizens.

The parish-church of Elstow, two miles from Bedford, an edifice intimately connected with the name of the "Dreaming Tinker," is about to be restored. For many years it has been in a bad state of repair, and scarcely fit for public worship. Mr. Jackson is the architect and Mr. Haines, builder, has taken the contract for the work.

A stained-glass window has just been placed in the north aisle of St. Guthlac's Church, Market Deeping, in memory of the late Mr. John Webster. The subject is the "Call of the Infant Samuel."

The Bishop of Truro consecrated on Wednesday week a large piece of ground, which has just been added to the churchyard of St. Martin's, East Looe.

At the last meeting of the Tiverton town council a contract was signed for pipes for the town water works amounting to £1,896; and another for the execution of the works £1,051. Operations have commenced, and must be completed by July 31st.

Mr. William Parsons, at present surveyor of Raumarsh, near Rotherham, was last week unanimously appointed surveyor and inspector of nuisances to the Barnet rural sanitary authority; there were 225 candidates.

In consequence of the unsatisfactory condition of the cathedral clock, the Dean and Chapter of Lincoln have ordered an entirely new one of Messrs. Potts and Sons, of Leeds. The whole expense will be borne by the Dean and Chapter, and Mrs. C. Seely and Mr. N. Clayton have offered two additional bells, costing £100 each, so that the Cambridge quarters may be chimed. The work is to be completed by July next.

An inquiry was held last week at Wirksworth, Derbyshire, before Mr. C. Neale Dalton, an inspector from the Local Government Board, with reference to an application from the Wirksworth local board for power to acquire the undertaking of the water commissioners by transfer, so as to obtain a more adequate supply of water for the district.

The first portion of the church in Upper Orwell-street, Ipswich, consisting of part of the nave and an aisle, is about to be built, a contract having been entered into with Mr. R. Girling for its erection. Mr. Bisshopp, of Ipswich, is the architect.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. Passmore Edwards.

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Front Page Advertisements and Paragraph Advertisements 1s. per line. No front page or paragraph Advertisement inserted for less than 5s.

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Received.—W. B. F.—J. H.—I. S.—J. R. M.—H. L.—W. and H.—Coltishall Reading Rooms.—T. R.—Clapham.—T. H. Baker.—W. M. F.—E. J. T.—T. J. S.—P. J. N.—S. J. N.—S. P.—W. F. L.—G. and P.—J. D. S.—W. W. N.—T. E. C.

James H. Pickard. (Write the secretary of the R.I.B.A., 9, Conduit-street, W.)—N'stle. (If plans only were prepared a charge of 1 per cent. would be a fair charge, including the estimate; but if elevations, sections, and specifications were included, the usual charge is from 1½ per cent.)—Chas. Prond. (The flange strains must be found first. There is no reliable formula for what you require, as the length of cover plates depends mainly upon the net sectional areas across the rivet holes. The middle strain of the girder may be roughly taken to pervade the central 6ft. of the girder, and plates of the length shown would be ample.)

"BUILDING NEWS" DESIGNING CLUB.

List of Subjects.—A. A fire-brigade station for a small country town, consisting of engine-house, hose, and tool room, stabling for two horses, and two rooms for attendants. A paved yard in front for washing, and accommodation for a fire-escape outside. Plans, elevations, and sketch. Scale, ⅛in. to a foot. B. A screen in painted deal for a village church for a chancel 20ft. in width. The height of chancel floor above that of nave to be 3ft., or 5 steps. Scale, 1in. to the foot.

Drawings Received.—Pupil, J., Attempt, No. 90, Binney, B. in three circles, Clansman, Fleur-de-lis, Boz, Our Praises are Our Wages, Edwin.

Correspondence.

THE DESIGNER OF THE ROYAL PALM-HOUSE AT KEW.

To the Editor of the Building News.

Sir,—In reply to the interesting communication on the above subject, in last week's Building News from my friend, Mr. Thomas Drew, of Dublin, I can only say that he has surprised me very much. Having always understood that Mr. Decimus Burton was the author of the Kew Garden palm-house, I wrote him, before writing my recent lecture on Conservatory Building, to ask for the loan of some drawings, in order that I might illustrate my remarks with authentic diagrams. Mr. Burton most kindly lent me an entire set of tracings from the working-drawings which he had by him of the building in question, and as these drawings were all inscribed with his name as architect, I simply on this authority made the statement that he was the author of the work; but this Mr. Drew, on the evidence of Mr. Turner, the builder, now denies. I think it can but be the subject of regret that Mr. Turner should have made this statement so many years after the date of the work, since which time Mr. Burton has always been named as the author of the design, and probably he has a better reason than that accorded to him by Mr. Turner for doing so. Anyway, the credit of the design most certainly should be given to the author of it, whoever he may be.—I am, &c.,

Maurice B. Adams.

Sir,—In reply to the inquiry respecting my knowledge of the designer of the palm-house at Kew, I have no hesitation in saying that every point of Mr. Drew's statement in last week's Building News is correct, and that Mr. Turner was the sole designer.

After Mr. Turner had obtained the approval of the Board of Works to furnish a plan and estimates, I said I hoped he would be able to modify the plan which Mr. Burton had made, and which I had shortly before seen and disapproved of, on account of so many pillars, there not being room between for the proper arranging and growth of the palms. "Oh! yes," said Mr. Turner; "give me a piece of paper, and I will show you what it is going to be." He took the paper, folding it, to make a crease in the middle, then, with a pen, quickly traced a vertical profile of one half of the intended house, on one side of the crease, then, folding the other half of the paper on the inked part, and, on opening it, there was a section of the whole length of the palm-house, as it was afterwards erected, and which proved satisfactory to me as far as the accommodation and growth of the plants were concerned.

Mr. Maurice B. Adams was, therefore, scarcely correct in saying Mr. Burton designed the palm-house at Kew.

Mr. Drew is quite correct in saying that Mr. Turner objected to the site chosen for the palm-house, it being the lowest ground in the parish of Kew, and, although dry in summer, a quagmire in winter, of which I informed Mr. Burton, and that there was water within 8ft. of the surface; but our objection to the site was unheeded, and, since then, it has cost many thousands of pounds in endeavouring to keep the water out of the furnace-rooms, to the risk of extinguishing the fires.

In Mr. Adams' lecture, recently published in your pages, Mr. Maurice Adams gives Mr. Hunt, of the Geological Museum, the credit of suggesting the use of green glass for the palm-house.

To this I may reply that that green glass was used at Kew many years before Mr. Hunt was applied to, and that it was I who first suggested it to Mr. Turner.—I am, &c.,

J. Smith,

(Ex-Curator of the Royal Gardens, Kew).

Park House, Kew, March 20.

FARM PLANS AT DUBLIN.

Sir,—In the present depressed condition of British agriculture, it would be assumed as a matter of course by the public in general that any feature tending to improve the position of the farmer would receive every attention, and individuals who experienced a private loss in endeavouring to do public good would meet with courtesy, at least, from the societies professedly established to render assistance and give advice in all matters pertaining to agriculture.

The Royal Agricultural Society of England, however, at their meeting at Kilburn, last year, disabused that large portion of the public who laboured under this impression by the remarkable manner in which about seventy exhibitors of designs for farm buildings were treated, and which treatment resulted in a large amount of correspondence in the Building News and its

contemporaries relative thereto; but what will be said of the Royal Agricultural Society of Ireland, who advertised for designs for dairy-farm buildings, to be exhibited at the International Dairy Show, at Dublin, in December last, and who, not to be beaten by their bigger brother this side of the Irish Channel, not only refuse replying to inquiries made by exhibitors, asking what have become of their drawings, but make no mention of the competition in their annual report? Nor can a single competitor learn if any award was made, or gain the slightest information on the subject. Perhaps Professor Sheldon, as one of the Judges, or Canon Bagot, as one of the Show-yard Committee, would throw a little light upon the matter.—I am, &c.,

P. T.

CRESSET STONES.

Sir,—In illustration of the cressets of Durham, I may quote from the inventory of Westminster Abbey, which I printed some time since, "ii. standards of latten, and one standard to sett one cruetts of latten." The latter were probably the little cups of oil furnished with wicks, to which Mr. Micklethwaite alludes.—I am, &c.,

Mackenzie E. C. Walcott.

ARCHITECTURAL SCANDALS.

Sir,—Permit me, through your columns, to call the attention of the architectural profession generally to what appeared in the Liverpool press last week.

The Birkenhead Guardians, having determined to enlarge their workhouse, advertised for applications from architects stating the terms on which they would undertake the said work, receiving 26 in reply, as to which the newspapers reported as follows:—

Liverpool Daily Post, March 17th: "Messrs. Bleakley and Murray offered to do the work at 2 per cent., but said nothing as to taking out quantities, whereas Mr. C. O. Francis offered to do everything for 3½ per cent. This offer was therefore accepted"!

The *Liverpool Mercury*, March 17th, said: "Messrs. Bleakley and Murray offered to do the work for 2 per cent., but without quantities; whilst Mr. C. O. Francis's offer was for 3½ per cent., including the quantities. The building committee recommended that the offer of Mr. Francis be accepted."

The *Birkenhead Advertiser*, March 20th, said: "Messrs. Bleakley and Murray offered to do the work for 2 per cent., but said nothing about taking out quantities; whereas Mr. C. O. Francis offered to do everything for 3½ per cent. This offer was therefore accepted."

Taking it for granted that these several reports are correct,—and they have not been questioned—too much publicity cannot be given to such professional delinquency under any circumstances; but what are we to think and do, Mr. Editor, when the head of the firm thus valuing its own abilities (at 1 per cent. each) is—unless he has resigned very lately indeed—an Associate *of the Royal Institute*, and one whose name is rarely to be seen without the A.R.I.B.A. behind it?

All I can say is, unless the Council of the Institute at once purges itself of members who, whilst using its distinctive marks, ignore its rules and discredit their profession, the letters alluded to, even as marks of membership, will soon be looked upon as the veriest of shams, and the Institute itself sink into utter disrepute.—am, &c.,

Architectus.

GLASGOW MUNICIPAL BUILDINGS COMPETITION.

Sir,—The authorities of Glasgow have distinguished themselves where distinction is difficult, by the defective character of the conditions of competition just issued by them. In the mean time, we are bound to suppose that the committee have acted in what they believe to be the interests of the citizens, and that when public opinion has been freely expressed, and when those who are best qualified to advise on such subjects have spoken, the whole matter will be reconsidered, and the conditions modified in such a way as to render possible a successful issue. We are encouraged in this hope by the fact that the conditions are, in some respects, liberal, and we do not believe that the magistrates, when the result of their action is explained to them, are prepared to take upon themselves the responsibility of a disastrous failure.

For the instructions themselves I refer your readers to your advertising columns, and offer a few remarks and suggestions about them. It is stated, in the first place, that architects are invited "to design elevations" towards the streets that bound the site, "and also towards each side of the inner court or quadrangle of the buildings." The next paragraph goes on to say that "plans of the internal arrangements have been designed by Mr. Carrick, city architect (who is not to be a competitor), and copies will be supplied to competitors at his office." Further on the instructions state that "the plan of the internal arrangement may be changed as regards portico, windows, &c., to suit the elevations, but not to such an extent as to interfere materially with the design."

It will be seen from these quotations that architects have a novel task imposed upon them—that of designing a carcase to an important municipal building; they have been asked only to whiten the city architect's sepulchre. I desire to draw the attention of your readers to this matter, and to consider the effect of the proposal on the plan of the building and on its elevation. It will be observed that plans are not invited for the internal arrangements. If we were asked to say what was the principal advantage that has been derived from the competitions for municipal buildings in so many of the leading towns of England, we should reply that it was the development of the art of planning to a point never before reached. Anyone who has studied these competitions will agree that they have elicited plans of the very first order; plans which, in fact, indicate not less of the imaginative faculty, than does the external design of the buildings, and which, to perfect convenience of arrangement, add the qualities of balance, proportion, and the happy combination of structural and decorative features which renders the interior of some of the buildings we refer to a series of sparkling pictures. But, setting aside entirely this quality of artistic planning, I must express a conviction that the chief object of such a competition as the one under review should be to obtain the most perfect arrangement of the different departments of the building that can be produced, and that whatever suggestions the city architect may have to offer to competitors, the latter should be at liberty to adopt them or not, as they think proper. It has been stated that the city architect's plan is not by any means worthy of an experienced architect; but if it were of the most admirable nature, can it be supposed to have attained to the highest summit of perfection, so that our poor finite capacities can conceive of nothing better? I think not. A large hive of public offices is like a great machine, and the perfect working of its complex movements depends entirely upon the arrangement of its parts. The object of a public competition should be to obtain the most perfect arrangement.

It will be seen that the magistrates have determined not to avail themselves of the most important advantage that can be derived from competition. They have adopted a plan which, if our information is correct, is deficient in every quality usually thought necessary in such a building. It may be supposed that a fine exterior, at least, will be produced by such a competition: the discomfort and inconvenience of the interior will be atoned for—to those, at least, who are not to occupy the building—by a magnificent façade. But is such a result probable? Is it even possible? I know what answer will be given to this question by every architect who has been called upon to design a large and complex building of this nature. The plan and the elevation must go hand in hand. It would be impossible and ridiculous to design either of them without the other. It is not a thing to be seriously attempted out of a drawing-school, and if the Glasgow magnates adhere to their conditions they will only cover themselves with ridicule. An elevation got up to fit a plan already adopted may be a very pretty piece of drawing; it is not more practicable than the plan which has been prepared without an elevation.

The paragraph giving the heights of ceilings is a touch of delicate humour. Architects are believed by the committee to be perhaps better qualified to design the building than they are themselves, but not so well able to determine the heights of ceiling. The restrictions as to scale and finish of drawings we consider to be judicious, and such as a committee are well entitled to make. The time allowed is not more than one-half of what it should be. I am informed that the cost named is perfectly understood by the magistrates to be inadequate, and that it is intended to spend at least 30 to 40 per cent. more than the sum mentioned by them. I do not think it necessary to protest against such a preceeding. It condemns itself. Let the point be again carefully considered, and a reasonable sum named and rigidly adhered to, or else let the cost be left to the discretion of competitors, and allow cheapness to take its proper position among the other considerations, which will determine the plan to be adopted. The framers of the conditions have shown a wise liberality in fixing the amount of the three premiums, but in connection with this point we must ask a question. Is there a *bonâ-fide* intention to appoint one of the competing architects to carry out the work? There is a general impression that there is not; and I believe this alone, whether well or ill-founded, is sufficient to shipwreck the entire competition. I cannot entertain the idea that a body of men who have been raised to a position of trust by their fellow-citizens, would propose to themselves to obtain three sets of elevations, drawn to a minute scale, with the intention of handing over these sketches to another architect to carry one of them into execution.

We do not expect a town council to be composed of men of artistic culture; but neither do I suppose them to be devoid of the intelligence of ordinary men of business. I venture to suggest that this matter be made more explicit. Let it be stated that the successful competitor, if duly qualified, will be appointed to carry out his design, and if the other conditions are modified in the direction I have indicated, I am confident that the result will be satisfactory. I do not ask the Town Council to accept my authority for anything I have said; but let them consult with some architect of high position and ability, or let them look for guidance to the towns that have already carried into execution buildings such as that proposed to be built. If, in spite of the remonstrances of those who are entitled to be heard, the conditions are adhered to, with the inevitable result, I should be sorry to occupy the position of men whose names will be associated with such an enduring reproach to the city.—I am, &c.,

A Glasgow Architect.

CHIPS.

On Sunday next (March 28) the Grosvenor Gallery will be open to the public, who will be admitted by free ticket, which may be had from the hon. sec. of the Sunday Society, 9, Conduit-street, W., by those who apply by letter, sending a stamped and addressed envelope for reply.

The fifteenth exhibition of pictures by the Irish Fine Art Society was opened at the galleries in Molesworth-street, Dublin, by the Lord Lieutenant of Ireland, on Tuesday week, and it has thus far been very well attended, a large number of paintings having been sold. The exhibition will close on the 10th April.

The Rev. E. W. Blore, of Trinity College, Cambridge, has presented to Lambeth Palace Library the architectural drawings by his late father, Mr. Edward Blore, F.S.A., from which the palace was restored and enlarged about 1830.

New schools have just been built for the school-board of Seaford, Sussex. Mr. Charles Morling is the contractor.

At Luton new Wesleyan schools to accommodate 1,200 scholars, and to cost £5,250, have just been commenced.

A great landslip, displacing many thousand tons of material, has occurred in the red sandstone cliffs at Dawlish, and the security of the pleasure-ground on the cliffs, recently given by Mr. Lea, M.P., has been endangered. Steps have been taken to secure the other cliffs, by filling the caverns at their foundation with masonry, and by removing the overhanging sandstone at their summit.

A Local Government Board inquiry took place recently at Woodville, Derbyshire, before Major Hector Tulloch, R.E., with reference to an application from the Ashby-de-la-Zouche rural sanitary authority for power compulsorily to acquire land for the proposed sewage works. Mr. Geo. Thompson, the engineer to the sanitary authority, and Mr. S. Heward, sanitary inspector, gave evidence in support of the scheme.

Intercommunication.

QUESTIONS.

[6075.]—**Sketching.**—Will someone kindly give me a list of buildings of interest to the architectural sketcher within a radius of thirty miles round Chester (not including Liverpool and environs), stating in what direction they lie?—Lancelot.

[6076.]—**Protecting Iron from Rust.**—Professor Barff, I think, has invented some method for preventing iron from rusting by coating it in some way. If any of your correspondents can kindly tell me the names of any manufacturers who can apply it, or how I can get any information about it, they would much oblige—Rust.

[6077.]—**Girder.**—I have to insert a girder in front wall of shop to support the upper part of building. The shop is 18ft. wide between party walls, and a 9″ pier on each side reduces span of girder to 16ft. 6in. The walls above will be 20ft. high. Can any reader kindly tell me the weight the girder will have to bear, the joists of 1st, 2nd, and 3rd floors running from back to front, and so coming on girder, and also tell me how he arrives at the weight?—No Name.

[6078.]—**Artificial Asbestos.**—Could any one inform me whether there is a material called "artificial asbestos," used for the purpose of deafening the sound in walls? It is the case of a sitting-room with a kitchen adjoining, separated only by a wall, and the object is to deafen the sound from the latter by some effectual process, which will at the same time detract as little as possible from space. "Artificial asbestos" is spoken of in one of the scientific magazines as most effective for this purpose.—Valentine Fleming, Holbrook, Red-hill, Surrey.

REPLIES.

[6073]—**Mathematical Question R.I.B.A. Exam.**—Let b = the weight of the bricks in lbs., then $44064 - b$ = the weight of the mortar. 1 cubic foot of bricks = 142lb., $\therefore \frac{b}{142}$ = number of cubic feet of bricks, and $\frac{44064 - b}{80}$ = number of cubic feet of mortar. As there are 272¼ sq. ft. in a rod, if we multiply this by 1 1-6 we have the number of cubic ft. in a rod. We then have the equation $\frac{b}{142} + \frac{44064 - b}{80} = 272\frac{1}{4} \times 1\ 1\text{-}6$. This worked out gives b = 42777lb. and a fraction over. Subtract this from 44064 (44064 — 42777), and we have left 1287lb. as the weight of the mortar, therefore bricks weigh 42777lb., mortar weighs 1287lb., 1 rod of brickwork weighs 44064lb.—E. J. A.

[6073.]—**Mathematical Question R.I.B.A. Exam.**—A rod of brickwork 13½in. thick is 272·25ft. super, = to 306·2815 cube, and weighs at 142lb. to a cubic foot 43492lb. It would require 3912 bricks 9 × 4 3-8 × 3 with a ½in. joint, and 38·86ft. cube of solid mortar (no waste). Thus 3912 bricks 267·422ft.

mortar 38·86

306·282

If the mortar weighs 80lb. to a cube foot, the bricks would weigh 151·01. Thus, 267·422 brick 40383·39

38·86 mortar 3108·80

43492·19

—B., Lincoln.

[6073.]—**Mathematical Question R.I.B.A. Exam.**—"Two in a Fix" have made a mistake in what constitutes a rod of brickwork. A rod of brickwork is 272¼ft. super of 14in. work, or 317ft. 504in. cube. If he will take 301ft. 504in. at 142lb. to the cube foot, he will find it weigh 42784lb. brickwork and 16 cubic feet of mortar at 80lb. to the foot, he will find it weigh 1280lb., making a total of 44064lb.—Oliver H. Kenny, Dovercourt.

LEGAL INTELLIGENCE.

An Architect's Commission.—At Yeovil County-court on Thursday, before Mr. T. E. P. Lefroy, judge, the case of Charles Benson, architect v. the Rev. L. H. P. Maurice, rector of Northover, came on for hearing. Plaintiff claimed £22 as commission on building works in connection with the restoration of the parish-church of Northover, and defendant made a counter-claim for £43, the contention being that the work was improperly done. Mr. Watts, solicitor for the plaintiff, suggested that the case should be referred to Mr. Hall, architect, who would be in Yeovil that afternoon; but to this objection was made, as Mr. Hall's object in visiting the town was to confer with plaintiff on another matter. Eventually the case was adjourned for the appointment of an arbitrator.

Claim for Abandoned Plans.—Cork City Record Court, March 22, before Mr. Justice Fitzgerald. Richard G. Champion, jun. v. H. W. O'Donovan and others.—In this case plaintiff, an architect and civil engineer practising in Co. Cork, claimed £139 18s. for work performed for defendants, members of the select vestry of Abbeystrewry Church, near Skibbereen. Mr. Heron, Q.C., for plaintiff, stated that the sum claimed was commission at 2½ per cent. on £3,900, the total cost of repairing the church, for plans, and 1½ per cent. for preparing a bill of quantities. Plaintiff was ordered to prepare the plans in question, and when they had been made he exhibited them at the select vestry, and they were approved, subject to minor alterations. Subsequently it was decided to build a new church, and the plans for restoration—for which plaintiff had been distinctly told he should be paid 3¾ per cent.—were abandoned. Plaintiff was called and proved these facts, adding that he modified the plans to meet the requirements of Mr. Hill, diocesan architect, who then approved them, but that eventually the matter was allowed to remain in abeyance. The defendant O'Donovan had promised to repay him for his trouble. On Monday, when the case was resumed, for the defence it was contended that the plans were expensive, impracticable, and unsuitable, and that Mr. Hill had reported upon them to this effect. Plaintiff, it was asserted, had obtained the plans, for which he claimed over £100, from a clever young man named McSwiney. The jury, in summing up, informed the jury that the skilfulness and experience of plaintiff were not in question. The matters of fact they had to decide were simply whether O'Donovan and other members of the select vestry ordered plaintiff to make the plans for altering the church, and to draw up quantities? Did they or did they not promise him 2½ per cent. for the former work, and 1¼ per cent. for the latter, and did they approve the plans and quantities prepared by plaintiff, subject to minor alterations, or did they reject them? After a short deliberation the jury found a verdict for the plaintiff for £120, and judgment was entered accordingly.

Libel on a Civil Engineer.—The *Nottingham Journal* having libelled Mr. Hawksley, C.E., in an article suggesting that his advice to the Corporation of the Borough as to the purchase of the waterworks was prompted by interested motives, Mr. Hawksley brought an action against the proprietors. They pleaded justification, and paid 40s. into court as sufficient damages should the plaintiff prove his case. On a motion in the Queen's Bench to amend these pleadings, the Lord Chief Justice said the defendants could not rely upon two different forms of defence. They appealed, and on Monday the Lords Justices reversed the judgment of the Queen's Bench.

Powers of a Local Board.—The Queen v. the Sherborne Local Board.—This case, tried last week in the Queen's Bench Division, before the Lord Chief Justice, Mr. Justice Lush, and Mr. Justice Bowen, raised a question of some importance as to the powers of local boards. This was an application to remove into this court proceedings against a gentleman living near Sherborne, on the part of the local board, to recover the expenses they had incurred in making effective the water-closets of certain houses he had built, without, it was said, proper "flushing" apparatus. The board directed a surveyor to inspect the closets, and he reported that they were insufficient for want of a proper flushing apparatus. They then directed the owner to execute the necessary works, and, on his not doing so, directed it to be done, and obtained from the magistrates an order upon him to repay the expenses. The magistrates, without entering into evidence on the question of nuisance, made the order, to remove which into this court with a view to set it aside the present application was made. The grounds upon which the application was urged and supported were that the local board had no power to interfere unless there was a nuisance, or something certain to cause a nuisance, on which the justices should hear evidence, and that in such a case as this, a mere supposed defect in construction or defect of supply of water, there was no power to interfere in this manner. On the other side it was contended that the board had to judge as to the tendency of a thing to produce or cause a nuisance, and that here, upon a proper inquiry and inspection by their officer, the surveyor, they had formed a judgment on which they were entitled to act, and that view in the result prevailed; for, after a protracted argument, the court held that they could not review the discretion of the local board in such a case. It was, they said, entirely for the board to exercise their judgment in the particular case upon the report of their surveyor. They therefore dismissed the application and upheld the order. Judgment for the board; application for a *certiorari* dismissed.

Reredos Case.—In the Ecclesiastical Court, in the Galilee of Durham, before the Chancellor of the Diocese, the Rev. James Barmby, B.D., vicar of Pittington, recently petitioned the Court, praying to be allowed to introduce into the reredos of that church a painting of the Saviour in Majesty in the centre compartment, whilst in the right-hand panel were to be figures of St. Lawrence (to whom the church was dedicated) and the Blessed Virgin, and in the left-hand panel the figures of St. Stephen and St. John. On Friday afternoon a court was held at Durham, when an elaborate judgment was read by Archdeacon Prest, dismissing the petition on the ground that the introduction of the figures into the reredos was calculated to excite superstition.

The George Moore memorial hall at Mealsgate, Carlisle, was opened on Tuesday

Our Office Table.

On Friday, the 19th March, the Association of Municipal and Sanitary Engineers and Surveyors held a district meeting at Dewsbury, in Yorkshire. The proceedings were commenced by Mr. Graham Smith, C.E., secretary, reading a paper by Mr. E. H. Allies, on the Sewerage Disposal of West Derby, near Liverpool. In the paper were given statistics showing that the proceeds from a sewerage farm, when properly managed, may be made to cover its working expenses. Mr. B. C. Cross, borough engineer, Dewsbury, then read a paper dealing with the sewerage scheme now being carried out by that borough. This paper went fully into the subject of the design and construction of the various sewers and works, and other matters relative thereto, such as the population and death-rate of the district. The members then thoroughly inspected the works, and were generally satisfied with the works and the various novelties which have been introduced into their design by Mr. Cross. During the course of the day, the members were taken a trip in a tramcar drawn by one of Messrs. Merryweather's steam tram-engines, and were accompanied by Mr. Gomersall, and Mr. Truswell, the manager of the Tramway Co.

The space in the Museum being limited, and to avoid confusion, admission to the Architectural Museum Lectures, "Caskets of Jewels" series, by Mr. John P. Seddon, F.R.I.B.A., Architect, will hereafter be by tickets, either free or reserved, for which, therefore, early application should be made to the Curator, Mr. Randall Druce, at the Museum, Tufton-street (close to Dean's Yard), Westminster. There can be no admission without payment on the evenings of the lectures, except with tickets; and it is doubtful whether there will be room except for persons previously provided with tickets. Necessarily, first consideration must be given to holders of reserved seat tickets. All profits accruing from the lectures will be devoted to the funds of the Museum, which are in need of assistance. Subscriptions or donations, therefore, to the Museum are earnestly solicited. The subject for the next lecture will be "Oriental Caskets," which will be delivered on Tuesday evening, April 13th, at 8 o'clock p.m. Transferable tickets for reserved seats at 2s. 6d. and 1s., or 12s. 6d. and 5s. for the course.

We have to announce the death of Mr. Josiah Wedgwood, of Leith Hill Place, near Dorking, and formerly of Etruria, who for many years was actively connected with the pottery trade of Staffordshire. He was born on the 12th of January, 1795, nine days after the death of his grandfather, the founder of the house at Etruria. On leaving Edinburgh University, after a tour abroad, he joined his father in business at Etruria. Here he studied mainly the practical and scientific side of of the potter's work. To this he brought a wide knowledge of authorities, an excellent memory for facts (which gained for him the sobriquet of the Walking Encyclopædia), and a good judgment in the use and application of these materials. Thus in the practical part of pottery he attained great success. Blue printing, which was introduced during his connection with the manufacture reached in his hands a greater perfection, approaching more nearly the beauty of tint and of softness of Nankin china, than it has ever attained since. Many of the results of his trials, however, remained stillborn. The revival of the interest in pottery had not begun in his time, and there was not a demand for any of the less common and more difficult productions of the potter's art. His notebook, however, remains an interesting record of his energy and of his love for his art. After some months' illness he died on the 11th of this month, and is buried at Coldharbour.

A movement has been set on foot by the Classical Professors at King's and University Colleges, in conjunction with the Committee of the King's College Lectures to Ladies, to provide for instruction in Greek art, and to utilise the collections in the British Museum with that object. Mr. C. T. Newton, C.B., has undertaken to deliver the first course, consisting of eight lectures on Greek Sculpture and Painting, at the Botanical Theatre, University College, during the months of May and June next, commencing May 5. The lectures will be accompanied by visits to the Museum, and will have special reference to the works of art which can be studied there.

The old metal endorsing stamps, with their faint and blurred impressions, and their greasy and finger-soiling inks, are fast being superseded by the indiarubber stamps more recently introduced. One just sent for notice, by Mr. John Berkeley, of Birmingham, certainly deserves favourable mention, and will be found most useful by architects and others, for attaching names to plans, &c. On any flat surface a clear impression is instantly obtained, which dries rapidly and is ineffaceable. The stamp seems capable of any reasonable amount of fair wear, and the inking pads only need washing now and then to be always fit for use.

Colonel Eugene Frote, who died recently at Berne, in his 51st year, was an architect and engineer of considerable eminence, and one of the most distinguished officers of the Swiss Federal Army, in which he commanded a brigade. He planned the Jena-Berne-Lucerne Railway, and superintended its execution, the Dachsfelden-Delsberg line, and many others, which, owing to the configuration of the country, presented great difficulties, but all of which by his energy and skill he was enabled to overcome. His death at so comparatively early an age is greatly regretted.

Edward Girardet, a Swiss painter of some note, died a few days ago in the house of his brother Paul, an engraver, at Versailles. Edward was born at Neuchâtel, and belonged to a family which has been long connected with art. Edward's first master was his brother Karl; his first studio the Bernese Oberland, where the two lived and wrought together for several years in a sequestered village of that romantic district. Among the paintings that he executed at this time, all well known in Switzerland, are "A Sale by Auction in a Village," "A Dying Peasant Blessing his Family," "A Young Mother Dying in the Snows of the Great St. Bernard," "The Doctor's Visit," and many others. These works won Girardet great renown, and their possession was competed for by all the galleries of the Confederation and by many private collectors; but in the midst of his triumphs he conceived a sudden dislike for his art, and after a year of idleness exchanged the brush for the graving tool. He was as successful in his new vocation as he had been in his old one; his engraving of the "Divicon" of Gleyre is regarded as the gem of the Musée of Lausanne, and his reproduction of the "Banquet des Girondins," and the four plates of Paul Delaroche's "Passion," are masterpieces of art. Girardet was no less admired and respected in France than in the land of his birth, and his merits as an artist were recognised by the bestowal on him of the Cross of the Legion of Honour.

The next series of the Society of Arts' Cantor Lectures will be upon "The Decoration and Furniture of Town Houses,' by Mr. W. Robert Edis, F.S.A. The course will consist of six lectures, commencing April 5, and ending May 10. The first lecture, on April 5, is introductory; the syllabus for it includes the following:—Influence of schools of art on design; fashion in decoration and furniture; modern rooms; truth, fitness, and beauty in decoration; use and suitability in furniture; moral influence; cost of artistic furniture; types of ancient furniture. The subject of the second lecture on April 12, will be:—Floor, wall, and ceiling decoration, treated under the subdivisions of mosaics, tiles, parquetry, external painting, tapestry and stuff hangings, wall papers, various types of wall and ceiling decoration, distemper, stencil work, figure decoration. The third lecture, on April 19, will treat specially of Furniture, ancient and modern; general furniture; constructive furniture, as mantelpieces, fire-places, fenders, closets, lavatories, window-seats. The fourth lecture, on April 26, will be devoted to the entrance-hall, staircase, dining-room, and library, their general treatment, division of wall spaces, examples of treatment, decoration and furnishing. In the fifth lecture, on May 3, the drawing-room and boudoir, bedroom and offices, will come under discussion, their general treatment, colouring and decoration, lacquer work, gilding, furniture and hangings. The sixth and concluding lecture, on March 10, will deal with the general articles of domestic use, including pottery, crockery, glass, plate, gas-fittings, sconces, bronze, brass, and iron-work.

The following preliminary announcement as to papers and visits for the second session has just been issued by Mr. R. Howard Wall, hon. secretary of St. Paul's Ecclesiological Society:—April 6. "Gems of Architecture," by means of photographic illustrations and limelight magic-lantern; Messrs. John P. Seddon and Hugh R. Gough, FF.R.I.B.A. April 10. Visit to St. Paul's Cathedral, to be conducted by Mr. F. C. Penrose, M.A., Surveyor of St. Paul's. April 22. "Gems of Architecture," second course, by Messrs. Seddon and Gough. April 29. "Ecclesiastical Heraldry," Mr. Stephen Tucker, Rouge Croix. May 1. Visit to St. Mary Overy, Mr. Francis T. Dollman, F.R.I.B.A. May 4. "Decorative Period," Mr. Herbert Carpenter, M.R.I.B.A. May 8. Visits to Ely Chapel, Mr. G. Gilbert Scott, M.A., F.S.A., and to Austin Friars, Mr. Geo. H. Birch, M.R.I.B.A. May 27. "Perpendicular Period," Mr. J. D. Sedding, M.R.I.B.A. May 29. Visit to Westminster Abbey, Mr. J. D. Sedding. June 12. Visit to Stone Church, Mr. Hugh R. Gough; and June 26. Day Excursion to Canterbury Cathedral.

The fifth annual business meeting of the members of the Sunday Society, to obtain the opening of Museums and Art Galleries on Sundays, was held on Tuesday, March 23rd, at 9, Conduit-street, W., Professor W. H. Corfield in the chair. The honorary secretary read the annual report, stating that there was the most gratifying evidence of the steady advance which the society was making. The Sunday art exhibitions initiated by the society had been attended with signal success. On each occasion when the society had opened the Grosvenor Gallery on Sundays, the members wishing to attend were so great that it had to be limited by the issue of tickets, and a like satisfactory result had to be recorded in connection with the Loan Exhibition opened on four Sundays in the centre of the City of London. The Parliamentary action during the past year had been in accordance with the policy agreed on in 1877. The principle the society sought to extend had been conceded by the last House of Commons voting money for the expense attending the opening of the museums at Kew, &c., on Sundays. This it was which led them to take the matter before the House of Lords, where they were only defeated by a majority of 8 in the first division. The society had decided to introduce resolutions into both Houses, in the first session of the new Parliament, with a view to continuing the action year by year until the British Museum shall be open to the public on Sunday afternoons. The Criminal Code Bill was being watched by the society. The income during 1879 was £559, and on December 31st there was a balance in hand of £68. The report having been adopted, and a vote of thanks passed to Sir Henry Thompson, the retiring president, the Earl of Dunraven was elected president for the year; Professor Corfield was re-elected chairman of committee, and Mr. Mark H. Judge was re-elected honorary secretary. The Duke of Westminster, Earl Derby, Professor Fawcett, and Mr. P. A. Taylor were those elected as vice-presidents.

CHIPS.

The local board of Oxford propose to present Mr. White, their engineer, with £1,000, in recognition of his services to that city in carrying out the recent drainage scheme, and also to augment his salary from £350 to £450 per annum.

On Wednesday week the "oldest inhabitant" of Chichester, Mrs. Redman, of East-street, in that city, widow of the late Mr. C. Redman, builder, attained her 100th birthday.

The following gentlemen were elected Associate Exhibitors of the Society of Painters in Water-Colours, at their general meeting, held on Monday, the 22nd inst.:—Messrs. T. J. Watson, W. E. Walker, E. A. Waterlow, and Walter Field.

A Constitutional Hall and Clubhouse are about to be built opposite Trinity Church, at Stackstead, near Manchester, for a local Conservative Association, from the designs of Mr. Lawrence Booth, architect, of King-street, Manchester.

In Friday's *Gazette* it is stated that the partnerships hitherto existing between Phelps and Rice, Clapham, S.E., builders, and Hodges and Wildman, Burton-on-Trent, builders, have been dissolved.

In our recent review of Mr. J. H. Watson Buck's "Large Tunnel Shafts" we spoke of the "Treatise on Oblique Bridges" as being by the same author. That work was written by Mr. Buck's father, the late Mr. George Watson Buck, M.Inst.C.E.

A large lecture-hall is being erected at the rear of Hope Baptist Chapel, Canton, near Cardiff. Messrs. Jones Brothers, of Cardiff, have taken the contract at about £2,000.

The Southampton Harbour Board, on Tuesday week, adopted plans and sections prepared by their surveyor, upon lines laid down by Mr. J. W. Deal, the deputy-chairman of the board, for widening the roadway on the Town Quay from the new sea-wall to the angle immediately beyond the Hythe landing-steps. The extreme length of this projected lateral extension is 360ft., with a width of 52ft., to be supported on 150 iron screw piles 11ft. 6in. apart, giving a superficial area of 17,850 cubic feet. The estimated cost of the work, which is to be carried out forthwith, is £4,000. It was reported to the board that 1,320ft. of the 2,000ft. extension of the quay had been completed under the supervision of the surveyor, and it was believed that the whole, with the three landing-stages, would be completed by the beginning of May. Messrs. Green and Burman are the contractors, and the foundation-wall was built by Messrs. Bull and Sons.

A Fine-art Gallery was opened in Ipswich on Saturday week, with the sixth annual exhibition of water and oil-colour paintings by members of the Ipswich Fine Art Club. The building occupies a portion of the plot of land in High-street, recently purchased by the Corporation, as a site for the new Museum and Public Library, and is erected from the designs of Mr. Horace Cheston, of London, who is also the architect of the latter buildings, now in course of erection. The style is Queen Anne, and the materials red Suffolk brick, with Bath dressings, and upon the north side roof is a continuous range of glazed skylights. Messrs. J. F. and B. Bennett, of Ipswich, are the contractors.

The Basingstoke urban sanitary authority have decided, subject to obtaining the sanction of the Local Government Board, to erect an infectious diseases hospital on the site of the old Rest-house and meadow adjoining at a cost of £1,500. Mr. Gibson is the architect.

The Wesleyan Chapel Committee has just issued its 25th annual report, from which it appears that the total amount received from public collections, private subscriptions, and subscriptions from chapel trusts is £9,332, being a decrease on the year of £578. The committee have sanctioned 374 cases of erection and enlargement during the year, at a total cost of £315,000. Amongst them are 114 chapels at a cost of £207,000; 17 ministers' houses, £12,000; 19 schoolrooms, £15,000; 28 organs, £7,500. Of the proposed new chapels, 50 to accommodate 10,155 hearers are to be erected in localities where previously there were no Wesleyan places of worship. The new erections sanctioned during the past 25 years, including chapels, ministers' houses, schoolrooms, organs, &c., number 5,684, involving a cost of £4,967,502.

Canton Schwyz has decided that railway-making comes within the operation of the Federal Factory Law, and the local authorities have forbidden the continuance of work on the St. Gothard line by the Axenstrasse on Sundays and Church festivals without their special permission.

St. Mary's Cathedral, Limerick, was reopened on the 11th inst., after restoration.

Holy Trinity parish-church, Ulverston, is about to be restored, at a cost of £2,500. A faculty was granted last week by the Carlisle Consistory Court for the work, which includes the replacement of the internal fittings with new ones, enlargement of vestry, erection of a western gallery, and the extension of the chancel 17ft. eastward from the present wall, with a width of 27ft. By these alterations the sittings will be reduced from 965 to 700 in number.

A Board of Trade inquiry was held at Carlisle on Tuesday week, before Major-General Hutchinson, respecting a series of tramways proposed to be laid in the streets of Carlisle by Messrs. Ridley and Co. Objections had been made by residents that some of the streets were too narrow, and these sections the promoters offered to abandon, but the Town Council considered that either the whole scheme should be carried out or dropped.

At a special meeting of the Governors of Worthing Infirmary, held on the 18th inst., it was decided to build a new infirmary and dispensary on a fresh site, at an estimated cost of £3,300. A committee was appointed to view sites and to take all preliminary steps.

Holloway's well-known and highly-esteemed Pills put the power of removing his infirmity within the grasp of every invalid. Martyrs to indigestion, who are daily becoming weaker and worse, may make themselves stout and strong by taking these medicines in the doses plainly indicated in their accompanying directions.

Lamplough's Pyretic Saline is refreshing, most agreeable, and the preventive of FEVERS, BILIOUSNESS, SMALL POX, SKIN DISEASES, and many other spring and summer ailments. Sold by chemists throughout the world, and the Maker, 113, Holborn Hill. *Use no substitute.*—Advt.

THE BUILDING NEWS.

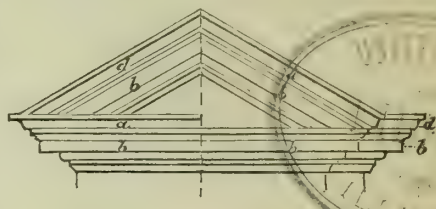
LONDON, FRIDAY, APRIL 2, 1880.

THE PEDIMENT.

ONE of the Classical features which has been turned into account of late by the disciples of the Queen Anne school is the pediment, though of course the mode adopted of using it is sometimes anything but correct, and certainly not Classical. How it ever came to be stuck on house-fronts in any position, cut in half, or broken at the apex, as a mere ornament, is a question into which we need not enter. Like other architectural features with a constructive origin, it has degenerated sadly since the days it formed the crowning composition of the octastyle Temple of Minerva at Athens. In the great Greek temples it simply served the office of a gable; in the Roman architecture it still fulfilled that office, but less truthfully, and became more of an ornament than a necessity of construction; while during the Renaissance its primitive purpose had so far disappeared that it sank into the character of a mere disguise, masking by its presence the fronts of buildings as an ornamental accessory. We are not, however, inclined to go so far as to say that, because the pediment has lost its structural expression, it ought not to be used in a decorative sense; if we did, we might go on and strike out of our vocabulary of architectural features the columnar ordinance itself, the buttresses, pinnacles, and parapets of Gothic architecture, and a host of other details, the original objects of which have partly ceased to exist. We are not purists enough to contend that every ornament should be rejected which has come to be applied in a different place from that which it formerly occupied. Even as superficial ornament, the pediment has an architectural meaning; it breaks and varies the horizontal lines of buildings; it imparts, by the principle of association, in its angular lines, an appearance of strength and vigour to the composition; and it serves to emphasise the prominent parts of a building. Even the pediment to the façade of St. Peter's at Rome, feeble and unsatisfactory as that front is, marks the central entrance to the basilica. The Mansion House façade and the river front of Greenwich Hospital show a similar treatment of the pediment; in all those cases it is subordinate to the ruling lines of the front, a lofty attic forming the background, against which it appears merely as a screen. The west pediment above the portico to St. Paul's cathedral retains this feature as a crowning termination, it also expresses the roof to which it is attached. In the river façade to Somerset House the three pediments also crown the porticos or open loggias, though they are essentially decorative, and intended to break up the long lines of the façade. We only allude to these typical instances to show how the Italian revivalists endeavoured to retain and make the most use of the feature as a decorative adjunct to their buildings. The 18th-century architects always used the pediment to give expression to an entrance, to crown a portico, or to pronounce a wing. We need only refer to such examples as the park fronts of Castle Howard and Holkam House to show how it was used in large residences, without pointing to the buildings as deserving of imitation. Let us go back to the source of the inspiration. The cinque-centists of Italy, extreme mannerists as they were, were content with piling order upon order and making the fronts of their buildings screens of more or less Roman pretensions; they used circular and twisted pediments, broken to suit their projecting columns or pilasters, and their compositions were often mere frontispieces to the buildings they adorned. Regarding pediments in particular, every conceivable shape was introduced by the cinque-cento architects; their application in some countries was not governed by any rule: they were sometimes composed of scrolls and busts, and enriched by festoons; placed one within another; no proportions were followed, though, according to the Italo-Vitruvian school, there is a rule that fixed the height of a pediment at from one-fourth to one-fifth the length of its base. In illustration of this taste, if we turn to the Elizabethan and other varieties of Renaissance in England, France, and Belgium, we find it soon becoming a purely decorative feature. It accordingly held a less prominent position, but was combined grotesquely with many of the details of Gothic, as we see it introduced in Wollaton House, Clare and Caius Colleges, Cambridge, and Charlton in Wiltshire. In a much more appropriate manner and less offensive to good taste, it appears in the chateaux of the reign of Francis I; although in many of the buildings of the reign of Henry IV. we find it assuming all kinds of fantastic shapes, the circular alternated with triangular forms; under the dominion of the Grand Monarque the feature regained somewhat of its propriety and soberness, till we see it in the style of the Empire once more pure and correct.

In the domestic architecture of Belgium the pediment was treated in the most diverse and grotesque manner. In the quaint old Flemish cities of Ghent and Bruges the most playful outlines are seen, in which the pediment plays a conspicuous part. We find it exterminating the summits of broken gables, or cut into two parts to adorn dormers or brick fronts. Thus, from the earliest times to the most recent revival of Stuart taste, it has, according to the law of the "survival of the fittest," become a recognised feature, either used as a crowning member, as a mode of pronouncing the principal parts of buildings, or employed as a subordinate decorative wall-relief, as in the examples named. It is not confined to exterior gables, but has been employed by the Italian revivalists, particularly as a crowning to openings of doorways and windows. We know the many forms it has taken for the latter purpose: triangular, curved, scrolled, broken by pedestals for busts, and in various other ways. The mobile fancy of the Jacobean architects turned it into a feature of considerable picturesqueness, and our modern architects have availed themselves of a device which can be so readily turned to decorative account. We may, however, make reasonable protest against its use by certain architects of the Queen Anne school, who apply the broken pediment as a decoration in a lavish, and rather meaningless, way. In their hands, the feature is parodied by its application to insignificant objects; it is twisted and contorted to adorn the tops of tablets, niches, and small openings in chimney-stacks and gables. What meaning has a pediment at the bottom of an external chimney-projection? Not a few buildings that have been erected show it introduced at the first-floor level, a chimney-stack springing out of the raking mouldings. Either the idea is that the chimney so built rests upon the pediment—a sufficiently absurd idea to be at once rejected—or that the projection penetrates that feature, which is introduced to break the vertical lines of the shaft. Taking a few random instances of its recent application, we may mention Southport Glaciarium, where it has been used in a series of dormers (p. 90, BUILDING NEWS, Vol. XXXVI.); the Glasgow Bank; in Mr. Colcutt's houses at Wandsworth, illustrated in the same volume. In Mr. Norman Shaw's houses in Cadogan-square, Chelsea, we find a variety of treatments in the more picturesque manner, though scarcely examples to follow. Equally quaint and picturesque is the manner it has been introduced at the houses at Pinner and Streatham (see Vol. XXXVII., p. 8) by Messrs. George and Peto. We cannot commend the practice of introducing pediments over every small and insignificant feature or aperture, for capping little ornaments at the ends of chimney-stacks, of piling it over arches in a rather uncomfortable way, or breaking it in the centre as we might instance in innumerable cases, though even these whimsicalities may be sanctioned by old examples.

We may next draw attention to two modes in which the pediment has been used by architects of the revived schools, without convicting one class of authors of improperly—not to say ignorantly—using a feature they do not understand. A very usual mode of designing a pediment is that shown in our diagram (the left hand), in which the



raking cornices or members are cut off by the horizontal cornice, the latter having its full complement of mouldings, as shown by the letters *a*, *b*. We find no objection with this method of designing a pediment, provided the angle or pitch of the raking cornices are steep, and form an angle of 45° or more with the base, as in this case the upper cymatium cannot be well returned at the end. But we find the same principle is often adopted by the Jacobean school, when the angle of the pediment is much flatter, the effect being a heavy and clumsy aggroupment of mouldings, especially in small decorative pediments over doors and cabinets. Those who design their pediments in this way appear to forget or ignore the Classical rule of composition, and they commit an architectural pleonasm, the less excusable when the feature is thrust upon our notice so often as we see it in buildings of the fashionable style. We scarcely need to enumerate instances. The right-hand half of our diagram shows the correct manner of designing, as followed by all the best masters of the style, the upper "cyma" *a* of the horizontal cornice being omitted across the pediment. Our remark applies with equal force to scrolled, curvilinear, and every form of ornamental pediment. The shouldered form is frequently to be preferred to the plain angular springing for dormers and small coverings, and, with regard to the broken apex, we think it is more architecturally applied in cramped situations and to subordinate features. High pediments require ornament to fill up their tympana, and it is for the architect to consider that his unbridled fancy in reversing these plain dictates of common-sense is setting up innumerable crotchets which must readily yield to the analytic and critical spirit of our age.

GRANITE PAVING SETTS, AND "BIG BLASTS."

THE geology of a district has great influence on the character of the paving of its roads and streets. Great cities, like

London, Paris, and Berlin, are dependent on external supplies for the means of rendering their streets convenient and comfortable to their populations. Until increasing trade and commerce demanded passable roads for the traffic which they created, little attention was paid to the subject. The Romans—those grand old engineers—it is true, organised a system of road-making which even the most advanced modern science hardly excels. The object of these roads, however, was not to facilitate or encourage industry, but to secure the speedy and uninterrupted passage of the armed host bent on its course of dominion and conquest.

The great city of London, with its teeming population aggregated in a comparatively narrow circle, and, in its natural expansion, producing an increase of seven miles of new streets in the year, offers the best experimental ground for new schemes of paving. It may be said that every geological formation has been ransacked for novelties to render the streets of so populous a centre comfortable, and although, during the last thirty years, every kind of paving has been tried, no final or satisfactory result has been reached. Wood, iron, stone, and asphalte, in all their varieties and shapes, have been tried, and still the question of paving is an open one. The forty-nine vestries, or so, which govern the metropolis, in the paving direction, at least, cannot, and, we suppose, never will, agree on the exact kind of paving which will meet the wants of the great traffic of London streets. Possibly, when the three-thousand-man-power of London Vestrydom is concentrated in a competent dictator, we shall then have solved the now complicated problem, and be content.

Granite, from many parts of the country, has always played, and still plays, an important part in the scheme of street-paving. Its durability, and comparative cheapness, regardless of its great and inexhaustible abundance, has secured for it a position of great favour in all large towns where it can be supplied economically. Jersey, Guernsey, Scotland, and many places in England, Ireland, and Wales, have all, in a greater or less degree, contributed to meet the wants of the great city, to say nothing of the contributions levied in France, Belgium, and Norway.

Quality, that is to say durability, is, of course, an important ingredient in the question of granite setts, although hardness in itself is not, in every case, the most desirable test of value. Granites are so variable in texture, that even in the same quarry considerable difference arises in the character and extent of their crystals. The finest-grained granites, of a pale blue or whitish colour, are generally considered the most desirable for carriage-traffic, provided they are not too hard, and become, after partial wear, slippery on the surface. Originally, and until recently, large setts were regarded as most suitable, but modern experience is quite in opposition to such a practice, and small setts, within reasonable dimensions, are now in favour. An examination of the granite paving in some of our London streets laid, say, twenty years ago, will show that the surface of the sett is very slippery, with rounded arrises, and, for quick traffic, exceedingly dangerous to the horses. The reason is obvious, from the excessive surface exposed to the action of the horse's hoof, which has no resting-place, or anchorage, except at the joints. Hence, all improvements based on experience consist of a decrease of the smooth surface, and an increase of the joints. Manchester, perhaps the best paved city in this country, was the first which led in the direction of improvement, and substituted for the large grits stone setts the small basalt cubes from Penmanmaur, in North Wales. Although a comparatively level city, the great cotton metropolis has adopted the use of lurries, capable of carrying eight tons or so (including the weight of the vehicle itself) and such weights requiring powerful horses to draw them, the basalt surfaces soon, under such wear, become dangerously smooth in character. This difficulty was at last overcome by reducing the size of the cubes, which now barely measure 3in. in breadth. Glasgow again, another important industrial centre, began the paving of its streets with the local "whin," or basalt, which was found in abundance within the city itself. Danger to the traffic compelled the authorities to abandon so cheap an article, and, in its stead, to use granite from Lochfyne, in Argyleshire. The original setts were, however, considered too large, and the tendency is to reduce them in size. A good comparison can be formed of the relative values of the two materials, whin or granite, in the old and new quarters of the city. Whin, or basalt setts, are not capable of being so accurately squared as granite, or grit-stone, and, in consequence, are more ragged at the edges, and look, and, indeed, are, more dangerous than the finely-edged granite. A recent improvement has been made in some of the paving of important crossings in Glasgow, where large traffic converges in the shape of what is locally known as "turntables." These consist of paving setts 4in. square, laid some distance beyond the corners of the street, and it is surprising with what ease and freedom from danger of slipping both quick and slow traffic passes these points. A frequent source of accident is caused by the sudden turning sharply round a street corner where large setts are used, but, owing to the numerous and regular joints of these 4in. cubes, a horse can always find a grip for its toe or heel, and, however great the speed at which it travels, can retain its hold, and thus prevent itself from falling.

In the belief that where all the various kinds of wood, asphalte, and other new systems have had their day, and served the turn of their promoters and supporters, granite will maintain a position of usefulness as an agent of street paving, we will give some particulars of the more advanced means by which it is quarried.

The mineralogical character of granite, when in its best condition, necessitates a large expense in fitting it for the purposes of street-paving. The primitive rock of nature, resulting from igneous action, and massive in character, its displacement is attended with much labour and danger. As, however, for street-paving setts the sizes are of inconsiderable extent, the means for its removal may be violent in character so long as they are profitable, and do not occasion too much waste or *débris* in their accomplishment. A salient characteristic of the generality of granite masses, is the amount of fine fissures, sometimes hair-like in extent, but usually irregular and eccentric in direction. They generally indicate that, during the cooling down of the molten mass, its shrinkage, when the crystals assumed their final definite form, produced the rents and lines of fracture with which those accustomed to study the granite rock are familiar. These fissures differ from those which are found in the more recent sedimentary deposits, inasmuch as their irregularity and frequency is due to the contraction of the earth's crust during the cooling of the globe itself. The chemical value of granites differ almost as much as their physical characteristics, and according to the extent of their alkaline ingredients is their ductility measured. In dry climates, the wearing or easily-degraded felspar, which is practically the cementing agent, maintains its normal state longer than in a wet, or humid, one.

Until comparatively recent times, the quarrying of granites for street-cubes, or setts, was accomplished through the well-known "jumper" boring tool, which was simply a steel pointed bar, of from 1in. to 1½in. in diameter, which was struck by one man with a hammer, while another held it, and kept rotating it, during the intervals of the blows. Such a tedious process involved a great deal of labour, and was expensive in character, besides being dangerous. Railway and harbour operations, requiring the removal of great masses, regardless of the quality of débris produced, led the way to "big blasts," amongst the earliest of which was Abbott's Cliff at Dover, and the Holyhead Mountain, the one in connection with the South-Eastern Railway, and the other for the Great Breakwater. The Abbott's Cliff "blast" had a power of 8¼ tons of gunpowder, divided into three mines, and the result was in the highest degree satisfactory. From these successful operations have sprung the modern practice of big, or monster blasts, one of the latest of which we will describe.

On the shore of Lochfyne, in Argyleshire, are large deposits of granite, and at Furnace, eight miles distant from Inverary, a quarry has been worked for upwards of thirty years in supplying setts for paving purposes in Glasgow and elsewhere. Rising abruptly from the margin of the loch, a fine, hard, grey granite mountain, of considerable altitude, offered unusual advantages for the operation of monster blasts, and since 1852 the system has been practised at the Furnace and other quarries of Messrs. William Sim and Co. Having witnessed the last "big blast" at Furnace, we will proceed to describe the method of its preparation, and the results obtained. The first preparatory operation for a big blast is to decide on the most advantageous points from which to begin the mine or drifting which is to lead to the powder-chambers. The experience of many years enables the quarrier to select the best positions, so as to avoid the danger and waste resulting from the charge being placed in too close proximity to faulty rock or small fissures. The most profitable situation is to base the charge against a main leading back so as to prevent any waste of explosion-energy being applied other than in the direction of the outward fall of the rock to be displaced. The calculations ruling the site of the chamber in which the powder is placed are that the minimum top should be about 40ft., and the maximum 80ft., and one-third of these dimensions as lateral distance from the face of the quarry to the mine chamber. The mine should enter from the level of the quarry floor, so that the mass, when toppled over, shall rest on the working platform of the quarry. The calculations to determine the amount of powder-charge are very simple, but they are the result of much experience, and consist of cubing the dimension of mine with the weight and breadth of the face to be moved. The allowance of powder is one pound for every three tons of rock to be moved; at least that is the safe formula; but much less powder under exceptionably favourable condition suffices. For example, if the face of the rock was 70ft. in width, its weight 50ft., and the depth of the mine 50ft., it would represent a cubical capacity of 6,500 yards or 13,000 tons. The powder required for such a blast would be upwards of 4,000lb.

The late explosion at Furnace consisted of 5 tons of gunpowder, placed in two chambers at right angles, and the fall is estimated at 100,000 tons of rock. The mouth of the mine was situated in this case 100ft. above the quarry floors, having a burden or top of rock 90ft. high. The whole distance of the mine was 65ft., and at 40ft. from the face a short chamber was run to the lines of a fine leading or dividing seam. The second

chamber was on the other side of the mine. In each chamber two and a half tons of the best gunpowder was placed and fired by a dry electric battery placed at a safe distance, and under the control of the manager of the quarry. The signal for discharge was given from a steamer a mile distant in Lochfyne. The effect was disappointing to the spectators, for they expected a sort of earthquake result; but, beyond a slight smoke, and a growling, rumbling sound, as of distant thunder, there was nothing to indicate that so violent an operation as the displacement of 100,000 tons of rock from its original bed had taken place. Nor could the close observer, favourably placed at two hundred yards from the quarry, with a powerful glass, perceive more than the gradual cracking of the rock-face in almost hair-like lines, immediately before the fall forward of the huge mass. The effect can only be compared to the buried energy of some pent-up victim of a malign geni bursting his bonds, and acquiring his liberty, after having accomplished his allotted time of thraldom, according to fairy-tale lore.

The practical result of an explosion of this kind is to lift, as it were, the doomed mass, and press it forward, for, under the best circumstances, the gas has no other method of escape, and the calculations should be safe enough, so as to prevent the mass being too much for the elastic, or lifting, power of the gas generated by the explosion of the powder. In such a case much waste would occur. It is found that the smallest convenient mine is the best, for it has to be hermetically sealed after the deposit of the gunpowder, and quick-setting Roman cement is used for building up the chambers and mine, in which the conducting wire, and extra fusees are carefully embedded, protected by wooden shooting. Experience has shown that the horizontal mines are the most profitable, although those of a vertical and zig-zag form have been used, but not with equally satisfactory results. Of course, all the best arrangements as to mine and the surroundings of the intended blast cannot secure a profitable blast if defective gunpowder is used. An abortive explosion at these quarries, some time ago, led to an investigation of the merits of the powder, and it was found that, from imperfect manipulation, the grains, or granules, varied considerably in size, and, altogether, there were thirteen different sizes. The effect was a spasmodic explosion, at different instants, and thus the shot was dissipated, preventing the simultaneous heave of the desired power. Much care is now bestowed in selecting a powder uniform in grain, of the best and most approved sizes and shape.

Although the accomplishments of a successful "big blast" of 100,000 tons insures a supply of rock for about a year's operations, there is much still to do in converting the irregularly-sized fall into symmetrical shapes. The character of the shattered rock is varied, consisting of pieces from twenty tons or more in weight to the finest gravel. The whole, however, must be moved out of the way, or the quarry-face would soon get blocked up, and its profitable working interfered with. Some of the larger pieces are high up, and all sorts of schemes have been devised for bringing down and breaking them ready for the "dressers." Among the means adopted was the use of a powerful double cylinder steam winch, having a strong chain attached which was fastened to the larger blocks and drew them down to the quarry floor, where they were broken up by "jumper" blasts, or smashed by a huge cast-iron "mall" or "mell" weighing about two tons. The dragging-down plan was found inconvenient owing to the difficulty of taking so heavy a chain up to such high points, and the smasher was found to break up too much, so that now the further reduction of the larger pieces is accomplished by small blasts. Under the most favourable circumstances of conversion, however, there is only about one ton of dressed setts or paving cubes realised from every ten tons of material brought down. The consequence is that an accumulation of débris is taking place at these quarries, which, if near London or other seat of advanced concrete industry, would be worth a goodly sum of money.

There is no mechanical means in use at these or other quarries for dressing the cubes, which now costs something like ten shillings per ton.

The size of the mines is about 3ft. 6in. square, in which only one man can work at a time; but the work is proceeded with continuously by the use of three shifts of eight hours each. The average cost of driving these mines and chambers is, for the former, 20s. per foot, and 25s. for the latter, the miners finding their own light, powder, and fuse, but the implements and their maintenance is provided by the quarry-owner. The rock at Furnace is of an exceptionally hard character, so much so, that to drive ninety lineal feet of mine the jumpers had to be sharpened as many as three thousand and sixty-eight times. A miner in this rock sometimes cuts as much as three feet a week, but the general average progress per man is only two feet. The granite of the Furnace quarry is of unusual hardness, for it is found that a tool which will penetrate ordinary granite 12 or 15 inches without sharpening, can only be used to bore 2½in. in this formation.

Although "big blasts" are now looked upon in the Highland lochs as ordinary occurrences, there was a time when the proposition to make the first one was received with great disfavour, so much so, that Mr. Sim, before being permitted to operate, had to enter into a bond to restore any damage caused by its influence. Happily, no loss was occasioned, and, indeed, there is much less risk in the use of these great explosions, occurring, as they do, only once a year, than the daily, if not hourly, shots from the ordinary jumper operations. A return to the old system would practically stop the profitable workings of these quarries, for the continual shooting would greatly retard their output, and render them useless, until an extended line of face was prepared.

The "big blast" we have thus endeavoured to describe is, after all, puny in character when compared in its results with Nature's great hurricane of the 28th of December last. We have just passed through about sixty miles of the Highlands, from Lochfyne southward, and witnessed the destructive effects of the gale which laid the Tay bridge low. The maximum force of the gale occurred at from a quarter to half-past seven, and, in the short time of its duration, thousands of trees of ancient growth were torn up by the roots. Spruce, beech, and Scotch fir, but more especially the spruce, from its needle-laden branches, offering the greatest surface of resistance, were strewed about the roads, so much so, indeed, as to have interrupted the traffic for upwards of a week. In every direction, testimony is afforded of the violence of this memorable gale at even so remote a distance from Dundee, and all agree in stating that it is unparalleled in modern times. The boatmen on Loch Awe (an inland fresh-water lake) describe it as overpowering in intensity, impinging almost vertically on the water, which was lashed into a foam, without apparently having the capacity to rise into a wave.

A RECENT VISIT TO RUSSIA.—III.

IN the markets of Riga are many noticeable features. The old one is very small, and in the heart of the town; the more modern one is on the banks of the river. The former is surrounded by old property. On one side is the town-hall, round which, as protectors of the narrow causeway, are a group of posts composed of the old cannon removed from the fortifications prior to their demolition; on the other is an old hall of one of the ancient guilds. This building, erected in 1200, was originally of Gothic design, but having, as the inscription on the front sets out, undergone some half-dozen restorations, there is little left of its original character. Its gable is more noticeable for its Queen Anne details, the effects of which are heightened by some charming crests and finials of wrought or hammered iron. The market is held during the whole of the seven days, and the square is literally filled with fixed wooden booths, which reflects the custom at one time common in the markets of England. The awnings fixed in the fronts of these booths, supported by slanting poles, remind us of more Eastern lands, from which the custom has no doubt been borrowed.

The commodities vended in these booths are mostly of the small-ware type; we search in vain for vendors of Russian shrines, from the simple fact that we are here amongst a people of Teutonic race, the faith of which has no affinity with that of the Greek or Russian Church. All that is Russian has been put on since the time of Peter the Great: we see it in the strange letters written or duplicated under the street names, and we see it in like manner on the tradesmen's signs. One thing truly Russian was a booth or stall devoted to the sale of peasants' carvings in limewood. These are mostly illustrative of natural objects. One group we noted had a tree in the background, clothed with some dozen leaves, each of colossal size, and carried on a footstalk of spiral wire. The artist, by this device, approaches nature in such a degree, that he is able to depict the trembling of the leaves; beneath this tree is a bench, on one end of which is seated a woman in the act of combing flax, and on the other her lord and master, making merry with his bottle and glass. Another group represented a male and female regaling themselves at a table, beneath the shade of the ever-present tree. Perhaps the most noticeable was a sporting group, composed of a lot of huntsmen firing at a bear. The execution, in all cases, may be set down as extremely rude, and the models as being very antiquated. These carvings, which, as works of art, are far below the standard of Switzerland and the Tyrol, offer illustrations of the thousand-and-one occupations of the Russian peasants during the dreary winters peculiar to this northern country. The question of what work these peasants apply themselves to in the winter season is one not easily answered; but it may be taken that they largely follow the occupation of hewing of wood and converting it into articles of general use, hence the occupations of sledge-building and the manufacture of cooper's-ware are actively pursued. Having somewhat extended our notes on the "Old Town," we will turn for a moment to

THE NEW TOWN OF RIGA.

The double line of walls and ramparts, which hedged in the old town, were demolished in 1858, and the ditch was laid out as an ornamental water, the ground on either side being converted into public gardens and boulevards; on the skirts of which are lines of princely residences. This new town, stretching over the adjoining sands, is known as the St. Petersburg Faubourg. The style of the architecture is mainly Greek and Italian, the facings of the buildings, except in the case of brickwork, are of stucco, workable or soft stone being practically unknown. The facing bricks are imparted from Denmark and the North of England, those of local make being only

suitable for common purposes. In colour the imported bricks are buff or yellow, and they are used as substitutes for the unattainable stone. The private buildings are mostly of a residential character; they are of great size and strength, and vary in height from four to six stories. The outer walls are coloured in various lines of brown, grey, red, and yellow; but in all cases they are very subdued. The sills, cornices, strings, and roofs are covered with sheet-iron, which is invariably painted Indian red. The ground-stories, partly sunk, are devoted to offices or domestic purposes. The first floors are ascended by flights of spacious steps, on which are sundry doors and lobbies. The windows, double-framed and glazed, are of the French casement character, sashes, as used in England, being wholly unknown. The doors are hung in pairs, and the floors are invariably of polished oak laid in various patterns, the principal fittings being in the same wood. The heating is conducted by large porcelain stoves, and the fuel is wood. Open fires are practically unknown; their inability to warm the air, and their well-known character of draught generators rendering them highly objectionable. This will be understood when we state that it is no uncommon thing to find a difference of 30 degrees Reaumur (64 Fahr.) between the outer and the inner air. In the larger buildings hot air, generated in the basements, is forced along flues, and turned on and off as required in the various apartments. We see nothing of the detached villa standing in its own garden, the climate, and the system of living on, or occupying stocks, or flats, not being favourable to the development of such a system. Of

THE PUBLIC BUILDINGS,

the most noticeable are the Theatre, the Technical Institute, the new Greek Church, and the Ritter-house, the latter being built on an old site within the line of the city walls.

The Theatre, built in the character of a Greek temple, is the only building standing in the public grounds. It is of large and imposing proportions, and outwardly bespeaks the purpose to which it is applied. The walls are faced with stucco, which is lined and coloured in imitation of stone. For a population of 100,000 this building appears far too large; but in practice this is not the case, as music and the drama are here, and throughout Russia, cultivated in a far higher degree than is known to us in England. The interior is well arranged, and ample space is allowed for every member of the audience. The lighting is effected by a ring of sunlights, but to prevent their action in extracting the warm air they are screened off by a large horizontal ceiling light. The sides of the corridors are used as stores for clothing, and along their walls, during the time of the performance, are tons of fur clothing, caps, scarfs, belts, overboots, &c., into which the natives literally retire when about to enter the open air.

The Technical Institute is a large building, with receding wings, faced with buff bricks somewhat deep in colour. Over the second range of windows is a red brick cornice, to balance which are sundry bands of lilac-glazed bricks, which, although an innovation on our accepted rule of ornamentation, are far from being harsh or unpleasing in their effect.

The Greek or Russian Church, now building, is the first of the kind we have had occasion to notice. Its plan is a cross, the arms of which are of equal length. The centre is crowned with a great dome, and the inclosed angles of the cross are each covered with smaller domes. The walls are of buff bricks, said to be of English manufacture, and shipped from the neighbourhood of Newcastle-upon-Tyne. The dressings are of cement, a material manufactured on the spot, but formerly obtained from England. No colour whatever is introduced in connection with these materials. The style, as may be gleaned from the introduction of domes, is Byzantian, and of this it is a very pleasing example. A grand effect is obtained by the lights being formed of a series of circles pierced through slabs of artificial stone. These lights are in single or double rows, and in some cases they are grouped together, the divisions being marked by attached shafts of good design. The gables, from taking the line of the segmental roofs, are not to our taste. The whole of the dome and roof-covering is of sheet-iron: in the former, to symbolise the orb of day, they are a blaze of gold; and in the latter, to answer the mere purpose of a covering, they are painted Indian red. The mode of handling sheet-iron as a roof-covering in Russia is truly excellent; in the case of domes, the segments are banded together with moulded ribs of leadwork. Like all other buildings in progress, this church was closed for the winter, it being understood to be undergoing the process of seasoning by frost.

The Ritter House stands on the site of the old Hall of the Teutonic, or ancient Knights of Livonia, a building said to have been erected in 1202. The present building dates from 1868, and, like the former one, is used as the Parliament House of the Guild of Livonian Nobility, whose arms, to the number of five hundred, decorate the walls of the great hall. This building is of brick, faced with stucco, and, although plain in outward elevation, it is, from its rustication, bold and effective. Internally the fittings are of a superior class. The doors, of great size, are highly wrought in wainscot oak, as, indeed, are the mosaic floors, and the roof and galleries of the dining-hall; but the richest portion is the great hall, or throne-room, which is entirely fitted up and wainscoted with this beautiful wood. In this building we see, perhaps, the best example in Europe of wrought work in first-class wainscot oak. Turning to other details of this building, we find the staircase, the lower part of which is a single flight and the upper part double, in its steps, newels, and hand-rails, wrought in white Italian veined marble, the balustrading being composed of massive sheets of cast and highly-chased and gilt brasswork. The sills of the windows are of the same marble throughout the whole of the building. The gas-fittings in the great hall are worthy of note: they consist of a central gaselier of ninety lights, and four smaller ones, each of fifty lights, the entire cost of which is stated to be 15,000 roubles (£1,875). A word may here be said about the furnishing. The retiring-room is fitted in white-and-gold, upholstered in blue satin, and on the walls are four fine Canalletos, superbly framed, the value of which is over 40,000 roubles (£5,000). The dining-hall, with its oak tables and its 200 highly-wrought oak chairs, is an imposing sight; but at the date of our visit this furniture was stored along the walls.

We need scarcely say that the great river was a sheet of ice, across which the highway to the southern suburb, or manufacturing portion of the city, was formed. These highways on the ice in Russia are remarkable from being lined with young fir-trees, pointed and stuck in holes in the ice. Their object is to mark the way, which would otherwise be lost in the deep falls of snow. In the summer season this stream is crossed by a bridge of boats, a primitive mode of construction, which, in the hands of these Northern people, is applicable to any width of river. Of late years the stream has been spanned by a girder-bridge, through which runs a single line of rails to the loading-station of Bolderaa. This bridge is of a composite order; the centre for the railway, and the sides for pedestrians and vehicles. Riga, as a port, furnishes this country with a vast amount of

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in the form of wood. It is the leading port in the world for the shipments of wainscot oak, a class of wood but sparingly used in England, owing to the shipments from Memel being larger and cheaper. The superiority of Riga wainscot is manifest to anyone who has the pleasure of witnessing such fittings and furniture as are exhibited in the principal buildings of Riga. The finest logs we have seen were brought from the neighbourhood of Kief, in the watershed of the Dnieper; they find a market in London, to some extent; but their cost, in crown quality, is about eight shillings per cubic foot.

Riga furnishes us with red or yellow fir in the form of masts and spars for ships, and hewn logs for building purposes, blocks for railway-sleepers, and billets for lath-riving. The wood, although finer in grain than the Memel and Dantzig, is not of a quality suitable for conversion into deals and battens for wrought joinery purposes. Of whitewood, or spruce-fir, the shipment from this port is enormous, no other place in Europe being anything like its equal. This wood is nearly wholly shipped in the form of deals, battens, and boards. The quality, from being grown in the south, or fertile parts of Russia, is soft and open-baited, and it is inferior in this respect to that of more northern shipments.

It may not be out of place to note that Riga represents the northern limit of the growth of the oak; it is here soft and fine-grained, of good colour, and highly figured. More south, as noted at Dantzig, the oak is hard and tough, and unsuitable for the finer class of wrought work. As we move further north we see nothing of this familiar wood, where for wrought purposes the ash becomes its substitute. As regards the red or yellow fir, Riga may be taken as a neutral line; to the south the wood is quick-grown, hard, and tough, and only valuable for rough and heavy work, whilst to the north it is soft and kind, and is rarely shipped other than in a converted form. As regards whitewood, it represents, with faint exception, the southern limit of its growth; but, as above stated, it is soft and open grown. As we journey north it becomes harder and closer in its texture, and consequently of better quality; but the stock is by no means so inexhaustible.

(To be continued.)

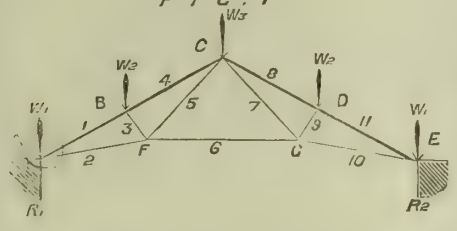
GRAPHIC STATICS.*

We have frequently urged upon the attention of the architectural student the value of the graphical method of determining the stresses in structures, and the many advantages the study affords to those not versed in mathematical processes. Practical men can always understand a diagram, where they fail to perceive relations expressed by algebraic or trigonometrical symbols. Beyond these direct advantages of the graphic method of expressing strains and the action of forces, it is not less valuable as a mental training, and we thoroughly endorse the remark of a writer upon the subject whose work on the principles of the system is before us:—"A mind brought up only on mathematical symbols is but half-trained. The graphic is the complement of the analytical process." Lieut. George Sydenham Clarke, R.E., has published a work, written professedly upon the study of graphic statics, in which he attempts to formulate the principles of the subject, and to treat it in an elementary manner. The author differs a little in his nomenclature from other writers on statics. He employs

* The Principles of Graphic Statics. By George Sydenham Clarke, Lieut. Royal Engineers. London: E. and F. N. Spon, Charing Cross.

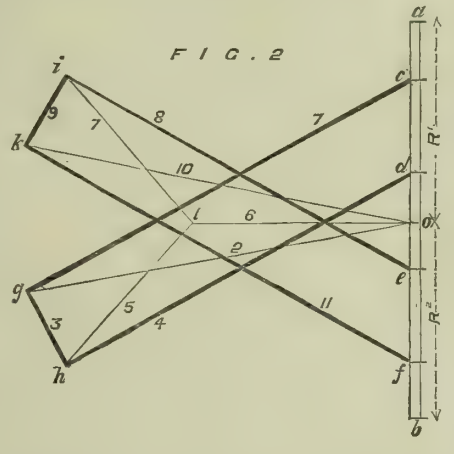
the term "pressure," instead of "compression," as denoting compressive stress, and he applies compression as meaning alteration of length due to pressure, in the same manner as "tension" and "extension" are used. The words "vector," "stress centre," and the German "kern," are also used, the latter to signify, as it does in German, "the locus of the stress-centre under certain conditions." In the first part of the work, the interesting subject of graphic arithmetic is explained by diagrams, and the various processes worked out, of course employing lines to represent numbers, and constructive processes to represent the ordinary numerical ones. The author very clearly introduces the subject, by explaining that by the square root of a given line is meant a second line which represents the square root of the number which the first line stands for. Of course, in all cases, a scale is necessary in dealing with lines instead of numbers, and when lines are spoken of, it is meant that they represent, on some convenient scale, actual numbers. Thus, in the multiplication of lines, the product of two, or more, lines is obtained by a most simple construction of radial lines, which cut any perpendiculars raised from a base line, at distances equal to the given lines to be multiplied. By construction, the raising a line to any power is equally simple and, for many practical purposes, the line obtained would be near enough. Of course, in all these constructions, great accuracy is needed in drawing and applying the scale. The extraction of roots is a very beautiful application of the graphic system. By means of a number of radii, drawn at equal angular distances from a centre, or pole, so that they cut a curve at the same angle, producing corresponding similar triangles, a series in geometric progression is obtained, which enables a logarithmic curve, or spiral, to be drawn, which determines the root of any line. We cannot, without a diagram, explain the process; but any one versed in geometrical drawing, or with the merest rudiments of geometry, could readily understand the rule. In a similar manner, the spiral line obtained may be used to raise a line to any power, and examples of these processes are furnished by Lieut. Clarke. Fractions, and the areas of rectilineal figures, are explained upon precisely the same principles; in the latter operation, or that of obtaining the areas of polygons, the system may be employed most advantageously; but it is when we come to consider forces such as those in one plane acting at a point, that the method of graphic representation is so eminently useful. The mechanical propositions, called the "Composition and Resolution of Forces," are too well known to our readers to require recapitulation, but they, of course, form the principle of this system. Every student of statics knows that two forces acting at a point may be represented by a parallelogram, and their resultant found by the length of the diagonal; or that, if three forces act on a point, and keep it at rest, they may be also represented in direction and amount by the sides of a triangle drawn parallel to them. The author proceeds, from this fundamental principle, to show how the resultant of any number of forces may be determined graphically—a very simple problem—which includes the cases of any systems of bars and frames; and reasoning from the theorem that when a system of forces, acting on a body, keeps it in equilibrium, they can be represented by a closed polygon, he shows how the polygon of forces can be applied to various constructions, such as in finding the "line of pressure" in an arch, roof-trusses, &c. There is one preliminary statement to be made, before the student can proceed to represent the stresses in a structure from the method we have referred to, and that is, that he should understand the conditions necessary to make two plane figures reciprocal to each other. For instance, it is necessary that to every side of one figure there is one corresponding side in the other figure, and that these sides must be parallel, perpendicular, or inclined at some constant angle, and lastly, every system of lines meeting at a point should correspond to a closed polygon. Lieut. Clarke devotes a chapter to the subject of reciprocal figures, in which he considers the conditions of reciprocity, and the exceptions, and the various classes of plane figures are pointed out. One of the most important applications of the principle of drawing reciprocal figures is its enabling

FIG. 1



us to determine the stress in the bars of a frame, since we know that, if the frame is in equilibrium, the forces acting upon each joint must form a closed polygon or triangle. A reciprocal figure so employed is called a "stress diagram." It cannot be too clearly stated, and may save a great many abortive attempts to determine the stresses in a framework, that the statical problem "becomes the geometrical problem of determining the reciprocal of a given figure, and is possible, impossible, or indeterminate, according as the construction of the reciprocal is possible, impossible, or indeterminate." It will be noticed that the problem of finding the stresses in the bars of a given frame is determinate only when the latter is of a figure whose angles are determined by the lengths of the sides, and these sides contain only the exact number sufficient; in other words, the author says the problem is determinate only when the framework figure is "strictly indeformable." It is so when $s = 2v - 3$; s being the number of sides, and v the number of vertices. This rule is important to be observed. We now give an example from Lieut. Clarke's treatise, which will explain to those who do not understand the method of graphical statics, the principle of constructing *stress diagrams*, from the frame, or "frame diagram," as it is called. Fig. 1 is the frame diagram of a roof-truss, used for spans up to about 60ft., and Fig. 2 the stress-diagram. The reactions of the supports are first found, then the polygon for the exterior forces. In the present instance we may suppose the loads are vertical in direction, an ordinary condition in roofs. The

FIG. 2



polygon of forces for the loading becomes, in this case, a straight line, and is called the "line of loads." We may also consider the loading distributed at the five joints of the truss A, B, C, D, E, (Fig. 1), the intermediate parts of the roof being carried by the purlins. R, and R_2 are the reactions of the roof at A and B, and each is equal to half the load on the truss = $\frac{2W_1 + 2W_2 + W_3}{2}$. Beginning from a in the line of loads (Fig. 2) set off $ac = W_1$, $cd = W_2$, $de = W_3$, $ef = W_2$, $fb = W$ from a scale in lbs. or tons. Bisect ab in o, then oa and ob represent the equal reactions R_1 and R_2. From c and o draw cg and og respectively parallel to BA and FA, then the figure $acgoa$ is the reciprocal of the joint A, and cg and og give the tresses in the bars 1 and 2. Proceeding next to the joint B, draw gh and dh respectively parallel to BF and CB, and the figure $cdhg$ is the reciprocal of the joint B, and gh and dh give the stresses in the bars 3 and 4. Taking the joint F, draw ht and ot parallel respectively to the bars FC and FG, then the figure $othgo$ is the reciprocal of joint F, and ht and ot give the stresses on the bars 5 and 6. The joint C is in like manner represented in the stress diagram by the lines ti and ei, which give the stresses on the bars 7 and 8. The joints D and G are similarly represented, as will be seen by the corresponding numbers in the diagrams to which we need not refer in detail. The thick lines in the stress diagram show the compressive members, and the thin lines the bars in tension. The author shows various other applications of the system to trusses of varying spans, including a bow-string roof for spans of great length, in which case it is often desirable to reduce the frame diagram to a single system of triangulation. It may be observed that in case of unsymmetrical loading, as when the roof is exposed to wind-pressure, some of the tension diagonals will be placed in pressure, and the author shows by example the method of treating roofs with varying reactions or loads on the supports, how to draw stress diagrams for wind-pressure, in which case a separate diagram is necessary. In plates III. and IV. examples of diagrams for normal, and horizontal and vertical components of wind-pressure are given, worked out to scale, into which we cannot enter here. A table of wind-pressure per square foot of roof-surface for horizontal winds of 40 and 50lb. per square foot of vertical surface is given for roofs of varying pitch. Of course, in working out these problems the stresses obtained from the dead load and wind-pressure must be added together to obtain the maximum stresses. The stress diagrams for the Warren and other forms of trussed girder are illustrated by examples; these are of even simpler character. Chapter V. deals with beams and the action of stationary loads, and will be found of great value to the student. The bending-moments for different loads, or for distributed loads, are easily obtained by the ordinates of triangles, or of a parabola, in a manner we have shown on previous occasions, and the moment at any section of the beam is a simple matter of drawing a vertical ordinate at a given point. Travelling loads, it may be noticed here, do not add much to the complexity of the operation. When a single load traverses a beam, the limiting curve of the bending-moments is a parabola. When two loads, with a fixed interval between, are moving, the curve is more difficult; but the moments can be found by adding the ordinates of the maximum moments due to each load. The section of Mr. Clarke's work treating on these subjects is very complete, and examples worked out are given. Braced structures are also considered. We find the author gives the following average loads on railway-girders:—2 tons per foot run of

each line of rail for 25ft. space; 1¾ tons for 30ft.; 1½ tons for 40ft.; 1¼ tons for 60ft. span, and so on. The methods for finding the centre of gravity of plane figures, are useful additions; after which the treatise enters into the subject of the "moment of inertia," &c. The mechanical principles involved in the "bending moment" and "moment of resistance" of beams are well discussed in chapter X, and the student will derive clearer notions of the subject, as treated graphically, in the manner shown, than he possibly can by confining his attention to abstruse analytic works on the subject, and the expression of equations of the two forces we have mentioned. We might, for instance, mention how much more obvious to the mind the area of resistance of a beam becomes, when shown graphically, by a figure representing the distribution of the fibres of resistance. Various sections of beams are given by this method, and a copious table of the moment of inertia for different forms. The author here introduces the subject of the "central ellipse and kern of a section." As every area has a centre of gravity and a moment of inertia, it has also a central ellipse, determined by the radius of gyration, which, being once drawn, gives the moment of inertia. We need not dwell on these points, which the student will find easy enough when he has mastered the preliminary chapters. We find an appendix is given, containing a variety of useful data on weights of roof-coverings, loads on bridges, &c. Besides numerous diagrams in the text, the work contains several plates of worked-out roofs, girders, and beam sections; and we can commend the quarto of Lieut. Clarke as the most complete treatise on the elements of graphic statics that we have seen, not excepting the admirable treatises of Professor W. C. Unwin, Ranken's "Strains on Trusses" and one or two other works that have appeared. We consider the subject especially deserving the attention of the architectural student, and Lieut. Clarke's work will, we hope, pave the way to an acquaintance among the rising school, with a branch of applied mathematics as beautiful in its suggestiveness as it is simple and fascinating as a study. We trust the architectural examiners at the Institute will make it as necessary a qualification for the student as it has been made at Coopers' Hill and in the schools on the Continent.

"DOWN-ALONG" IN CORNWALL.

WE have read that "extremes meet," but suppose that Land's End and John O'Groats may be deemed that oft-quoted exception which goes so far to prove the rule. The counties wherein these two often-quoted points stand are probably very little known, for they both lie a long way from the busy centres of British industry, and it is only now and again that the general reader has opportunities for going to places which, in common parlance, lead to nowhere. But, for all that, Caithnesshire and Cornwall are by no means lackless of interest, and those who visit them once "cut and come again" when the chance offers.

Take the latter county as an instance, for in it the main portion of our remarks to-day are to be concentrated, and say did you ever enter Cornwall by Brunel's great Suspension-bridge over the Tamar, at Saltash? That bridge is 2,200ft. in length, the span of each of the openings is 455ft., the height of the central pier from the foundation to the top 240ft., and there is a clear 100ft. above the highest tide that ever was to the line of the railway. The cost of this bridge—not so long, but far more majestic-looking than the ill-fated Tay bridge—was quarter of a million, and it has been opened just twenty years. Have you roamed through Cornwall, poked about amongst its low waggon-roofed churches—churches with Perpendicular window tracery in nearly every one of them, wrought sharp and clean in hard grey granite? Have you "padded" over its rugged Tors, sketched the quaint road-side crosses, that in Cornwall so often come in one's path in remote cross-ways, and ate pilchard pasty in the rustic home of some hospitable cotter? Have you "drank of the water so cool and clear" at the celebrated well of St. Keyne, a little place not many miles from the old town of Liskeard? If you haven't, do so, if you can ere 1880 has run its course, for does not tradition say:—

> "If the *husband*, of this gifted well
> Shall drink before his wife,
> A happy man henceforth is he
> For he shall be master for life.
> But, if the *wife* should drink of it first,
> God help the husband then!" &c.

In fact, going from one bit of stupendous rock scenery to something of peculiar architectural, or archæological interest, or in listening to a weird old tale first told to the teller's ancestors the ancient Britons by their Phœnician visitors, and by him in direct descent, handed down to this present 19th century, the days will so pleasantly pass away that one gets to Land's End altogether too quickly, and should time and weather permit, it will be as well to go yet thirty or forty miles further, and there, in the midst of the troubled waters of the Atlantic, spend a day or two at the Scilly Isles. Do you admire ever-changing coast scenery? Amidst the one hundred and forty islands that go to form the Scilly group you get it to perfection. Do you believe in sublime headlands, and in mountain rollers that come right across, without a break, from the Mexican gulf and burst up against them in big white pillars of foam, full 200ft. high? Go to the rocks of Peninnis, on St. Mary's Island, Scilly, and say whether anything like what you will see there exists in the coast scenery of any part of the United Kingdom. Do you delight in tropical foliage, in hedges of the hard sombre ice-plant, or brilliant geranium, in fuchsia-trees 30ft. high; in passion-flowers growing around the very pigsties in the farmyards; in seeing the cactus, palm, aloe, and a hundred rare plants, found nowhere else in England save in hot-houses, all flourishing in wild and luxuriant profusion on every hand? It is at Scilly, and at Scilly only, in Western Europe, so far as my experience goes, and I have seen most of it—that such a sight is to be obtained.

Of all Cornwall as a county, there are few parts more startlingly picturesque than is St. Michael's Mount. Those who know the Giants' Causeway, in the north of Ireland, remember how romantically Dunluce Castle stands upon the top of a sea-girt rock. It is a St. Michael's on a small scale. But such as are familiar with Mont St. Michel, in Normandy, will have a still better idea of the gloriously wild position held by Sir John St. Aubyn's ocean-washed home at the eastern side of Mount's Bay. Situated some half-mile out to sea, and detached thereby from the little fisher-village of Marazion, the Mount is a rugged pyramidal mass of granite, rising some two or three hundred feet above high-water mark, relieved here and there by the shadows of dark firs, and crowned upon its summit by the pile of buildings which go to make up the mansion in question. It is not always that St. Michael's Mount has been so isolated, for ancient documents record that long years ago, this very mount stood in the midst of a dense forest. Since then, however, the inroads of the sea have been so great that the very face of Nature has undergone a change, and for many a long year it is stood as it stands to-day, stupendous and majestic in its stately solitude.

The restoration of St. Michael's Castle is now nearly complete, and some brief description of it will be interesting. A very comprehensive drawing of the works in question appeared in these pages some time ago (Nov. 20, 1874). That was soon after their commencement, and they have been in hand ever since, a large staff of men having been employed, not by a contractor, but by Sir John himself, under the direct management of Mr. R. Damper, the clerk of the works. For all that has been done, Mr. James Piers St. Aubyn, of Lambe Building, Temple, London, has been the architect. This, though the most important of Mr. St. Aubyn's works in Cornwall, is by no manner of means the only one, for over the whole face and breadth of the county far and near, Mr. St. Aubyn's thoughtful work, be it ecclesiastical or domestic, is to be found scattered. The whole of the additions made are in the same characteristic Baronial sort of Tudor style as is the old work, and the one incorporates so well with the other, that they blend together with particularly happy effect. The first part that received attention was the south-eastern elevation. Here an immense drawing-room, a billiard-room, and twenty bed-rooms have been added. From the large windows of the two former compartments, a superb panorama is obtained. The windows are all worked in solid granite, moulded with double order mullions, and with rich tracery heads in the same material. The large oriel windows corbel out in a pleasant and picturesque manner. One is over a splayed and weathered roof, which is the entrance to the eastern elevation, and forms a buttress to that part of the building; whilst the other begins square at the base, as a buttress, until it gets to the third floor, where it opens into the room with windows on each cant. These oriels, octagonal in plan, at the third floor or the fourth, are connected by a balcony supported by large granite corbels. The roof of this portion of the building—for the levels of different parts of the mansion not being the same, the roofs vary considerably, adding thereby much to the picturesqueness of the grouping—is quite level, and forms the south court. This roof is composed of Dennett's patent arching and iron girders, and is paved with Claridge's asphalte. Above the level of this south court, two rooms have been added east of the old Chevy Chase room, and they have been worked in with much artistic arrangement. The internal dressings are of Ham-hill and Wild Duck stones, and of granite from Crowan and Breage. The two chimney-pieces in the drawing-room are of Mount granite, the material having been excavated close by where it now stands. The bells are on the pneumatic principle, and the building is warmed by Messrs. Haden and Son's hot-air system.

The foregoing gives a very imperfect idea of what has been done on the south side. On the north elevation, what was formerly solid rock has been removed by blasting to a depth of some twenty feet, and new kitchens, &c., have been built on the site. These kitchens have been fitted up by Messrs. Edward and Son, of London, with a fine range of boilers and cooking apparatus. From this part of the building, two tunnels are cut through the rock 50 feet long; one runs under the chapel and joins the kitchen with the servants' hall, &c., and the other, taking its course under the old drawing-rooms, joins the new south-east addition on the fourth floor at its north-west angle. A new north wing has also been built adjoining the kitchens just mentioned; it has three floors, giving five bedrooms and more offices. The rocks are at a much lower altitude here, but the roof is level with and forms part of the north court, which is surmounted by a battlemented parapet all around its outside walls. In the old part of the building, the ancient Chevy Chase room has been repaired with new granite windows on its north side; the breakfast-room has been restored, and the old kitchen converted into a morning-room. Further, it has had a new buttress put at its south-west angle, and having been under-pinned, a large bedroom has been made under it. The old western building has been gutted and rearranged internally, but its exterior elevation remains the same as before, with the exception of the north-west corner, where there have been added two piquant gables with battlements. New stained-glass windows have been put into the chapel, and the chapel tower roof repaired. The north-west side of the ancient guard-room has been taken down to carry down a new staircase, and in removing the soil thereabouts, an interesting old cannon of the 14th century was unearthed. St. Michael's Mount, it is recorded, has frequently, in days gone by, stood a siege; and stern testimony of this has been discovered in the many iron cannon balls that have been exhumed during the progress of the works. The lodge at the base of the mount, and the entrance gateway are very happily designed. Over the gateway is a large shield with the St. Aubyn and Townsend coat of arms upon it. A new dairy, octagon in plan, has also been built upon the green. It is, of course, of granite, and has buttresses at all its angles, and a solid granite roof, weathered on the outside, and circular within, with an open lantern on the top. It is 43ft. long by 23ft. wide and 32ft. to the top of the lantern, and, taken altogether, is one of the most striking bits of modern granite work in the country. A large new laundry, fitted up by Messrs. Bradford and Sons, of London, has been built, and near it the sea-walls have been raised to enlarge and inclose

the drying grounds. Water is brought across from Marazion—the village on the neighbouring mainland—in the bed of the sea, and is carried into the whole of the buildings in the castle, and as precaution against fire, hydrants are fixed in many parts of the premises. The new furniture and the fittings are all of oak, and are particularly artistic.

This very general account may give some faint idea of the magnitude of the works just brought to a conclusion at St. Michael's Mount. It is, undoubtedly, by far the most important of all Mr. James Piers St. Aubyn's many works. Nature has been particularly kind in that she has given a wonderfully majestic site upon which to work. Mr. St. Aubyn has seized the exceptionable opportunities offered with all the enthusiasm of an artist, and the careful consideration of an architect; whilst in the working-out of his ideas he has been singularly fortunate in having in Mr. R. Damper, the managing clerk of works, one who, in every way, by seconding his ideas, has proved himself to be pre-eminently adapted for his work; and, to crown all, and to make everything the success that has been arrived at, Sir John St. Aubyn—the noble proprietor—has had the money at his command to spend, and what is more to the point, has had the will to spend it too!

There are few mansions in old England where Nature and Art have worked hand in hand so lovingly, and with such wonderfully pleasant results as they have done at that beautiful spot "down along" in old Cornwall, known as St. Michael's Mount. Harry Hems.

THE SANITARY CONDITION OF DEWSBURY AND ITS SEWERAGE WORKS.

A PAPER upon this subject was read by Mr. B. C. Cross, borough engineer of Dewsbury, at a district meeting of the Association of Municipal and Sanitary Engineers held at Dewsbury on Friday, the 19th ult. In his opening remarks the author contrasted the rural and cleanly appearance of the town 40 years ago with its present busy and grimy state, especially dwelling on the altered condition of the river Calder. Its pollution had an especial interest as a sanitary problem, for no doubt it would be the duty, if not of this generation, of its successors, to transform this river of ink into a comparatively pure stream once more. Only those intimately acquainted with the trade of a town like Dewsbury could, however, fully appreciate the difficulties in the way of doing this, but when they saw the river, and considered the immense quantities of dyes and chemicals used annually in the district, the magnitude of the question became apparent. In 1877 the author ascertained that seven of the principal firms together used 2,859,000 gallons of water per diem for manufacturing purposes, exclusive of water employed for condensing purposes. Eight firms together used annually:—Nitric acid, 15½ tons; hydrochloric acid, 3; sulphuric acid, 81; nitro-muriatic acid, 68; ammonia, 31; soda ash, 347; bichlorate of potash, 29½; alum, 55; sulphate of iron, 120; sulphate of copper, 13½; equal to a quantity of 2·44 tons of various chemicals from these eight works. Indeed, it was estimated that from 25 to 30 tons of the above chemicals were used daily in Dewsbury and neighbourhood, to which should be added about 12 to 15 millions of gallons of water highly impregnated with spent dyes, &c., and all the sewage contamination from an area of over 15,000 acres, in order to show approximately the amount of pollution in the river Calder within a length of about two miles of its course. The area of the borough was 1,468 acres, and the population was now estimated at 32,000, having in 50 years increased fourfold. The sanitary condition of the town was rather behindhand, but rapid strides had been made during the last few years. The chief sanitary evils were:—1. Beck-floodings. 2. Back-to-back houses. 3. Common midden system. 4. The bad construction and non-ventilation of existing sewers and drains. 5. Direct communication between houses and drains; and with each of these the author dealt in detail. 1. The Dewsbury Beck, which passed through the town, drained an area of 7,000 acres, and received the sewage and manufacturing refuse of populous districts. The ground on each side of the Beck was hilly, and in times of heavy rains the Beck was very quickly greatly swollen. Its channel was contracted in many places, and discharged into the Calder at right angles to its flow, the consequence being that occasionally the water overflowed into and through the streets and Market-place. The greatest evil was that at present all the sewers along the course of the Beck discharged into it, so that in times of freshets the basements in the low-lying portions of the town near to the Beck were flooded. This latter evil would be remedied when the sewerage works were completed. 2. Whole rows of cottages were numerous, so constructed that the back of one was built to the back of another, and the only space belonging to these houses was the street in front. Want of ventilation in these houses was nearly always perceptible, and the system tended to increase the mortality in the borough. 3. The common midden system was, in the opinion of the author, the greatest sanitary evil in Dewsbury. There were about 2,300 privies and 1,500 ashpits in connection with them; for the most part not more than 4 to 5 yards away from a dwelling-house, being in reality open cesspits. The excreta was deposited at one end of the ashpit, and ashes, garbage, &c., at the other end; consequently no ashes covered the excreta until the ashpit was at least half-full. One privy was allowed to suffice for four houses. All middens in the future were to be built upon an improved plan devised by the author. 4. In 1878, on opening up and examining the public sewers, nearly all were found to have been put in irrespective of any sanitary principles. The oldest and worst sewers were generally square in section, and constructed of dry wall-stones, with a rough stone cover on top. A great number of sewers were almost silted up, and in some cases were completely filled with sediment. During the past five years every house-drain to new houses had to be ventilated by a special 3in. pipe. 6. The greater portion of the houses within the borough were connected directly with the drains, but this was being gradually remedied. In 1876 the author prepared a scheme of sewerage for the borough, which having been reported on by Mr. J. Bailey Denton, was with a few modifications finally adopted. The works comprised outfall, western and northern main, and internal sewers, surface-water drains, pumping station, and a sewage-farm. The outfall sewer was 1,605 yards in length, and had been let in two contracts. Contract No. 1 includes 327 yards of 54in. barrel sewer, together with manholes, shaft, and storm-water overflow. 300 yards of this length are in tunnel, the depths varying from 18 to 90ft. The depth of the centre shaft is 76ft. This portion is constructed of 9in. brickwork on a bed of concrete 6in. thick, and encircled with 6in. of the same material. The 9in. work had been taken at £1,875 0s. 11d. = £6 7s. 2d. per yard lineal, and a few yards of 4½in. work at £95 16s. 7d. = £2 19s. 11d. per yd. lin., shafts and overflow works bringing the total cost to £2,513 9s. 3d. The cost per yard lineal complete equalled £10 13s. The gradient of this sewer was 1 in 2,000. Contract No. 2 included 1,259 yards of 54in. barrel sewer constructed of 4½in. brickwork incased in concrete, 8in. thick at top and bottom and 10in. thick at sides. Before the concrete was put over the brickwork a collar-joint 1in. thick of Portland cement mortar (1 to 1) was made. The cost per yard lineal complete equalled £4 7s. 11d. The gradient of this sewer was the same as the other. The western main sewer consisted of 40in. cast-iron pipes at the outlet, and of brick barrels, the chief length being 2,350 yards of 27in. work. All the pipes would have turned and bored joints. The pipes would be laid on a bed of Portland cement concrete 8in. thick, with a 4in. bed of bituminous concrete over same. The pipes would then be covered with a 4in. ring of bituminous concrete, and this again incased with a 7in. ring of Portland cement concrete, the object of the bituminous concrete being to allow for the expansion and contraction of the iron pipes. A portion of the northern main-sewer was let, comprising 640 yards of 33in. brick barrel sewer, and 28 yards of 33in. cast-iron pipe sewer, together with manholes and storm-water overflow, at £2,338 10s. 5d. The cost per yard complete equalled £3 10s. 4d. The internal sewers would be of fireclay, namely, 132 yards 24in., 1,659 yards 18in., 3,496 yards 15in., 7,182 yards 12in., and 7,793 yards 9in. Surface-water drains were of the same material. 716 yards 18in., 1,765 yards 15in., 7,753 yards 12in., and 17,465 yards 9in. The pumping-station was to be erected at the north end of the farm; the maximum quantity to be lifted was 1,500,000 gallons 100ft. high in 12 hours. The same engines would be capable of being attached to other pumps for lifting the sewage only 15ft. The engines would be in duplicate, provision being made for a future extension. For the sewage-farm the corporation had purchased about 155 acres of land, in the townships of Toothill Nether and Ossett. The total cost was about £16,755. The land was to be laid out on the principle of intermittent downward filtration, combined with surface irrigation. The main drain was composed of 2ft. fireclay socket-pipes laid at a depth of 5ft. to 10ft. below the surface. Near to the main outlet was constructed an inverted siphon underneath the Healey Mile Gort, composed of 3ft. cast-iron pipes with leaded joints, and covered with Portland cement concrete. Mr. J. Bailey Denton was the engineer for laying out the farm, the author acting as resident engineer. All the works at the farm were being carried out by daywork. In a tabulated summary the author showed that the total estimated cost of the sewerage works described was £91,093. The total length of sewers and drains would be 31·38 miles. All cement used on the works was tested, the test specified being 250lb. to the square inch tensile strain. In all cases of brick sewers one-quarter of the circumferences (forming the invert) was constructed of glazed fireclay bricks. All concrete used was in the proportion of six of gravel to one of Portland cement. All pipe-sewers and drains had their joints caulked with tarred gaskin, and a collar of Portland cement put round afterwards. All mortar used was in the proportion of one of Portland cement to one of sand.

THE PROPOSED SPHINXES FOR CLEOPATRA'S NEEDLE.

WE have seen the large clay model prepared by Messrs. C. H. and J. Mabey, sculptors and modellers, of Princes-street, Westminster, for the sphinxes intended to be placed near the base of the Cleopatra's obelisk on the Thames Embankment. The model is of colossal size, about 18ft. long, and, to judge from the rather limited point of view afforded by the workshop, we think Messrs. Mabey have creditably turned out their rather difficult work. It has the symbolic human head and the body of a lion. The artist has consulted the best models, and has been assisted by Dr. Birch, of the British Museum, in the details and inscription. The face of the sphinx is benignant in expression, and the artist has admirably succeeded in representing the Egyptian cast of features of the old sculptures.

There are two sphinxes to be cast from the model, and these will be placed one on each side of the obelisk, of course, the pedestals being centred or ranged on a line or axis passing through the needle. It is not quite determined, we hear, how the sphinxes will be turned in reference to the obelisk. Some of the authorities are for having the casts placed so as to face the Needle; but we should think the only proper and sensible position would be for the heads to point outwards, as if guarding, in the same manner as the Landseer lions round the Nelson column. On the chest, between the fore-paws of the sphinx, the cartouche of Thothmes III. is incised, with the hieroglyphics of the king. On the sides of the pedestal of obelisk there will be inscribed tablets in bronze. The principal one will give the particulars of the obelisk and its eventful history. The pedestal is intended to be finished at the top with a plain Egyptian cove cornice of bronze, and the conventional wings will cover the lower corners of the needle, which are now rounded off. These bronze accessories will add much to the finish and completeness of the pedestal, and the two sphinxes will form a suitable base, and contribute to the effect of the obelisk and its approaches.

The restoration of the parish-church of SS. Petrock and Mary, Bodmin, one of the largest churches in the county, but till recently in a sadly dilapidated state, is about to be carried a further stage, under the superintendence of Mr. R. J. Withers. Contracts have just been made for new flooring and oak doors in the first four bays of nave and aisles.

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ILLUSTRATIONS.

WALL ARCADING IN THE LADY-CHAPEL AT ELY.—LODGE, WIMBLEDON-PARK.—THISTLETON HALL, SUFFOLK.—RADCLIFFE CHURCH.—NEW OFFICES, READING.—BISHOP'S THRONE, ST. MARY'S CATHEDRAL, EDINBURGH.

OUR LITHOGRAPHIC ILLUSTRATIONS.

WALL ARCADE, LADY-CHAPEL, ELY.

We give the second sheet illustrating the details of the arcade from the Lady-chapel of Ely Cathedral, for the drawings of which Mr. Leonard Stokes obtained the Pugin Travelling Studentship this year. The general drawings, with description, were given in the Building News, March 19, 1880.

LODGE TO HOUSE, WIMBLEDON PARK.

The drawing given in this number is a lodge to a house, which was illustrated in our issue of Nov. 28th, of last year. The lodge is built with materials similar to the house—viz., ground-floor of red brick; upper-floor, timber framed in oak and fir, coated with Stockholm tar, and rendered between with Portland cement, and red bricks arranged in diapers built in Portland. The roof is covered with Broseley tiles. The work was executed by Messrs. Aldin and Son, contractors, of South Kensington, who built the house and stables, under the direction and from the designs of Mr. Thomas W. Cutler, 5, Queen-square, W.C.

THISTLETON-HALL, SUFFOLK.

On March 12th we illustrated in a detailed manner, from Mr. Brightwen Binyon's sketches, the interesting old chimney-piece from Thistleton-hall, Suffolk. To-day we publish a general view of the mansion itself, showing the extensive alterations and additions now in course of execution from Mr. Binyon's designs.

RADCLIFFE CHURCH.

Our illustrations represent the parish-church of Radcliffe-on-Trent, near Nottingham, as rebuilt from designs by Messrs. Goddard and Paget, architects, of Leicester. The old church was a small and very plain structure, dating from the close of the last century, and possessed no features of architectural interest. The chancel was built about 25 years ago, and this portion of the edifice is left standing. Both within and without the church is built of a hard local stone, with Bath-stone dressings. It consists of nave, north and south aisles, a tower at the south-west angle, which serves as a baptistery, and a narthex at the west end of the nave. The seats are massive pitch-pine benches, constructed independently of the floor. The church is warmed by flues proceeding from a furnace near the west door, passing underneath gratings in the floor, and connected with an upright chimney near the chancel-arch. These designs were accepted upon the recommendation of Mr. E. W. Godwin, to whom was assigned the duty of reporting upon the various sets of drawings submitted in competition. The contractors were Messrs. Barlow Bros., of Uppingham, and the woodwork was executed by Mr. Letall, of Walton, near Peterborough The wrought-iron gates, vane, and window-irons were made by Mr. Burbidge, of Leicester. Mr. Parr, of Radcliffe, was clerk of the works.

NEW OFFICE AT MESSRS. HUNTLEY, BOORNE, AND STEVENS' FACTORY, READING.

One of our illustrations shows the interior of the principals' private room at the Tin Factory, Reading, which has been recently erected. The whole of the joiner's work is executed in pitch-pine, with walnut panels. The ceiling bearings are of pitch-pine, moulded and dentilled, and the panels are plastered and decorated. The wall-panelling is of pitch-pine and walnut, with narrow panels just below the dado of painted tiles to special design. The floor is of pitch-pine dowelled and glued to an under-floor, and the boards are very narrow. The cornice is of pitch-pine, moulded and dentilled, and the frieze is of stamped leather, with raised festoons finished in gold on a coloured ground. The walls are hung with muralis. The whole of the woodwork has been French polished. The works were executed by Messrs. Wheeler, from the designs of Messrs. Morris and Stallwood, architects, of Reading, who also designed the furniture.

BISHOP'S THRONE, ETC., ST. MARY'S CATHEDRAL, EDINBURGH..

The throne and other fittings for Edinburgh Cathedral are from the designs of Mr. John Oldrid Scott. The material of the throne is walnut, and it was made by Messrs. Farmer and Brindley. The throne stands just within the presbytery on the south side.

BECKETT'S PATENT VERGE TILES AND WALL-BOXES.

Mr. Richard Beckett, of Hartford, Cheshire, has introduced and patented one or two expedients in building, which we believe will be accepted as improvements by all architects and builders. In the case of one of them, it is perhaps only surprising that nothing of the kind has been introduced before. We allude to the patent verge tiles for gables, &c. Every builder of cottages with tiled roofs knows that he can finish his gable ends in two ways, either by pointing the underside of the tiling against the wall, or, by bringing over his roof and finishing the end with a verge or barge board. Mr. Beckett's invention enables him to supersede the latter costly alternative, and to overcome the meagre and unworkmanlike finish of pointing by having recourse to earthenware verge tiles, so made as to overlap one another, and to cover the edge of the spar or rafter. In section, each tile is ⅂ shaped, the vertical flange or verge being capable of receiving any kind of artistic ornamentation, and preventing the wind from lifting the tiles, as it frequently does those made in the ordinary way. To our minds, one of the strongest recommendations in favour of Mr. Beckett's tile is that it does away with the unsightly cement fillet, which generally finishes the verge of gable, and which has no artistic value whatever, and another is that it is imperishable. Of course the tiles form a drip by being made to project a trifle over the wall or gable spar, and the verge can be made of any depth, either plain or stamped, with an ornament or border pattern; where barge-boards are used, they are less desirable. They are made double for two courses of tiles, and as the other tiles follow, a uniform lap must be preserved. The other improvement is strictly utilitarian; it is an earthenware "wall-box," the object of which is to receive the ends of timbers built into walls, and to insure a free current of air round them. Being of earthenware, it is proof against the ravages of fire and decay, and the experience of every one connected with building is familiar with the rapid decay of joists from being embedded in walls that are still damp. These shoes or sockets form four sides of a box into which the joist can be dropped, and the sides, we observe, are grooved, so that air can circulate round the ends and sides of the timber. The inventor says the use of these boxes renders wall-plates unnecessary; we are not disposed to say they entirely supersede the necessity of plates, though with hoop-iron bond and these earthenware sockets, a building would be doubly secure from fire or decay. We might suggest their use especially for trimmers, roof, and other timbers which enter the walls of chimney-stacks, a source of considerable danger in the ordinary careless manner of building. The boxes are made to any size, and the inventor can mould them to form corbels below, or as part of a cornice, a purpose they might admirably fulfil in large rooms where wooden girders are employed. As regards economy, it is thought that white wood in these shoes is more durable than red wood without them, and that thus a considerable saving might be effected. To secure the value of lateral tie, the sides of the boxes need not be made the full depth of the joist, so that the walls may have a "bite" upon the beams. We believe the use of these boxes would much reduce the risks arising from the close building-in of timbers in damp walls, and the danger of fire from the insertion of beams near flues.

CHIPS.

At the Dublin Police-court on the 25th ult., a number of persons residing in Ardee-street and Wood-street were fined, in sums from £3 10s. to £5, for disobedience of magistrates' orders in persisting in continuing to occupy houses unfit for human habitation.

At Banbury police-court on Monday week, and again on Easter Monday, a youth of 15, named G. W. A. Golby, has been charged with embezzling £26 from his employer, Mr. C. Claridge, builder. Prisoner was sent to cash a cheque, and absconded with the money, returning destitute a few days later.

The local board of Chorley, Lancashire, have increased the salary of Mr. W. Cunliff, inspector of nuisances, from £100 to £120, with certain allowances.

St. Peter's Church, Liverpool, has been fixed on as the pro-cathedral of the see about to be created.

A large United Presbyterian new church was opened in Perth-road, Dundee, last week.

The Public Health Committee of the Dublin Corporation have approved plans and specifications prepared by the borough engineer for the public abattoir proposed to be erected in the North Circular-road.

A new market-house is being built for the Millom-in-Furness local board. Mr. Bradley has taken the general contract, and Messrs. Salmon and Barnes have taken the sub-contract for the iron work.

A Local Government Board Inquiry was held at Plymouth Guidhall, on Wednesday in last week, before Mr. S. J. Smith, inspector, with reference to an application from the town council for powers to purchase property required to allow of the improvement and widening of Notte, Finnewell, and St. Andrew's-streets, and Old Town avenue, the opening out of Providence-street, and the formation of a new thoroughfare from King's-gardens into Morley-street. At the close of the inquiry, during which opposition was raised to the scheme by the owners affected, the inspector visited the several sites.

Mr. George Booth has been appointed surveyor of Woodbridge, Suffolk, at a salary of £50 a year.

New schools of St. John were opened by the Bishop of Manchester, at Baxenden, near Accrington, on Easter Monday. The schools will hold 400 children, and have cost £3,000. Mr. W. S. Varley, of Blackburn, was the architect.

Mr. John Bell Potter, the largest collector of paintings and works of art in the city of Glasgow, died on Monday.

Brough parish-church, Cumberland, was re-opened on Easter Monday, after complete restoration.

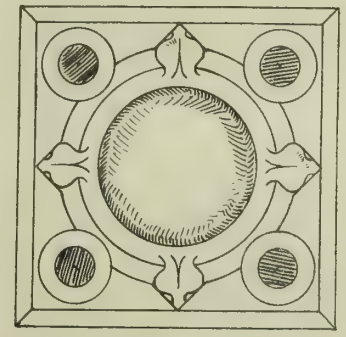
The new church of the Holy Trinity at Scarborough was opened on Easter Sunday.

The town council of Penzance, at their last meeting, raised the salary of Mr. Whear, the sanitary inspector, from £85 to £100 a year.

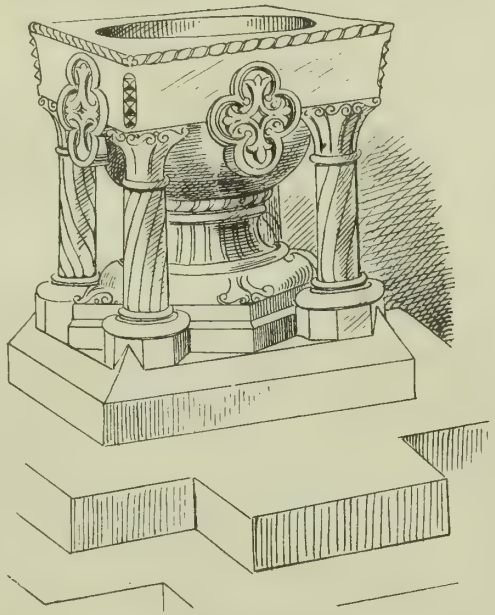
A new Wesleyan chapel was opened in the Broadway, Cardiff, last week.

The George Moore Memorial Hall at Mealsgate, Carlisle, was opened on Tuesday week. The meeting-room is 41½ft. by 24ft., and the reading-room 24ft. by 15ft. A bust, in terra-cotta, of the late Mr. Moore is being executed by Mr. J. Adams Acton, of London. The contractor for the building was a Fletchertown builder, and the cost has been about £1,000.

S·MARYS·CATHEDRAL· EDINBURGH ·



PLAN OF FONT



FONT

BISHOP'S THRONE

SEDILIA

G. GILBERT & JOHN O. SCOTT. ARCHITECTS.
31 SPARK GARDENS . LONDON

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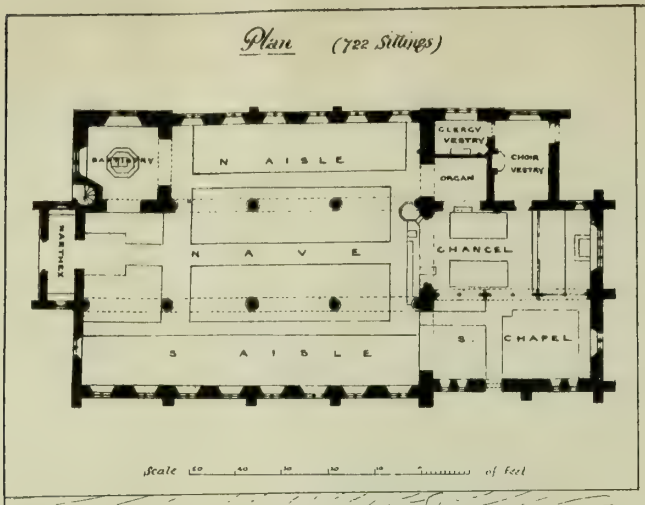


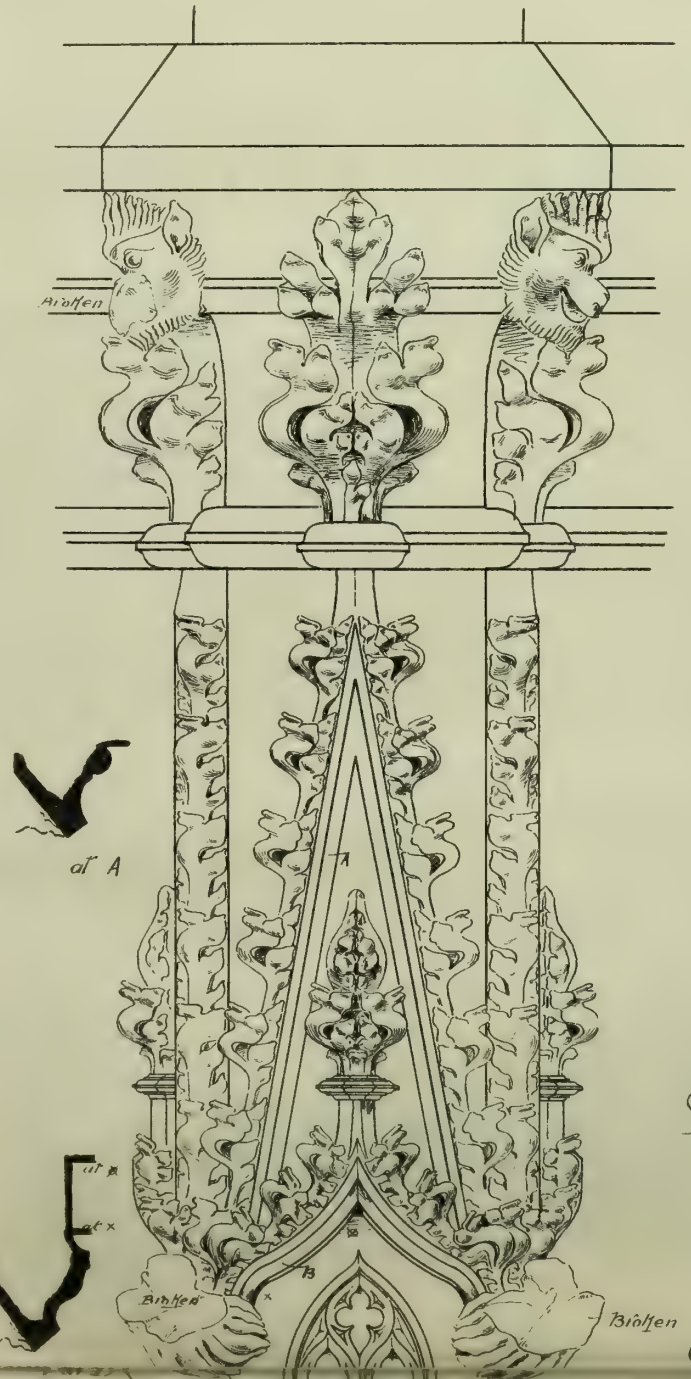
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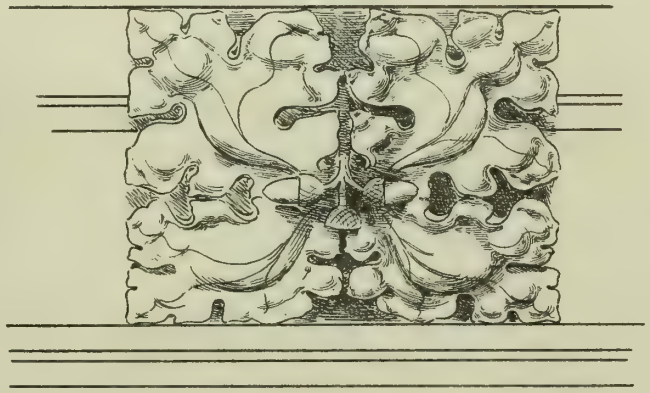
RADCLIFFE CHURCH

GODDARD & PAGET

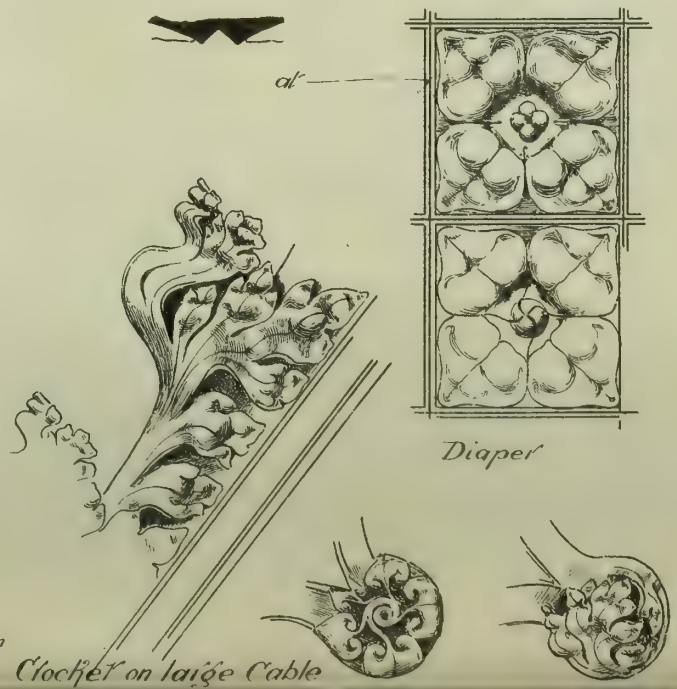
ARCHITECTS

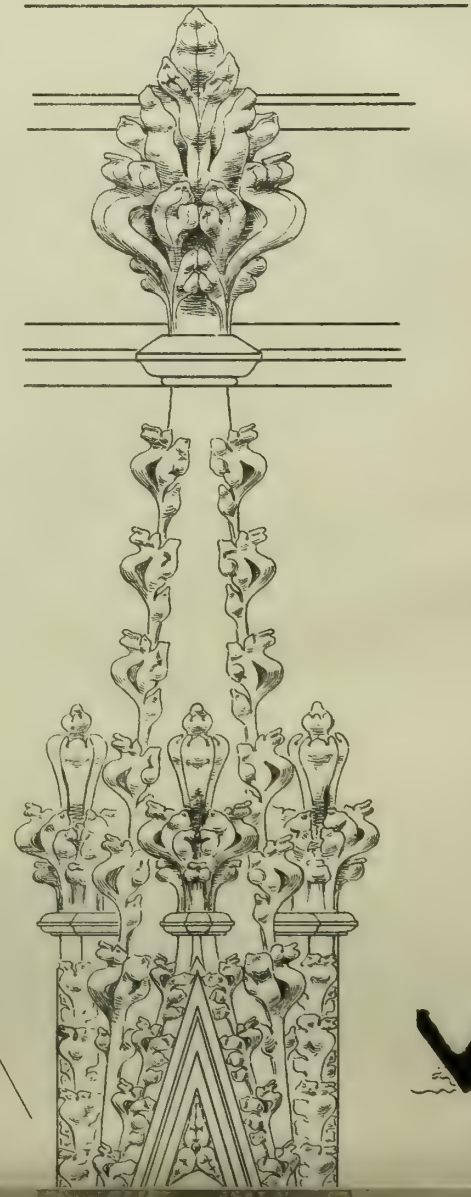
WALK ARCADING LADY CHAPEL ELY





Carving in Cornice





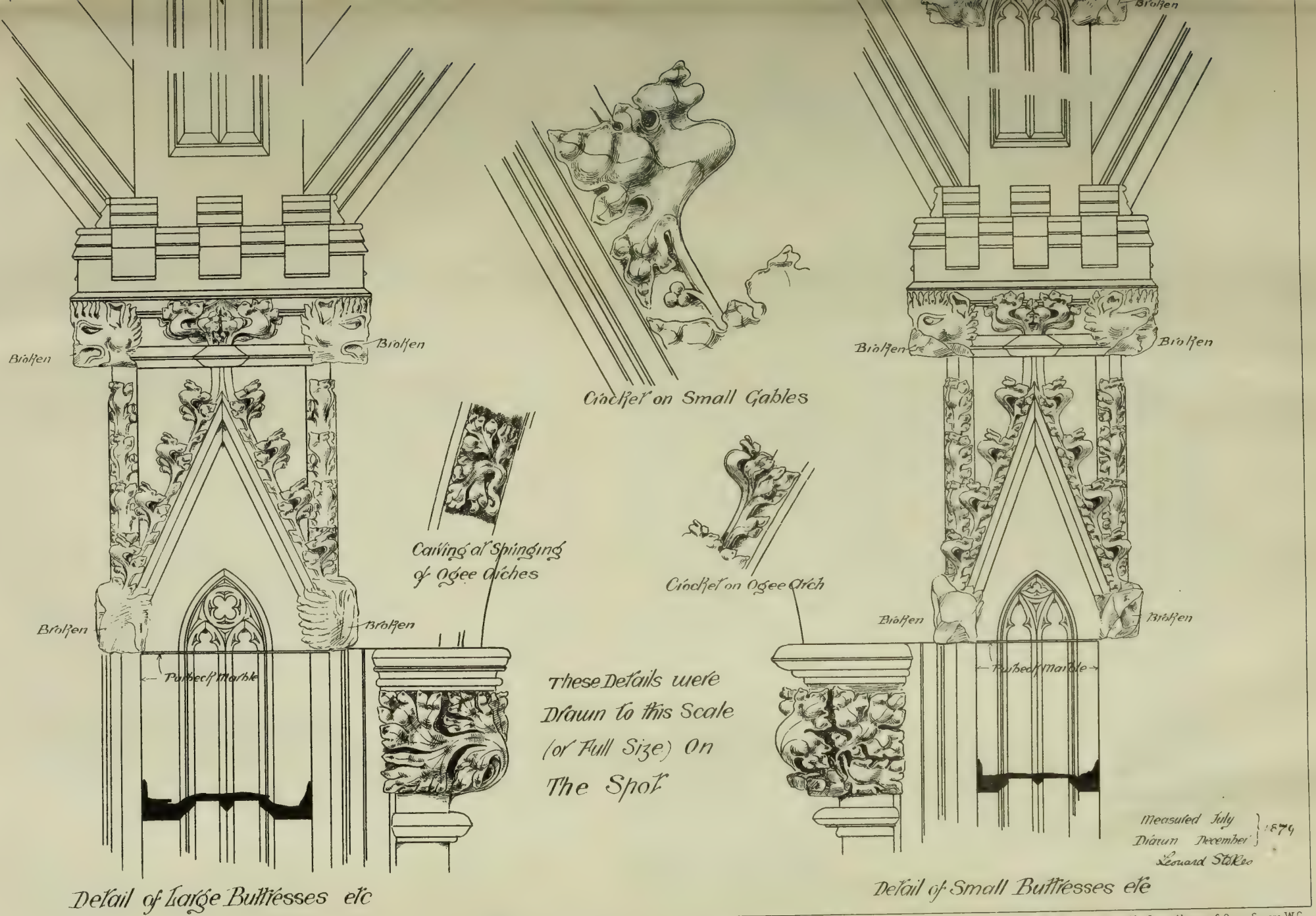


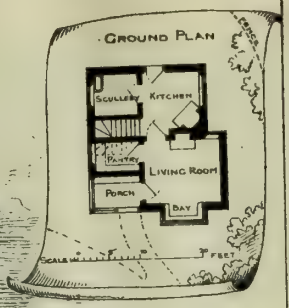
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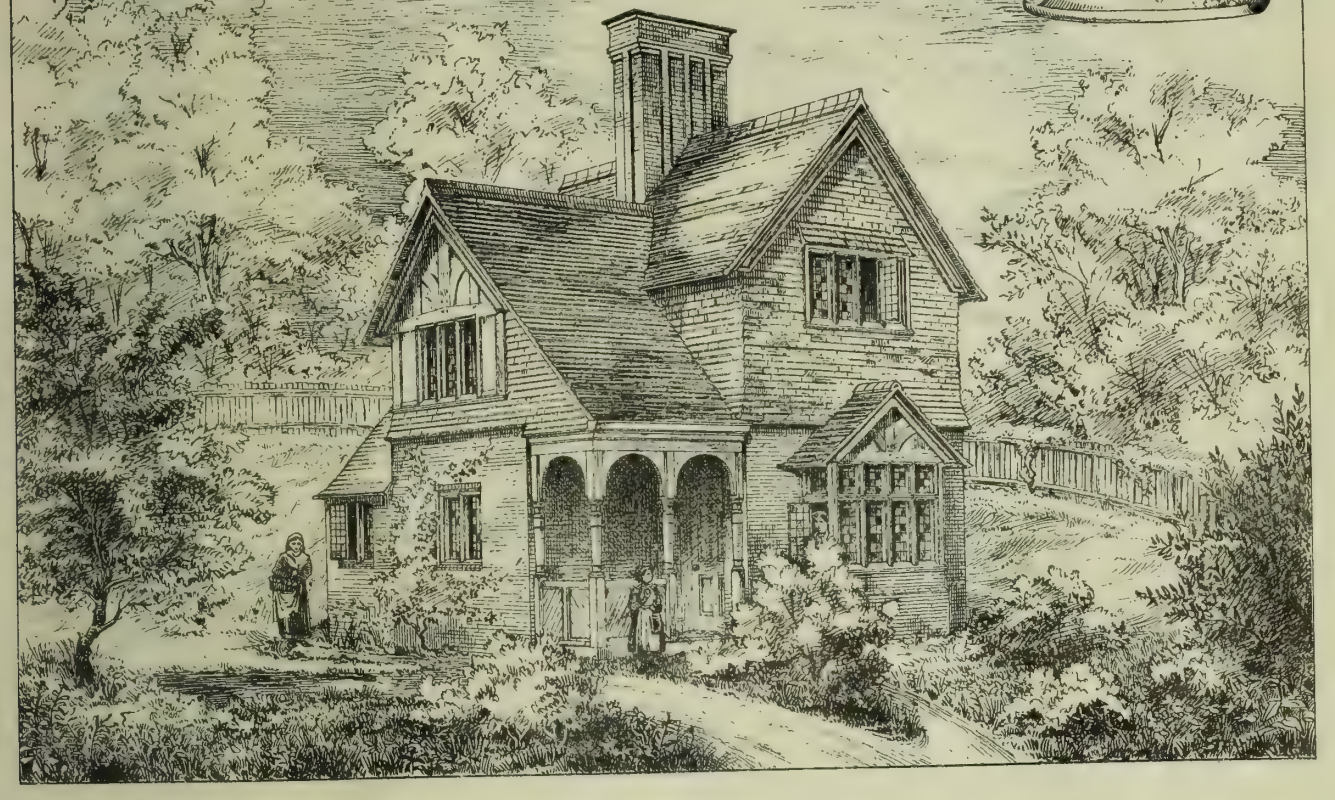
PUGIN TRAVELLING STUDENTSHIP

THE PRIZE DRAWINGS

LODGE, WIMBLEDON PARK

T. W. CUTLER
ARCHITECT





Thistleton Hall
Suffolk
Enlarged from designs by
Brightwen Binyon
ARIBA.



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MESSRS. HUNTLEY BOORNE & STEVENS'S NEW OFFICES : READING · PRINCIPALS' ROOM · MORRIS & STALLWOOD · ARCHITECTS · READING ·

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PAINTING AND SCULPTURE, IN THEIR RELATION TO ARCHITECTURE.*

By C. E. Norton.

IN the famous letter in which Lionardo da Vinci offered his services to Ludovico il Moro, the ruler of Milan, after enumerating the resources of his universal genius in the arts of war, he adds: "In time of peace I trust to give complete satisfaction, in comparison with any other man, in architecture, in the composition of both public and private buildings. Further, I will execute sculpture in marble, in bronze, and in clay; likewise in painting I will do whatever can be done, equal to any other man, be he who he may." There was no extravagance in Lionardo's claim to equal ability of performance in the three arts, nor is it likely that it would have struck his contemporaries as an unusual boast. The device adopted by Michelangelo was of three circles interlaced in such wise that the circumference of each passed through the centre of the other two, by which was signified the mutual dependence and inextricable relation of the three great arts of design, and when his funeral obsequies were celebrated, in his own church of San Lorenzo, with a stately and splendid pomp to which architecture, painting, and sculpture contributed in ardent rivalry, the three circles of his design were changed upon the decorations to three crowns, with the motto, *Tergeminis tollit honoribus*. The indissoluble union of the arts in the production of the highest achievements of each was not a mere doctrine of the Italian schools of art, but an article of faith, consecrated by long tradition, and approved by centuries of experience.

The contrast to this faith and practice afforded by modern modes of thought concerning the arts, and by contemporary production in Europe and in America, is striking. The separation of the arts is one of the most prominent facts in their history during the last two or three hundred years; never, perhaps, was the divorce more complete than at the present day. The architect contents himself with being simply the designer and constructor of buildings; the sculptor gives little study to the principles of architecture or of painting; the painter seldom uses other instruments or materials than the pencil and the brush and the colours of his palette, or if, as in some rare instances,—for example, that of Sir Frederick Leighton—he gives himself also to modelling, the applause with which a partial success is greeted indicates how far the modern standard of requirement of the artist has varied, has declined, since the days of the masters of the Middle Ages and the Renaissance.

No one can give serious thought to the nature and functions of the three arts as the modes of expression of individual, communal, or national sentiments, without recognising the fact that this change of feeling in regard to their mutual dependence, this virtual separation of them, this neglect of union of their forces in conjunct products, is one of the chief reasons of their comparative feebleness at the present time,—of the small part that they hold in the real interest of the community—of their failure to give due expression to its higher spirit—of their loss of power, in fine, as instruments of culture and of civilisation. The change is due to many causes, partly having their source in the general conditions of society, partly also in conditions within the special domain of the arts themselves, consequent upon received methods of discipline and practice, and upon habits of life and thought among artists. The detailed investigation of these causes would be a work of interest, especially in connection with the consideration of the remedies for a state so deplorable as that in which these arts for the most part exist today. But the subject is one that could be treated satisfactorily only at a length unsuited to this occasion, and with resources of learning, observation, and reflection such as few men possess. It may, however, not be without interest, leaving aside the graver question of cause and remedy, to go back to the time when in Italy the arts were working in unison for the production of some of the noblest and most permanently precious achievements of genius, and to endeavour to draw from these works some of the instruction or suggestion they may have for ourselves.

The brilliant revival of the arts of sculpture and painting in Tuscany, during the last half of the thirteenth century, was based on the already developed style of architecture of that region, which more than any other portion of Italy had inherited from ancient times the love and the practice of artistic expression. One after another of the Tuscan cities, as it grew strong and became conscious of its permanent character as a civic community, had built church and cathedral, following the lead of Pisa, in a style peculiarly its own, in which Classic reminiscences and traditions served as plastic materials in the hands of a new race of imaginative builders. Their science of construction was often defective, but their designs were distinguished by fair and often exquisite proportions, by dignity of line, by skilled apportionment of parts, by refinement of detail, and by a system of ornamentation in which colour, and the play of light and shade through the use of column and arcade, were the chief elements. The colour was mainly that of mosaic, of glass, or of marble. The designs of the mosaics, and of the bas-reliefs in bronze or marble, though stiff and mechanical, still often displayed the traditional quality of the Etruscan genius. Neither sculpture nor painting proper was employed in any considerable degree in the representation of figures or of scenes. Their powers were undeveloped, and the part of these arts in the production of conjoint effects with architecture was as yet subordinate.

Greece was once again, as so often in every field of intelligence and of imagination, to afford the light that should kindle a new flame. The vase, and the sarcophagi brought from some unknown site of ancient art to adorn the outside of the Pisan Duomo, and the cloister of her Campo Santo, were the teachers of Nicolas the Pisan. They sent him to nature as the source of all fine art. They led him out from the close confinement of traditional convention, and from the darkness of ignorance, into the open world and the clear light. They taught him the true methods of treatment and of execution.

Thus schooled and inspired, he became the leader of Italy, and, in full sympathy with the passionate, emotional spirit of his times, he gave expression to it in works that remain masterpieces of direct, powerful, and vivid expression. Now there is nothing more noticeable in all his work, and in that of his son and his other immediate disciples, than that it is not intended to have independent existence, but is intimately associated with architecture, and conditioned by architectural considerations. His pulpits for Pisa and Siena, supreme pieces of art as they are, were not only intended to be associated with the buildings in which they stand, but were themselves architectural compositions of elaborate and beautiful design. He was architect, sculptor, engineer, according to need. His son Giovanni carried on the tradition, and, becoming the most famous sculptor of his time, was so excellent an architect that the Sienese made him for a series of years the Chief Master of the Works on the Duomo which they were building, with desire that it should be the most splendid church in Tuscany. From this time forward, for nearly three hundred years, the master-architect was master-sculptor also.

A great change took place in the architectural taste of a large part of Italy during the thirteenth century, the century of Nicolas and John the Pisans, which is shown clearly in their works in the adoption of the forms of Northern Gothic art, especially of its most fanciful and decorative elements, such as its pinnacles and its tracery. This intrusion of Gothic forms profoundly, and by no means advantageously, modified the character of the beautiful and more simple native style. There was an essential incongruity, nay even antagonism, in the fundamental principles of the Gothic and of the Tuscan styles, and the Tuscan builders never succeed in fully mastering the constructive principles of the foreign school. But such elements of it as they adopted led to the production of buildings marvellous in picturesque variety of composition and adornment, however destitute of organic unity, and in which the three great fine arts were brought into even closer union than before. The façades of the churches erected in this composite style were the special fields for their joint work, and at Siena and at Orvieto may be seen the splendid result of their common labors. The architectural design is dependent upon mosaic and sculpture. The colour and the carving are not merely adjuncts to the architecture, but essential parts of it. Each gives and receives added effect. There is no rivalry, no division between them; they are united as one art.

But it was not on the exterior of the churches that the mutual dependence of the arts was chiefly manifested. It was within, where the walls were covered with paintings, and where the construction was apparently often determined by the desire of the architect to secure the broad surfaces which were to afford the field for the painter's work. The tendency of the proper Italian style to give but small space to window openings was favourable to the expanses which a pictorial treatment of the interior required. The same tendency affected the designs of Gothic builders. The first great Gothic church in Italy, that of St. Francis at Assisi, built by a German architect in the second quarter of the thirteenth century, exhibits this character in the fullest degree. There is no building in Italy more precious in its associations, more important in the history of art, more magnificent in the scheme of its pictorial decoration. It has never been properly illustrated, and I would venture to suggest that an American student of architecture in Italy could do no worthier service to his profession, than to make a complete historic and artistic study of this church, with the abundant illustration which its architecture and its painting alike deserve. It would, indeed, be a long labour, but a labour full of instruction and of delight to one who should undertake it in the right spirit, and with the required preparation.

If we enter the upper church we find its walls and its ceiling covered with paintings, which still, in spite of the injury of six hundred years, give to it an almost unexampled richness of effect. Although the scheme of pictorial decoration embraces two great series of parallel illustrations of the Scriptures of the Old and New Testament, and a third series of twenty-eight subjects from the life of St. Francis, upon the walls, as well as a multitude of separate but associated figures upon the vaulted ceiling, and a lavish abundance of ornament and tracery and foliage and stars of gold in the minor spaces and divisions, yet it is plain that, while many hands have been employed upon the vast work, the whole has been treated as a single, composite, carefully-considered piece of colour-decoration. Many of the designs exhibit the rude drawing, the imperfect technical skill, the lack of knowledge, of the painters; but among the painters was Cimabue, who, whether inspired by the powerful example of Nicola, or catching like him his inspiration from the works of ancient Greece, was beginning to open to painting the paths of nature, and was entering along the way on which his pupil Giotto was to advance, with the fast and firm step of genius, in the development of the resources of the art. "This work," says Vasari, "truly most grand and rich, and most excellently carried out, must, in my judgment, have astonished the world in those days, especially because painting had been for so long a time in such complete blindness; and to me, who saw it again in 1563, it seemed most beautiful, as I thought how Cimabue in such darkness could have seen so great a light." It is to be observed, however, that this splendid scheme of decoration is one not perfectly adapted to enhance the purely architectural character of the upper church, and I cannot but believe that the want of perfect harmony between the two arts which is visible here was due to the discord in artistic feeling and in architectural conception between the German designer of the building and the Italian painters. The painters did not completely succeed in harmonising their work with the organic composition of the structure. In the framing of their designs they have broken the vertical lines of Gothic construction with the horizontal lines of the Classic architrave, and have brought the forms of Classic columns into contrast with those of the clustered piers.

The lower church, which is of the nature of a crypt, built above the hollow in the rock in which the body of the saint reposes, is not of less interest than the upper, in the character of the paintings which cover its vaults and walls, especially because here, on the vaulted roof over the tomb, Giotto painted four most striking and renowned pictures — allegories of

* As illustrated by the practice of the Italian artists of the thirteenth and fourteenth centuries. Being a paper read before the American Institute of Architects, at their annual meeting in New York, Nov. 19, 1879.

Poverty, Chastity, and Obedience, and the Beatification of the Saint whose body lay beneath. Quaint, imperfect, strange, to modern modes of thought and representation, these allegories appear, but beautiful and of deep and permanent significance to one who interprets their meaning in the light of the thoughts and emotions and faith of the time when they were painted, and judges of their artistic merit by the standard of what up to that time had been accomplished by the art. No more appropriate, no more impressive decoration for the burial-place of such a personage as St. Francis can easily be conceived.

These paintings were but the first of a long series with which Giotto adorned the walls of churches in various cities of Italy. He became not only the first artist of his time, but he outranks in power of imagination, and of properly artistic conception as displayed in the rendering of character and action, all other Italian artists. He was supreme as painter, as sculptor, as architect, and when Florence, in 1334, sought for the best man to direct and carry forward the work on her new cathedral, she called upon him to take the place of Master of the Works, since "in the whole world there was not to be found anyone more competent," and she decreed that he was to be "received and to be held dear in his own country as a great master." Among the works of art which give to Florence her splendid distinction, ennobling her above all other modern cities save Venice alone, the crown is the Campanile of Giotto. No architect can study this most exquisite of modern buildings without recognising that great part of its beauty lies in qualities which exhibit the mastery of the artist, not in one, but in three arts.

(*To be continued.**)

ARCHITECTS AND THE GLASGOW NEW MUNICIPAL BUILDINGS COMPETITION.

A SPECIAL general meeting of the Glasgow Institute of Architects, convened to consider the conditions attached to the instructions issued to competing architects for this building, was held last Friday afternoon. Mr. Campbell Douglas, the president, occupied the chair, and amongst the gentlemen present were Messrs Jas. Boucher, Hugh Barclay, H. K. Bromhead, J. L. Cowan, Thomas Halket, jun., William Landless, D. M'Naughtan, John M'Leod, H. H. M'Lure, Alexander Petrie, James Ritchie, Alexander Skirving, William Forrest Salmon, T. L. Watson, and others.

Mr. Wm. MacLean, the secretary, read the minutes of the Institute on the subject, and also the correspondence which he had had with the Lord Provost regarding the terms of the competition. Thereafter,

The President said that he hoped the public would not judge the profession to which he had the honour to belong as incapable of viewing the state of matters in regard to the proposed municipal buildings as citizens and ratepayers as well as from a purely professional and selfish point of view. As they all knew, the conditions of competition issued by the Town-Clerk were not fitted to insure the desired end—viz,, to get the best result for the money—because it was doubtful whether the terms offered would enlist the efforts of the best men in the profession. He was convinced that none of the members who had a fair business and a fair reputation would throw it away and consign it to the limbo of an unrecognised authorship for the chance of the handsome premium with which they had been almost bribed. After alluding to correspondence on the subject which had appeared in the local papers, the President concluded by stating that the Institute had forwarded to the Lord Provost, as convener of the committee, the regulations relating to public competition, drawn up by the Royal Institute of British Architects, which communication had been courteously acknowledged, but beyond the knowledge that it had reached the committee the Institute remained in total ignorance.

Mr. Honeyman said that he had, very unwillingly, been forced into a somewhat prominent position in connection with the occasion of their meeting; because, on the publication of the plans of the proposed building, and the conditions of competition, it appeared to him that immediate action was necessary if there was to be any hope of inducing the authorities to reconsider their progromme. It appeared to him that the most likely way to stir up interest was to point out glaring defects in the plans, which the authorities announced were not to be materially altered. In taking this course he hoped no one would imagine that he had the least intention of abusing their respected Master of Works. He wished to repudiate such a charge in the most emphatic manner. When an artist or an architect published his work he deliberately invited the fullest criticism, and he would not ask Mr. Carrick, or any brother-architect, to accord more license in this respect than he would most freely accord to them. It was especially right that in anything of great public importance this freedom should be recognised. The grand difficulty which the authorities had drifted into now was this—that with a plan which was, he might say admittedly, bad they had decided to spend a large sum of money to get elevations only, and debarred themselves by the terms of the competition from taking anything else into account. Competitors were only asked to furnish small-scale sections, nothing more—neither plans nor sections nor any enlarged drawings—and the competitors who sent elevations only would be legally entitled to claim the premium. The difficulty would not be overcome by any change in the conditions now, because the authorities had not the least idea how many men might be well advanced with their designs who would never consent to prepare plans also; and their work being thus perhaps utterly thrown away, they would seek redress. (Hear hear.) There was another serious complication—the premiums offered were ridiculously large, and he was well advised in saying so, because the elevations must be plain. The proposed building—he spoke under correction—would cost, with the plainest exterior, 10d. per cube foot, and the total cost at that rate would reach £157,000 so that it was manifest that all designs of a costly character must inevitably be thrown aside by the professional assessor. He could not see his way out of the muddle, which was not only ludicrous, but serious. This might be the greatest erection in Glasgow since the Cathedral, and there seemed every probability at present that it would turn out a wretched failure, instead of being a thing of beauty, the joy and pride of many generations.

Mr. James Salmon thought that if the views of the Institute upon the subject were respectfully submitted to the Town Council, that body would give all due consideration to their suggestions, and see the advantage of altering the terms of the competition.

Mr. Burnet, referring to the Lord Provost's letter, said that the Institute ought to consider to what extent they could modify the conditions, which was the first question. The next was that it should be clearly understood that the decision was to be left to a professional gentleman of eminence. Then, again, it should be fully explained who was to carry out the work. His own impression was that the person whose plans were selected should carry out the work in conjunction with Mr. Carrick.

The Chairman, with reference to the remarks of Bailie Salmon, said that the Institute had already approached the Council in sending to the Lord Provost the broad recommendations of the Royal Institute of British Architects, instead of going into minute details.

Mr. James Salmon thought that the Town Council would pay more attention to a proposal from the Glasgow Institute than from the Royal Institute, owing to the strength of the local interest.

Mr. David Thomson said that he had written to Mr. Carrick regarding the limit to the alterations allowed to competitors without involving the violation of the conditions of the elevations. That gentleman said that there might be some little projection made into the area, but not sufficient, as it were, to interfere with the lighting of the area, and it certainly would not include any recessing, which would interfere with the size of the apartments beyond making a bow window or a portico or anything of that kind. After some further discussion, it was unanimously agreed to recommend to the Town Council that the last clause of the Instructions to Architects should be altered to read as follows:—"A premium of 750 guineas will be paid to the author of the design which is placed first in merit; a premium of 500 guineas to the author of the design placed second in merit; and a premium of 300 guineas to the author of the design placed third in merit; and on payment of these premiums the respective designs shall become the absolute property of the Magistrates and Council, who shall employ as architect for the buildings any of the premiated architects, either individually or conjointly."

CHURCH RESTORATION, WITH EXPERIENCES AND SUGGESTIONS.

I DO not (says Mr. E. P. Loftus Brock, in *The Antiquary*) take a gloomy retrospective view of what has been done. Most of our churches that have been restored have been well restored. Even in those where there are features to be regretted, there is really much that is good to call forth satisfaction—for at least the fabric has been rescued from decay for a length of years. We may, indeed, well congratulate ourselves that this age should be the one above all others remarkable for the calling forth of that spirit of self-sacrifice, without which these costly works, for so high an object, could never have been accomplished. With all this, however, and while there are among our workers many who have no need to be told what are the true principles of church restoration, there are others who have but a very vague conception of the rudiments. Then, too, many of our best writers on this subject have their hands too fully occupied to give the length of time that matters of detail demand; and without which injury must be occasioned.

We have recently seen a well-known architect called upon by his clients to construct a high-pitched roof, instead of a flat one, to an important abbey church.* Supposing the later flat roof to be past repair, no plan is more faultless than to restore a roof to something like its original pitch, particularly when, as in this instance, its presence would add so much to the dignity of the building. A new society whose object is the protection of ancient buildings, aided by some of our best-known church architects, addressed some remonstrances upon the expediency of this course, without much avail, but with much expression of opinion upon the shortcomings of the work. A few weeks only pass, when, to the surprise of many, the same society has to make an almost similar complaint against one or two of the very architects who had aided them on the former occasion, for an almost similar treatment of another large building. Observers of these matters might have thought that the remonstrances in the first case would have rendered extra care observable, even if there were natural differences of opinion with respect to the state of repair of the superseded flat roof. Nevertheless, in this very case, we have testimony of the removal of an ancient string-course, without any necessity at all, for it could easily have been preserved, were the roof flat or high. We now hear that it is contemplated to destroy the fifteenth-century west front, in order to erect a modern one in an earlier style. What can be thought of the knowledge of church-restoration among its best professors, when this state of things prevails amongst us?

We go to one cathedral: from a distance it appears very like a new building; so large an amount of modern work has been added, while the expenditure has been unstinted. Others show screens removed, tombs taken up and shifted, roofs altered, floors relaid without regard to old slabs or other memorials, and many other works that an antiquary must deplore.

Let us then look at certain features of church restoration which are wrong, and should be avoided.

Canterbury Cathedral once had a Norman west tower and a leaded spire. Both are swept away.

But it may be said, and with reason, that many years comparatively have passed since this was done. Yet this spirit of bringing all parts of an ancient church to a so-called harmony is one of the most common and the most false principles in church restoration. In practice, however, it is more common for later work to be swept away, in order to substitute our own notions of some earlier design.

Who is there, of even limited knowledge, who

* St. Alban's.

* We are indebted to the *American Art Review* for the above report. The fifth number, in which it appears, is fully up to the standard of those we have noticed before. Nothing like it has been published before in America, and very little this side of the water.—Ed. B.N.

cannot readily call to remembrance examples of fifteenth-century windows cut out and lancets inserted, good substantial flat roofs taken off and higher ones substituted to agree with an older design, and in many cases where such works were not at all called for by the wants of the building?

Another common error shows itself in the treatment of stonework. Stonework is often found in a dilapidated state, some stones being decayed, but others not so. All are frequently removed, instead of the decayed ones only, and often many of those which are simply worn are also removed. Now a worn stone may be not at all an unsafe one, and there is no reason to object to it on account of its appearance; yet decayed and worn alike are often removed, to the weakening of other parts of the work. In how many instances, even where this has not been done, has the work been subjected to a process of "combing down," with no object except to "smarten up"—as the workmen call it—the appearance of these buildings whose antiquity is their pride.

Stone tracery especially suffers from treatment of both kinds—removal and scraping. I could name a large church, where only two summers ago I saw the heads of traceried windows worked out of large solid slabs of stone taken out and discarded because one end was decayed; this decayed part, with a little loving care, could readily have been cut out and a new piece of stone inserted. As it was, leadwork with its iron bars, plastering, and face work, had to be cut through and disturbed.

Restoration often means a destruction of old work which has survived the worst period of the last century, as well as the tooth of time, to be copied in these latter days in new work; the old has disappeared to give place to a new copy.

Another error is noticeable in the treatment of woodwork. It is seldom that a beam is altogether worthless, and often many which are discarded could be spliced; old benches are capable of similar treatment.

The reglazing of windows formerly inflicted serious injury to our churches. This is now less frequently the case, since unhappily the old glass is all but gone. Better attention is now also generally given to the replacing of small fragments, but the havoc that has been made even in recent years is cause for serious regret. Much care is very requisite in the treatment of glass. Even in a church where I had taken the pains to specify how a few small fragments of stained glass were to be refixed, the glazier calmly offered them to me "for myself," and I had great difficulty to get his work altered in order to insert them.

As much injury to old stained glass has been occasioned by neglect in keeping the leadwork sound as has ever been done by fanaticism, and the little that remains will require examination from time to time in this respect.

Religious bias—and few men in earnest are free from it—is another hindrance to correct restoration; and an old church has been not unfrequently the ground of contention for men of different schools, who for the fleeting fashion of the hour, will obliterate many marks of the past. With many, all works later than the Reformation are cast out as unworthy to remain. The Church of England has no reason to be ashamed, but far the reverse, of the last 300 years of her history. Yet the treatment of her parish-churches will sometimes lead us to think that such is the general feeling.

THE TEMPLE BAR MEMORIAL.

THE monument which it is proposed by the City authorities to erect to mark the site of old Temple Bar will shortly be on view at the Guildhall, and we had this week a glimpse of the design, which has been modelled by Messrs. C. H. and J. Mabey, the sculptors, of Princes-street, Westminster. There have been various rumours lately about the kind of erection which we might expect to see, and we lately expressed the hope that any design should, if possible, be made to harmonise with the New Law Courts. Reserving any criticism, we will here simply describe the general form and features of the memorial. The design in plan is an oblong. Upon the plinth and pedestal is a lofty structure, of similar form in plan, with angle pilasters, carrying an entablature and attic, or base, upon which is placed a rampant griffin. The pedestal has its faces scrolled in section, and bronze panels are proposed to be introduced on the sides. One of these bas-reliefs represents the Prince of Wales going to St. Paul's. In the longest of the two sides of the structure are circular niches, filled, in one case, by a statue of the Queen, and in the other by a statue of the Prince of Wales. On the narrow sides, which will face east and west, and be in the axis of the roadway, the spaces between the pilasters are filled up with diaper ornament and busts of Beaconsfield and the present Lord Mayor. The pilasters are ornamented with arabesques, and round the frieze of entablature are the words, "Here formerly stood the Temple Bar." The material of the main structure is not yet determined upon, but the sculpture will be in bronze. The structure will be over 30ft. in height. The design is exceedingly ornate, and partakes of a florid Renaissance character.

THE "BUILDING NEWS" DESIGNING CLUB.

A BOAT-HOUSE.

AMONG those who appear to have met the requirements for this subject, we must place "Edwin" first. The boat-house is planned to take boats of eight oars, and the area is divided into three compartments by columns which do not interfere with the stowage, but may be used for boat-rests, while the doorways are conveniently placed at the end. One objection is the stairs in the boat-house leading to the first floor; they are rather in the way. The entrance to the picnic and dressing-rooms, &c., at the side is convenient; there is a good landing, and the dressing-room is well placed in the rear and leads out of the washing-room, while the caretaker's-room is placed so as to command the supervision. The long store for eight-oared boats is roofed with a lead flat, and a snuggery is shown at the front end opening from a covered balcony which runs along the front. The elevation is suitable; the balcony and external pillars are of plain square timbers, and the upper gables project and are also framed, the lower story or boat-house being of brick. The perspective suffers from the very rough and rather coarsely-lined sketch; but the author has generally caught the idea of a boat-house for a suburban river-side. "Sub Rosa" is a cleverly and artistically-drawn elevation in a half-timbered old English style, with good features, but rather costly in style. Two boat-houses are not desirable, and the residential apartments are overdone. The author makes his long boat-house 68ft. by 25ft., and a small one at the opposite end of the building, 40ft. by 25ft; these have each two sliding doors in front, under a balcony. The secretary and entrance to club-rooms are in the centre; the dressing-room is not very convenient, as placed behind the secretary's room; a club-room and the picnic-room are placed at the extreme ends on the first floor, divided by the landing and a ladies' cloak-room, &c., while a suite of living and bedrooms for the attendant, forming a separate dwelling, with its own entrance, is arranged over the rear part of one of the boat-houses. A piquant feature in the elevation is an octagon stair-turret, leading to the balcony. The cost is estimated at about £2,600, a rather larger sum than a small boating club would care to spend, and the structure, though exceedingly picturesque, is too expensive. "No. 90" is conceived in the right spirit; it consists of a long boat-house, 60ft. long by 26ft. broad, gabled at the front end, with a covered verandah and balcony over, supported on turned wooden pillars and brackets. There are three end doors, the centre one hung in two leaves and the end ones sliding. The iron columns down the centre of boat-house appear rather awkward for boats brought through the middle doorway. The great objection to the plan is, that no suitable entrance is made for the club or visitors, who would have to enter the boat-house and ascend a narrow stair to the picnic and dressing-rooms over. "Toledo" is also designed in a suitable style, and the boat-house is 45ft. long on one side and 24ft. the other. The entrances to it, and boat-rests along the walls and down the centre are well arranged; but we find a similar fault to the last: there is no separate entrance to the upper rooms, except an outer stair provided at one end of the balcony, which is uncovered. The picnic and dressing-rooms are not well arranged, and have no conveniences. "Our Praises are our Wages" is certainly better in plan; the boat-house is arranged for boats of the usual lengths, and there is a covered stairway on one side leading to the upper floor, which comprises a front picnic-room 22ft. by 14ft., a dressing-room behind, with lavatory and shower-bath, opening on to a verandah at the side; the corner octagon bay projecting from picnic-room and the front verandah are good features, and the walls of this story are proposed to be built in studwork and concrete, with ¾in. rough cast facing. We see the author sets back the front of his picnic-room to obtain the verandah, the railing of the latter being flush with the front of boat-house; altogether, the general design is appropriate. "Boz" sketches a half-timbered building with a verandah on three sides, approached by outside steps. The boat-house, which extends to the outer edge of verandah, forms a brick basement, and is 60ft. long by 25ft. wide. The design has the merit of simplicity and economy of arrangement, though the club conveniences are not very well planned. "Fleur-de-lis": This design would make a good village school. The treatment of gable is picturesque, but the arrangement of the upper rooms is wanting in economy and completeness. An outer staircase is shown to a verandah, with a narrow approach to pic-nic room. We fail to see anything that would stamp the building for a boat-house. The repairing-house is a useful addition, but is too large. Why waste half a sheet of paper by placing plans on a separate sheet? The whole could have been comprised in one by a little management. We must again ask the author to save us the trouble of looking over two sheets instead of one. "Clansman" is unpretending in design. There is a balcony in front, approached by an outside stair, with an additional stair on the other side leading to picnic and caretaker's room. These are tolerably well planned. The boat-house is not long enough. Cost is estimated at £797. Very ornate is the design with the motto "Attempt." The boat-house is too small and not long enough for eight-oared boats, and the dressing and ladies' rooms would be preferable up-stairs, instead of placed on each side of boat-house. The planning is confused in parts. "Mot" has a notion of what a boat-house should be. The galleried front and large flat or balcony on one side for race days are good features, and the author obtains additional length in boat-house by utilising the space below the balcony. If the detail had been better the design would have stood higher. The upper arrangements and kitchen, with American stove and bath appliances, are convenient. "North" is not without merit in design, though it lacks the aquatic character, and the boat-house is too short. "Con Amore" has a suitable front, with balcony and flat; but we do not like the cramped entrance to club-rooms nor the side lean-to. "Vis" shows a square-shaped boat-house, 46ft. by 41ft., with an upper floor, providing accommodation for steward and secretary. The elevation is artistically grouped, but the design is on too grand a scale, with the side entrance-tower, and looks important enough for a crack crew. "W. in W." is not well considered in the plan; the first-floor is wasted in hall and passages, and the elevation is heavily roofed. "Cross in Shield" has the germ of a good plan; the balconied front and octagon stair-approach to upper floor, and the area for stowage of boats, are good points, but there was no need for a second story. "Pupil J." has got the right idea, but his plan and approaches are poor. "Gemshorn" is a trifle too elaborate in cut woodwork and brackets, which look perplexingly clever, but would not stand long. Thirty feet is not long enough for a boat-house, and the upper floor is not well planned. "Juvenis" adopts a peculiar circular arrangement over the boat-house, with a gallery obtained all round and over the angles of the store below. The whole thing looks something between a turret-ship and a summer-house. "B. in three Circles" misses the point; the upper accommodation is much in excess of what is necessary, and how is the inner passage and bar to be lighted? We can only name the mottoes of "A U C in Triangle and Circle," who sends two designs, "Perseverantia," "Subjudice," and "Excelsior" as failing in the conception and requirements. There is little in any of them to suggest a boat-house; the designs look more fit for cottages, while the arrange-

ments have been planned without reference to the needs of a boat-club.

A WARDROBE.

For this subject the essays are scarcely equal to expectation. We place "Alfred" first, as being conceived in the right spirit, if it fails a little in the quality of refinement. The design shows a combined chest of drawers, a cupboard over filled with trays, a mirror, and on one side a hanging cupboard for dresses. The pitch-pine is proposed to be coloured a "quiet transparent green," to show the grain of the wood. There is a deeply-moulded dentil cornice along the top, but the broken architraves gives an unquiet look to the front. Details are good. "Sub Silentio" comes next, and had the drawing and detail been better it would have stood first. The design is quiet, of Chippendale character, with a slightly curved chest of drawers on one side and a hanging cupboard on the other; the latter is finished with scrolled pediment. Removed by several degrees of merit we come to "Binny," a plain panelled wardrobe with centre mirror and poor detail; "Pupil J.," a similar design, but with nests of drawers on each side and singular detail; "Clansman"—clumsy in mouldings; "B. in three Circles"—a design with two doors and a large mirror in each, having an internal chest of drawers; "Castello" and "Chip": both designs of a commonplace order, and recalling too much the ordinary stock patterns.

Building Intelligence.

Birmingham.—A few years ago one side of Anna-street, an important thoroughfare running from the Town-hall to Newhall-street, was cleared of the unsightly remnants of "the good old town," and gradually the space has been covered by buildings of a character better suited to the requirements of modern Birmingham. The latest addition to this really fine street is the Worcester City and County Bank, now nearly finished. The building is in the French Renaissance style, from designs by Messrs. Osborn and Reading. The materials used are red stone, trom the Round Oak quarries, for columns and architraves; the general structure is Bath stone, and the sculpture of Portland. The bank-room is 65ft. by 37ft.; the upper portion of the building will be used as chambers. The entrances to chambers and bank are placed at the ends, and form the principal features of the design. Sculptured figures, over life-size, recline on the pediments of these doorways, emblematical of the city and county of Worcester; the former being represented by a female figure wearing a civic crown, and bearing a shield with the Arms of Worcester; and a male figure representing a potter, with china-ware as an attribute. The county is represented by two peasants, male and female, bearing corn, hops, and fruit. The sculpture and ornamental details have been executed by Mr. Roddis, of Aston. Mr. John Garlick is the contractor; the estimated cost being about £14,000. Mr. Daniel Hopkins has acted as clerk of works, and Messrs. Hart, Peard, and Co. supplied the ornamental metal fittings.

Roslin.—The foundation-stone of the new Free Church, now being erected at Roslin, was laid on Saturday. The style of architecture is Gothic of the 12th century. The main gable, containing the principal entrance door, is surmounted by a belfry. Seating is provided for 468 persons. Entrance is gained to the ground-floor of the church through a handsome hall. The cost of the building, of which Messrs. R. Thornton Shiels and Thomson, George-street, Edinburgh, are the architects, is £1,600.

South Shields.—A new workhouse has just been completed for the South Shields board of guardians, from the designs of Mr. J. H. Morton, Mr. C. Cobham having acted as clerk of works. The contractor was Mr. Suddards, who was compelled to stop payment during the erection of the building, when the work was completed by his sureties, Messrs. Oldroyd and Readhead, in accordance with the terms of the contract. A considerable bill for "extras" was rendered at the close by the sureties, and on Monday week a special meeting of the guardians was held to consider these claims. The building committee reported that the contract amounted to £40,577, and the account rendered for extras was £3,755 17s. 4d. The committee proposed that £2,534 2s. 6d. be offered in settlement of the account; claims for clay, ornamental cornice, extra-thickness of boundary walls, and early completion of schools not being considered to be proved. Several amendments were moved to this at the board, and in the end it was agreed to add £250 to the sum awarded, reducing the sum in dispute to £971 14s. 11d.

St. Ives, Hunts.—The last stone of the rebuilt spire of St. Ives' parish-church, Huntingdonshire, was laid by the vicar on the 12th inst. The church was rebuilt, after destruction by fire, in 1207. Twice in modern times (in 1782 and in 1822) the spire has been blown down and rebuilt, and in 1878 it appeared so shaky that it was determined by the churchwardens to repair it. When the scaffolding had been erected its condition was seen to be worse than had been supposed; cracks large and numerous ran in all directions, and the builders declined the responsibility of proceeding unless an architect were appointed. Mr. Arthur M. Blomfield, M.A., was called in, and he condemned the spire as unsafe, and in August last the work was commenced. The new spire is of the same dimensions as the old one, but the windows have been reduced in size, and pinnacles and a battlement parapet are built in with the spire and tower, whereas the previous ones were simply lodged on. The spire rises above the tower 82ft. 7in., and is executed in Casterton stone from Mr. J. Everitt's quarries. Messrs. John Saint and Sons were the builders.

Swansea.—The central stone of the New East Docks, on the site of St. Fabian's Bay, was laid on Wednesday, the 1st inst. The length of the dock will be 2,320ft., and its breadth from 500 to 340ft., the narrow end being that to the east. The length of the quay walls will be 5,240ft., or almost exactly a mile, and they inclose a water area of 23 acres. The depth of water on the outer sill will be 29ft., and on the inner sill 26ft. at O S. tides. The dock will be worked with a tidal basin, with gates, covering a space of 4½ acres, with a length of 500ft. and a depth of 400ft. The lock will be 450ft. by 60ft. wide, and will be protected by a new east pier 500ft. long. High and low-level railway connections with the Great Western system are being formed, and land is reserved for further stores and lines. The whole of the walls and quays will be built of local stone from Kelvey hill, but for sills, quoins, and special works, Penrhyn granite will be employed. The dock embankment will be sloped to 1 in 3½, and will be faced externally with slag instead of stone. At the N.E. corner of the dock is being constructed the entrance to a proposed graving-dock, which will be excavated when required. The engineer-in-chief, Mr. Abernethy, is represented in Swansea by Mr. A. J. Schenk, C.E., and the contractor, Mr. A. J. Walker, of London, by Mr. R. W. Parker and Mr. Clifford. The contract price of the work is £197,000, and the stipulated time for completion three years from the date of signature, July, 1879. The water was shut out from St. Fabian's Bay in the short space of three months, and excavations are proceeding so rapidly that it is expected that the work will be finished well within the required time.

York.—On Thursday week a new chapel, which has been built by the Primitive Methodist denomination, at York, was opened. The architect intrusted with the plans was Mr. Wm. Peachey, of Coney-street, York. The style adopted is Renaissance, carried out entirely with red and white pressed bricks, with a little terra-cotta. The façade consists of two stories of Roman Doric pilasters in white brick, with cornices of the same. The windows on the ground-floor are semicircular headed, and those to the galleries are segments of circles—both having moulded arches in white brick, and moulded mullion and transome windows, the arched portion being a fan-light filled with painted glass. Inside, the height from floor to centre of ceiling is 38ft.; the roof consisting of three curves, relieved by moulded and enriched plaster beams springing from a moulded cornice. There are four vestries, situated below the organ-gallery. The building is well lighted, and is warmed by a hot-water apparatus fixed by Mr. Truswell, of Sheffield. The chapel will seat about 900 persons. The contracts amount to about £2,700, and were let to local tradesmen.

CHIPS.

The Ipswich town council, on Wednesday week, adopted plans prepared by Mr. E. Buckham, borough surveyor, for a public mortuary to be built in the Green-yard, on the site of a former county hall. A tender from Mr. Thwaites was accepted for the execution of the work. It was reported that the Treasury Lords Commissioners had sanctioned a loan of £45,000, repayable in 30 years, for the purpose of erecting new post and school-board offices, corn exchange, and museum, and that the Board of Trade had declined to sanction the scheme for connecting the tramway lines by a link through the narrow main thoroughfare known as St. Matthew's-street, applied for by a town's meeting as well as by the tramway promoters.

An arbitration claim has been commenced by Mr. Strickland, contractor for the drainage works recently carried out in Bournemouth, against the improvement commissioners of the town for £16,000. Mr. Alfred Wills, Q.C., is the arbitrator.

With regard to the intended restoration of Elstow Church, near Bedford, to which we referred last week, the Vicar, the Rev. Jas. Copner, has written, stating that "Mr. Whitbread has undertaken to restore, and to present to the church for a vestry-room (instead of the ugly erection now used for that purpose) the old monastic chapter-house—a veritable archæological gem—adjoining the church, and has, moreover, contributed handsomely towards the restoration of the fabric of the church."

At Liskeard, on Saturday, the rural sanitary authority proceeded to the election of a sanitary inspector for the whole union district. There were twelve candidates, and, after very close voting, Mr. Edward Mallett, builder, of Duloe, was elected.

The niche over the north doorway of the tower of St. Andrew's Church, Plymouth, which had been vacant for centuries, has this week been filled by a figure of St. Andrew, executed in Portland stone, and about 7ft. in height. The sculptor was Mr. Trevenen, of Plymouth, and the work has been executed at the sole cost of Mr. Alfred Hingston, churchwarden.

The rural sanitary authority of Bandon, Co. Cork, are about to carry out a scheme of water supply for that town. The water will be taken from two sources, one at Coolfudda, the other at Callatrim, and the water will flow by gravitation to separate reservoirs at Coolfudda and at Curryclough, and thence conveyed by 6in. mains into the town.

The memorial-stone of the new Town Hall for Hove, next Brighton, is about to be laid by the Chairman of the Commissioners. The building, which has made considerable progress, is being erected from the designs of Mr. Alfred Waterhouse, A.R.A., under contract by Mr. J. T. Chappell.

At Kelvingrove, Glasgow, on Saturday, the memorial-stone of a new United Presbyterian Church was laid. The style of the building is Early Decorated Gothic, and the internal dimensions are 113ft. by 50ft. There will be no columns or other obstructions to sight or hearing, and the only gallery is over the entrance vestibule. The centre gable will rise to a height of 86ft., and will be flanked by spires, each 120ft. in height. Sittings will be provided for 900 persons, at a cost, including organ and stall-furnishings, of £15,000.

Waterworks are about to be constructed at Mallow, Co. Limerick, from the plans and specifications of Mr. Lyons, C.E. At the weekly meeting of the Mallow Board of Guardians, held last week, twelve tenders were opened for the execution of the works, and that of Mr. O'Driscoll, of Glen, was accepted at £4,800 9s. 2d.

At St. Nicholas' Church, Brighton, stained glass, representing the "appearance of Our Lord to Mary Magdalene after the Resurrection," has been placed in the eastern window of the Lady-chapel, and a small window in the west wall of the church has been filled with stained glass, the subject being St. Wilfred, the patron Saint of Sussex. The work was executed by Mr. Kempe, of London, by whom all the other stained glass in the church was supplied. At the same time, the silver Communion-plate has been renovated, the two chalices recast after the "Camden" pattern, and a credence plate added, the work being done by Messrs. Folkard and Son, of Brighton, and these and an altar frontal of white embroidered silk, the work of a lady, were all used for the first time on Easter Sunday.

The new Metropolitan Asylum for imbeciles, at Darenth, Kent, will be opened for the reception of inmates during the present month. It has been built from the designs and plans of Messrs. A. and C. Harston, and was illustrated in the Building News in the latter part of 1875.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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RECEIVED.—E. W. P.—G. H. B.—E. and J.—C. T. F.—S. and B.—J. J.—C. P. C.—E. B. of N.—H. R.—J. C.—T. K.

J. ANGELO COX, Simla. (1. The best way of connecting corner post and bed-plate or sill (we presume you mean over the string-course in example mentioned) is to allow the corner post to run down, and tenon the horizontal plates into it. The manner in which you have done it has weakened the timbers, and the damp will penetrate the joint, as you anticipate. It is always advisable on this account to let vertical timbers run down instead of placing them upon horizontal ones. 2. Your sketch shows brick or stone corbelling for the cove. This is not desirable. It is better to form a plaster cove on wood brackets placed a foot or so apart, and then lathed. 3. The verge boards shown in design are not good. They would be better plain, moulded on the top edge by a moulding being planted on and simply chamfered below. 4. The diagonal timbers are, we expect, only 2in. thick, in examples plastered between. 5. If the slates are notched at the lower edge, they would present a similar appearance to tiles. 6. A good height from floor to sill of window would be 2ft. 9in. In the upper floor the same height would do. It appears to us the half-timber style has a future open to it in India, and we wish you success in your efforts.)—BUILDERS' CLERK. (Address secretary, 27, Farringdon-street, E.C.)—SCOTUS. (Your question has been answered before in "Intercommunication" column. See index to last vol.)—H. J. S. (We cannot insert your complaint; it is libellous.)—COMPETITOR. (Why not address secretary R.I.B.A., 9, Conduit-street, W.?)

"BUILDING NEWS" DESIGNING CLUB.

SUB ROSA. (The review of the designs, published March 19th, was right in placing your design second.)—T. Y. (The decoration of screen is left to the competitors. We specified green as the general colour. The drawing must not be coloured.)

DRAWINGS RECEIVED.—Attempt, Pupil J., No. 90, Fleur-de-lis, Clansman, Boz, Edwin, Juvenis, B. in circle, Our Praises are Our Wages, Mot, A. U. C. in triangle (2 designs), Sub Rosa, Gemshorn, Cross in Shield, Toledo, North, Perseverantia, Excelsior, W. in W., Con Amore, Vis, Subjudice.

ERRATA.—In article No. II., "The Indian Vitruvius," page 363, col. 1, for "Rāja Bhoga" read "Rāja Bhoja," and in col. 2, for "Chadrasana," read "Chadrasana."

Correspondence.

CRESSET STONES.

To the Editor of the BUILDING NEWS.

SIR,—The following may be acceptable to those of your readers who are interested in this subject.

In the *Archæological Journal*, No. 88, 1865, p. 339, is a sketch and a description of a stone found in the wall of a chapel on the north side of the chancel of Wool Church, Dorset. The dimensions are 10in. by 8in., and height 5in. On one face are four cup-shaped cavities, each 3in. in diameter and depth. When found the surface of these cavities was blackened as if by unctuous matter burnt in them. The question of their use is there entered into, and "The Rites and Ceremonies of Durham" is referred to for instances of similar stones being used as lamps. The idea is also brought forward, as suggested by Rev. Dr. Rock, that the cavities in the stone found at Wool may have been used to hold the three *ampullæ* for the holy oils, and the vessel for salt used at baptism, and reference is made to "The Church of Our Fathers," Canon Rock, Vol. IV., p. 69, and also to the *Journal* of the British Archæological Association, 1866, p. 107.

In the lower room of the hospitium of St. Mary's Abbey, York, among the antiquities there preserved is "No. 41, a fragment of a stone, in which are cut circular holes, 3½in. in diameter, and 2¾in. in depth. It appears to have been of a rectangular form, 4¾in. in depth, and to have contained nine such holes, *the use of which cannot be ascertained.*" This is the catalogue description. There can be little doubt that the stone was similar in use as in character to the one which stood at the entrance to the choir at Durham.

According to "The Rites of Durham," Surtees Society, p. 2, 3, "There is in the east end of the church a goodly faire round window called Saint Kathern's Window, the bredth of the quire. . . . And in the said window was there a frame of iron wherein did stand nine very fine cressetts of earthen mettall filled with tallow, which everye night was lighted, when the day was gone, to give light to the nine altars and Saint Cuthbert's Feriture in that part, and over all the church besides, did burne unto the next morninge that the day was broken."

The various instances given above and by your other correspondents, show clearly that the use of cressets of stone or other material was common.

Your correspondent, J. Romilly Allen, mentions some engravings in Prof. Nilsson's "Skandinaviska Nordens Urinvänare," "of similar holy-water vessels in Sweden." Will he kindly say whether they are so named in the engraving, and also whether they are still used for that purpose?—I am, &c.,

F. R. FAIRBANK, M.D.

March 29, 1880.

FIRE-PROOF FLOORS. — CONCRETE SUPERSEDED BY BRICK. — MR. HYATT'S LATER EXPERIMENTS.

SIR,—In the fall of 1877, I published and distributed a little work setting forth the results of my experiments with iron and concrete for floor constructions. Since that time I have made over a hundred additional experiments, resulting in the discovery that common stock bricks, combined with tie metals in "gridiron" form, make a perfect fireproof floor, giving a maximum of strength with a minimum of materials and labour, and therefore cheaper than any other floors hitherto made of a really fireproof character.

A narration of my experiments would require a volume larger than my former one, and the limits of a newspaper allow only a statement of conclusions. I can, therefore, merely state in brief the following facts:—The sample floor sections tested, were made by placing bricks on edge or end between the blades of metal upon a flat platform or centering of wood, the cement being applied in the form of grouting. The first samples were made at my works in New York during the fall of 1878, and the results were so surprising that I resolved to repeat them at the earliest opportunity. My experiments in New York were interrupted by severe illness, and it was some months after my arrival in England, in July last, before I was able to resume them. Accordingly, in the fall of last year I had made, at the yard of Messrs. Edwards and Symes, engineers, Cubitt Town, the following sections. A brick floor 8ft. long by 1ft. 5in. wide, and 4½in. thick, was constructed of six rows of bricks placed edgewise and laid end to end, five blades of thin iron ⅛″ by ¼″ being placed between the rows of bricks, one blade between each row, the wires crossing the metals at 9in. apart between the bricks. This floor, at four days old, upon a clear span of 7ft. 6in., supported 806lb. at the centre, equal to 1,612lb. distributed load, or say, 153lb. to the foot super, in addition to its own weight, with a deflection of ⅛in. A concrete section of same dimensions made at same time for contract with the brick, composed of same amount of Portland cement with same number of metal blades, sharp sand being substituted for the brick, was incapable of supporting any load at four days old, and at the end of 7½ days, could sustain on a deflection of ⅛in. but 196lb. at centre, equalling 392lb. distributed load, or 37lb. per foot super. The brick section, when seven days old, sustained, on a deflection of ⅛in., 225lb. per foot super, in contrast with the 37lb. of the concrete floor. At the end of 12½ days, the brick floor sustained, on a deflection of 3-16th of an inch, 469lb. per foot super, as against 177lb. sustained on the same deflection by the concrete floor. Brick floor sections of 9in. and 13½in. deep, were also made and tested with equally remarkable results. Tested by fire, the most surprising thing discovered was the ability of common stock bricks to resist heat and flame equally with the best firebricks. These floors are, therefore, easy of construction; the materials to be found everywhere, cheap and abundant, and are put together like concrete constructions, without skilled labour, the bricks being merely well soaked in water, placed in position between the metals and then bonded by a cement grouting made of pure cement poured in between the joints of the bricks and stamped home.—I am, &c.,

THADDEUS HYATT.

21, Addison-gardens, N., Kensington, W.

GLASGOW MUNICIPAL BUILDINGS COMPETITION.

SIR,—As an intended competitor, I am interested in the rules laid down, but do not agree with the Glasgow architect on the subject. The action taken by the magistrates is singular, but I think not unwise. Their own architect is, it appears to me, the proper person to make the plans, as he is in contact with the various officials who will occupy the building, and therefore best knows their several requirements, and he has time to quietly study the best arrangement possible. The result of his labours may reasonably be expected to be something superior to the "happy-go-lucky" result of a competition, hastily as such things are usually done. If a strict rule had been made that the elevations were to keep exactly to the plans as drawn, there might be a difficulty in harmonising them; but as license is allowed, I do not see that any injury need result in making the elevations subsequent to the plans. It is just such an arrangement as would probably take place if the same person designed both. If there is any radical defect in the plan, the designer of the elevation will probably advise, and be able to get it rectified. The two most important and least certain points, to my mind, are the appointment of umpire and the employment of a successful competitor to carry out the work. The umpire ought to be, I think, a person from a distance, the present or one of the past Presidents of the Royal Institute of British Architects. He should be free from local influences. I never knew a competition yet in which the local men did not depend upon interest as a means of success; and in spite of mottoes, the designs of local architects will assuredly be known. A fair field and no favour should be the motto of the ruling committee. They should be careful in selecting their umpire and strictly act on his decision. With regard to the execution of the work, I suppose they wish their own architect to do it. But assuredly no one is competent to make the full-size details of the elevation save the man whose conception the elevation is; therefore the way to reconcile matters would be that the elevation-designer and the plan-designer form a partnership for the carrying out—one to make drawings, the other to superintend. There need be no difficulty about this.—I am, &c.,

M.

"ARCHITECTURAL SCANDALS."

SIR,—A letter signed "Architectus," containing certain reflections upon our professional conduct, appeared in your last week's issue, and we desire that you will, in fairness to us, insert our reply.

The animus of the writer is not veiled by his shallow pretext of regard for the interests of the profession, nor did his assumed name for a moment deceive us as to his identity. The writer was Mr. C. O. Ellison, of Liverpool, a Fellow of the Royal Institute, one in whose office both members of our firm have spent a considerable portion of their time, the latter only leaving on the 9th inst.

We venture to suggest to Mr. Ellison that as he could not, with ordinary decency, have made his attack upon us openly, it would have been better, under all the circumstances, not to have made it at all. If, however, his zeal for professional purity did not permit him to remain silent, and he belived that the rules of the Royal Institute had been infringed, nothing would have been easier than to have laid and proved a complaint against our Mr. Bleakley there. None knew better than Mr. Ellison, however, that no by-law of the Royal Institute had been infringed, for (1) No *rule* on the subject of professional charges exists in the Institute code, and (2) Our reasons for our conduct had been fully explained to Mr. Ellison *before* the publication of his attack upon us.

On the 24th inst., our Mr. Murray called upon Mr. Ellison and requested him to sign a recommendation for his admission as an Associate of the Institute. Mr. Ellison at first demurred, on the grounds set out in his letter, but after hearing Mr. Murray's explanation, *did sign the nomination paper*. We ask your readers' attention to this dilemma: If Mr. Ellison was not satisfied with Mr. Murray's explanation, why did he sign a paper declaring Mr. Murray to be a fit and proper person to become an Associate of the Royal Institute? On the contrary, if he *was* satisfied with that explanation, why did he afterwards permit the publication of a letter reflecting upon our conduct?

Members of the profession in Liverpool and Birkenhead, who know Mr. Ellison and know us, will not find it hard to supply answers to our query.

Our reasons for quoting two per cent. for our services are as follows:—

(1.) No survey or preliminary sketches would be required, because plans of the present building are in existence for the use of the architect.

(2.) The male and female wards being duplicate, the working drawings would be simple repetition.

(3.) The work required being an extension, and the existing buildings being of the plainest possible character, no detail drawings would be required, but that it was chiefly a question of superintendence.

(4.) On reference to "Hirst's Architectural Handbook," we found that in dividing the 5 per cent. over the various departments of an architect's services, 1¼ per cent. is put down for "general drawings, plans, elevations, and specification," and 1¼ per cent. for "personal supervision and superintendence," making a total of 2½ per cent. Then allowing from this, half per cent. in consideration of plans of the existing buildings being provided, we arrive at the amount of our quotation, 2 per cent.

The matter shall not, however, rest here. We challenge Mr. Ellison to a mutual investigation before the Council of the Royal Institute, in the course of which we do not fear any light which he may throw upon *our* professional dealings. We trust *he* is as confident, but should recommend him, meantime, not to pose too publicly as a vindicator of professional morals.—We are, &c.,

Bleakley and Murray.

59, Hamilton-square, Birkenhead, March 31.

THE BRITISH ARCHÆOLOGICAL ASSOCIATION.

Sir,—Permit me to modify one of the statements in your otherwise accurate report of the last meeting of this association, which I have just noticed.

Satisfaction was expressed that the Fratery at Carlisle was not to be faced with new stonework; but from the reply to our representations I stated that this work had not been contemplated.—I am, &c., One of the Honorary Secretaries.

32, Sackville-street, London, W., March 30th.

It is expected that in the course of the present week Mr. Ford Maddox Brown will commence work upon the first panel of the mural decorations of the new Town Hall, Manchester.

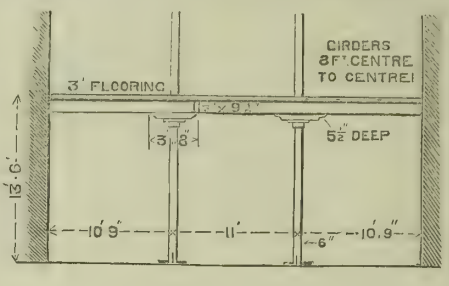
Intercommunication.

QUESTIONS.

[6079.]—**Measurement of Earthwork.**—Can any reader recommend a reliable work for calculating cuttings and embankments, or give a correct method? I have Bashforth's tables, but do not exactly understand them.—F.

[6080.]—**Crushing Weight per Square Inch.**—I have been unable many times to find out the meaning of the above when reading various works on strains, &c. I can understand the meaning of so many lbs. per square inch pressure in a boiler. If some one, through your most valuable journal, would kindly illustrate the above, I, with many others, would feel very grateful.—Student.

[6081.]—**Weight Store-Floor to Carry.**—I would feel obliged by some contributor informing me how many cwts. to the superficial foot a store-floor would safely bear? I am anxious to know, as, according to my



calculation, the floor, not taking into account the bearing piece, 5½in. deep over columns, would not carry the 2½ cwt. to the foot superficial usual for warehouse-floors. When calculating, do you take the length of span, as clear of the headpiece over columns, or take the entire span, and only look to headpiece for additional stiffness?—Caution.

[6082.]—**Royal Italian Opera, Covent-garden, E. M. Barry, Architect.**—I have before me some published lithographs of the ceiling of this work, and would be obliged if some reader who has the privilege of viewing the building can give me a little further information about the following:—In what year was it erected? What are Bielefield's fibrous slabs used in the ceiling, the small holes cut through same, and mode of decoration? The positions of the decorations are shown on my plan. Are the four arches which form the four sides of the square circumscribing the circular ceiling, covered with the same fibrous material as the ceiling, or are they plastered? There is a circular opening 12ft. diam, shown in the centre of the ceiling—is it for lighting, or ventilating, or both? Is it glazed or left open? What kind of roof is used to cover the workshops over ceiling? The least information will be very thankfully received.—William Griffiths, Birkenhead.

[6083.]—**Emigration.**—I am informed the Earl of Dunmore intends proceeding to the Western States of America to purchase large tracts of land and erect towns thereon. Can any reader give me any particulars of this scheme?—L.

[6084.]—**Water Supply.**—Water has lately been introduced into the town in which I live. There is a pipe run along the street in which I reside, but it is kept about fifty yards from my door, and the commissioners refuse to carry it to my door. Can they compel me to pay assessment for water? An answer will oblige—Kanyaka—for Another.

REPLIES.

[6048.]—**Wall and Gable.**—I think it is clear that under the Metropolitan Building Act B. could be compelled to build an external wall on his own ground. I will illustrate this by supposing that B. had erected his new building 10ft. higher than A.'s wall. The Act says, "every building shall be inclosed with walls." Now, in the case I have supposed it is clear that as B. has no right and property in A.'s wall, he cannot build on it. He must therefore build an external wall against it, resting "on the solid ground," to inclose his new building, and if this is the case for a building of the suggested height, it applies equally to a building of a lower height than A.'s wall, for "every building" must be treated in the same way. Again, clause 2 of the first schedule requires that return walls shall be bonded together—*i. e.*, a front wall with a side wall, a side with a rear wall, &c. B. cannot bond his walls with A.'s walls, as that would be a trespass. He cannot, therefore, have complied with the Act. Further, the definition of external wall clearly points to the fact that it is an inclosure to one building only. It is already the inclosure to A.'s building, so that it cannot be that also to B.'s. There is one loophole, and only one for B., and that is on the assumption that he has acquired, by 20 years' enjoyment, the use of A.'s wall to the height of the building now being erected. In that case the wall called A.'s is a party-wall to that height.—Edwin T. Hall.

[6070.]—**Orientation of Churches.**—I do not know of any church built before the Reformation that does not favour the custom of praying towards the east, but the exigency of modern progress appears to be breaking through that custom in the churches of the faith in which this custom originated. I know three Catholic churches of considerable interest in London that were built irrespective of this position. The late Oratory, Brompton (and I suppose the new one will be so), St. Mary's cathedral, Moorfields, and the church of the Immaculate Conception, Farm-street. The custom prevailed very generally with the Early Christians of turning towards the east in prayer, and the majority of ancient churches were built with a view to favour this custom. The reasons given for this practice by F. O'Brien, in his "History of the Mass," are the following:—First, because the east is symbolic of Our Lord, who is styled in the Scripture the Orient from on High, the Light and the Sun of Justice; secondly, the Garden of Eden was situated in that region, and thence did the Magi come to lay their gifts at the crib of Our Lord on Christmas-morning; thirdly, according to St. John Damascene, when Our Lord hung upon the cross His back was to the east and His face to the west. We, therefore, pray to the east that we may, as it were, be looking in His face. Fourthly, the Early Christians prayed in this direction in order not to resemble the pagans, who moved in every direction, now praying towards the sun at midday, now towards the moon, and again towards the stars. The Saracens prayed towards the south, and the Jews towards Jerusalem, and the Mahommedans towards Mecca.—P. Shaw.

[6073.]—**Mathematical Question at the R.I.B.A. Exam.**—Please rectify my answer to the above question I gave last week. My answer should have been 317ft. 540 cubic inches, instead of 317ft. 504in., which "Two in a Fix" will find constitute a rod of brickwork.—Oliver H. Kenny, Dovercourt.

STAINED GLASS.

Charlton.—A stained-glass window has just been placed in St. Paul's Church, Charlton, in memory of the late Rev. H. J. Balchin. The subject selected is that of The Good Samaritan. The window was designed and executed by Messrs. Heaton, Butler, and Bayne, of Garrick-street, London.

Denbigh.—The great south-western window in the modern church of St. Mary was formally opened on Saturday week, after being filled with stained glass from the manufactory of Messrs. Rowland and Co., Liverpool. The window is a six-light one, with cinquefoil tracery in the upper part. The six principal lights are divided into two parts, the lower portions containing full-length figures of the Twelve Apostles, with their names beneath, and a background of foliated work. The upper portion contains three subjects: the Annunciation by the angels to the shepherds, Paul preaching to the Athenians, and, in the centre, John the Baptist proclaiming the advent of the Lamb of God. Above are figures of Faith, Hope, and Charity, and in the apex is the Agnus Dei. The inscription beneath the window states that it is erected to the memory of Lewis Lewis, M.A., for 24 years rector of the parish, who died October 7th, 1876.

Folkestone.—A stained-glass window has been placed in the north transept of the parish-church of Folkestone. The window, which is a five-light one, is filled with figures of our Lord and the four Evangelists, and below the figures are subjects taken from the life of St. Matthew; the tracery above the window is filled with figures of angels with musical instruments. The artists are Messrs. Heaton, Butler, and Bayne, of London.

WATER SUPPLY AND SANITARY MATTERS.

Proposed Sewage Farm for Salisbury.—The Urban Sanitary Authority of Salisbury, having petitioned the Local Government Board to empower them to form a sewage-farm between Salisbury and Britford, an official inquiry as to the expediency of complying with the terms of the petition was opened at the Council-house, Salisbury, on Tuesday week, before Captain R. C. T. Hildyard, one of the Inspectors of the Local Government Board. The Mayor was first called, and, while expressing his general approval of the scheme (it having been adopted by the council), said he should be much pleased if the Local Government Board could substitute another and a better plan for it. Mr. Bothams, city surveyor, was examined in support of the scheme; but Mr. Lovibond, ex-Mayor, made a statement in opposition to it. He looked upon the Southampton-road scheme as far preferable to the Britford. It was stated by Mr. Whatman, in the course of an address in opposition to the scheme, that £67,766 would be the cost of the land, while providing for pumping, engineering, and other works would cost £14,000.

CHIPS.

We notice that the patent, No. 1599, dated 1879, for improvements in pneumatic signalling and communicating apparatus, is to be sold at the auction mart, London, early in April next, unless previously disposed of by private contract. Mr. C. J. C. Pawley, of 26, Moorgate-street, E.C., is the auctioneer, of whom copies of the specification of the patent may be obtained.

While some workmen were on Thursday night removing the centering from beneath a bridge just erected on the new Arbroath and Montrose railway, the whole structure suddenly fell, leaving nothing standing but parts of the abutments. The workmen but just had time for retreat.

The Lancaster town council on Thursday decided to erect a new infectious diseases hospital on the Marsh, and also to supply water from the borough works to the parish of Scotforth, just without the borough, at the rate of 7½d. per 1,000 gallons up to 2,500 gallons per day, and at 7d. per 1,000 beyond that amount.

LEGAL INTELLIGENCE.

Metropolitan Building Act.—At the Marlborough-street Police-court on Wednesday, March 31, before Mr. R. M. Newton, Robert Dennett and Co., of 5, Whitehall, were summoned by Robert Walker, district surveyor of St. Martin's-in-the-Fields, for doing certain work at No. 28, Haymarket, and neglecting to give the said Robert Walker notice in writing, stating the situation, area, height, and intended use of the building about to be commenced. Mr. Poland, barrister, appeared for the defendants. Mr. Walker said he had to proceed against Messrs. Dennett and Co. for having done extensive works as builders and contractors on the premises of the Co-Operative Stores, No. 28, Haymarket, in violation of the 38th section of the Metropolitan Building Act, whereby they had incurred a penalty, under the 41st section, not exceeding £20, to be recovered before a justice. The 38th section provided that the particulars of any proposed works should be notified to the district surveyor by the builder at least two days before the commencement of such works. The term "builder" was defined as applying to and including a master-builder, or other person employed to execute, or who actually executed, any work upon any building, so that any person doing work was, for the purposes of the Act, a builder. The intention of the Act, he submitted, was, that the man who did the work was responsible to the constituted authorities for what he had done. There were very important points involved in this matter; not as regarded the mere giving of notice, but because the giving of notice was, under the Act of Parliament, and also under the new by-laws, the preliminary step to all the proceedings which could be taken by the district surveyor, so that, unless notice was given him, he had practically no control over what might be done. At the end of the 38th section it said that all the works upon any building which were in progress at one and the same time might be included in one notice; but in this case Messrs. Kirk and Randall, the contractors for the external building, had no control over, and were in no way mixed up with, the work being done by Dennett and Co., and therefore he could not hold them responsible under the by-laws for that work. Hence it became imperative for him to take this action, which he extremely regretted the necessity of taking, to compel the defendants to give him notice, or at all events to obtain the decision of the magistrate, as there were other proceedings before the Board of Works dependent on that decision. The question at issue was whether separate contractors for works involving the whole weight-carrying power of buildings, and affecting to a great degree the construction of the internal party-walls, to be at liberty to do all those works without any supervision whatever, either for the public safety or the Act of Parliament. Personally, he could say that if they were held to be exempt from giving notice, it would relieve the district surveyors of a great amount of responsibility, and it would become their duty to inform the Home Secretary that the clause in the Act of Parliament was perfectly useless. He then called Mr. George Haly, who stated that he was secretary to the Co-operative Stores, 28, Haymarket. They were carrying out large buildings there. Messrs. Kirk and Randall were the contractors for the general work. Messrs. Dennett and Co. were putting in the fire-proof floors, &c. They were working for the stores, and not for Messrs. Kirk and Randall. The stores had a separate contract with Messrs. Dennett and Co. By Mr. Poland: Mr. Thomas Verity is the architect of the entire buildings in course of erection. Messrs. Kirk and Randall, of Woolwich, are the first contractors. We have a separate contract with Messrs. Dennett and Co. for the construction of their patent fire-proof floors. Messrs. Kirk and Randall are to work conjointly with Messrs. Dennett, so that the two sets of work may fit in together. One of the clauses in the contract is that Messrs. Kirk and Randall are to give the notices to the district surveyor and to pay all fees. Witness, by means of plans, explained to the magistrate that a certain portion of the works originally designed had been already completed, the building to which this summons had reference being a separate part of the building. The works had been going on since 1877. Messrs. Dennett's fire-proof floors had been put in those buildings which were completed. Mr. Newton asked if Mr. Poland wished to contend that the district surveyor was entitled to have no notice at all? Mr. Poland: He is entitled to one notice, certainly, from Messrs. Kirk and Randall, and I am told he has had that notice. Mr. Newton: Is there any reason why Messrs. Dennett should not also give the district surveyor notice? Mr. Poland said there was. The district surveyor's fees were something like £25 in each case; and as Messrs. Dennett were constructing a number of these fire-proof floors, it was a serious matter to them. In answer to the magistrate, Mr. Walker said there had been three or four cases decided similar to this, and in each it had been decided that every builder who had a separate contract must give notice of his independent work. One notice had been given him by Messrs. Kirk and Randall, but that notice referred to the building in connection with the stores in Oxenden-street, and had no reference to the building at 28, Haymarket. Mr. Poland contended that the buildings were one and the same, but on further investigation it appeared that the original notice did not cover the works at 28, Haymarket. Mr. Randall said he had given verbal, if not written, notice of the works at 28, Haymarket, but Mr. Walker said it was essential that the notice should be in writing. Mr. Joseph Randall was sworn, and stated that his firm had been engaged for three years on the works at the Co-operative Stores. The fire-proof floors, iron girders, joists, &c., were fixed by Messrs. Dennett and Co., and the ironwork rested on and was built into the walls. His firm had nothing to do with supplying or fixing the ironwork. Mr. Walker pressed the witness as to whether in case of accident he would be responsible in regard to Messrs. Dennett's work, also whether he could supply the particulars of that work should the particulars be called for by the district surveyor. Mr. Newton disallowed these questions, saying the only issue he had to try was whether Mr. Walker was entitled to be served with a separate notice by Messrs. Dennett and Co. or not. He wished to ask Mr. Poland how, if Messrs. Dennett did not give separate notice, the district surveyor was to get at the particulars of Messrs. Dennett's work. Mr. Poland replied that all the plans could be seen on the premises. The architect designed the whole building, but it became necessary to employ Messrs Dennett to put in the fire-proof floors, &c., because they had the patent for that work. All that the Act required in the case of a new building was that notice should be given to the district surveyor of the width, depth, and height, area, number of stories, and intended use of the building. That notice Messrs. Kirk and Randall, the first contractors, had given, or would give, in regard to this particular building, and he contended it was not necessary for persons like the defendants, who were employed to do certain works in the new building, to give separate notices. If that were to be so, it might involve the necessity of half a dozen notices, as there might be several different kinds of floors in a building, to say nothing of patent lifts, hot-water apparatus, &c. In cases where an existing building was to be altered, he admitted that it might be necessary to give separate notices of the different classes of intended works; but in the case of a new building being erected, all that was required by the Act, was a notice setting forth the height, depth, width, area, &c. The district surveyor then knew what kind of a building was about to be erected, and could obtain any particulars from the plans. In cases of that kind, where a number of different works in a building were going on, they might be all included in one notice, and it did not make any difference that the works were being done under separate contracts. Mr. Walker said that if one builder was doing all the work in a building with the exception of the party wall, and that party-wall was being executed by another builder, they always insisted that the builder executing that party-wall must give separate notice. In this case Messrs. Dennett had constructed horizontal fire-proof walls, and were therefore equally liable to give notice under the act. After some further conversation Mr. Newton said: You see, Mr. Poland, the surveyor has had no notice at all. The notice which has been produced does not relate to 28, Haymarket, but only to Oxenden-street. Somebody must give notice for the works in the Haymarket. Who is to do it? Mr. Poland: The original contractors, Messrs. Kirk and Randall. Mr. Newton: Well, we have got rid of that difficulty. You admit that Mr. Walker is to have one notice from somebody. Now, the question is, ought he to have two notices? What have you to say to that? Mr. Poland said the magistrate would understand that in a building of this kind, where Messrs. Kirk and Randall entered into the original contract, they were subject to these patent floors being put in by Messrs. Dennett and Co., and without going into details, it was obvious that the two contractors must work together. For instance, Messrs. Kirk and Randall put in the foundations for the stanchions and the stone templets in the walls for the girders to rest on, &c., and he contended that the general notice given by them to the surveyor was a sufficient compliance with the Act. Mr. Walker admitted that it was optional for the works to be included in one notice. If Messrs. Kirk and Randall would take the responsibility and make an arrangement with the other contractor, and give him (Mr. Walker) notice of all the work in the one notice, he would be only too pleased to deal with one person instead of two; but where separate works were being done by contractors who had no control over each other, he must have the particulars of the separate works. Mr. Poland contended that particulars of the works were not required to be given in the case of new buildings, but only in case of structural alterations in existing buildings. It was sufficient to notify to the district surveyor the height, depth, width, area, number of stories, and intended use of a new building, and then the surveyor could go and see for himself how the work was going on, and whether the Building Act was being complied with. After further argument, Mr. Newton said it was admitted that the surveyor was entitled to one notice of the works at 28, Haymarket, and that notice, which had not yet been given, must be given by someone. As to the question of a second notice, he saw breakers ahead, and any decision he might give would probably be appealed against, and cost all the parties a lot of money. He wanted to prevent that if possible, and he therefore advised that one notice should be given, and that that one notice should include all the works. Mr. Poland (after consultation with his clients): As I understand, your suggestion is that Messrs. Kirk and Randall may give a notice to the district surveyor relating to the uncompleted portion of this building, and include in that notice the particulars of the work which is being done by Messrs. Dennett? Mr. Newton: Yes. Mr. Poland: And I understand the surveyor very fairly says he does not want double notices with the view to double fees and all the difficulties likely to arise. The suggestion appears to me reasonable, and my clients accede to it. Mr. Walker asked the magistrate to impose a nominal penalty. Mr. Poland: That would involve a decision that Messrs. Dennett are liable to give notice. Mr. Newton: I want to avoid all that if I can. I want to bring you together. I shall adjourn the case for seven days, to enable the summons to be withdrawn, on the understanding that Mr. Walker receives a notice from Messrs. Kirk and Randall, which shall include the works to which the present summons refers. I hope I shall hear no more about it.

Ruston v. Tobin.—Sir R. Malins on Wednesday week delivered judgment in this action, which was originally brought by ten persons who claimed to have an agreement set aside for the purchase from the defendant of a patent for an improved mode of ventilating rooms, and of the apparatus thereof, on the ground that they had been misled by the defendant's representations, made, as they alleged, before the contract was entered into, and which they asserted to be false, to the effect that he believed the patent to be valid. After the commencement of the hearing the limited company to whom the plaintiffs had sold their interest under the agreement were, by order of the Court, added as plaintiffs to the action.—The Vice-chancellor said that the plaintiffs had failed to prove fraudulent concealment or misrepresentation on the part of the defendant, and for his part he did not believe that there had been any wilful concealment or misrepresentation on the part of Mr. Tobin. He was, no doubt, unduly sanguine as to his patent. It appeared that the plaintiffs knew when they entered into the contract that the validity of the patent was being attacked on all sides. That fact should have put them on their guard and caused them to make stringent inquiries. It was agreed on both sides that his Lordship was not called upon to decide as to the validity of this patent. And he would not give any opinion upon it. But after hearing three of the defendant's witnesses—scientific men—declared that this was the best system of ventilation yet known, and that in their opinion the patent was valid, his Lordship did not feel at all certain that if its validity had been brought to trial in an action it would not have been established; but even if the plaintiffs had proved fraudulent concealment and misrepresentation on the part of the defendant, which they had not, their conduct subsequent to the alleged date of discovery, and, indeed, since the commencement of the present action, had deprived them of any right to relief. By allowing the company to be joined as plaintiffs in this action (and without this the action would not have gone on) the books of the company were able to be put in evidence, and from them some very material facts relating to the dealings of the plaintiffs with this patent after this action commenced were brought to light; for it was shown by the minute-book of the company that it had sold and granted licences to work the patent to several persons, and had appointed agents in various counties for the purpose—and had, in fact, dealt with the patent as the absolute owners of it. This conduct disentitled them to come now to the court and ask for relief, on the ground of misrepresentation and fraud. Upon the whole case, his Lordship was of opinion that the plaintiffs had failed to make out any case of fraudulent misrepresentation or concealment on the part of the defendant, and they had by their conduct since September, 1876, disentitled themselves to relief. The plaintiffs' action must therefore be dismissed, with costs, and upon the defendant's counter-claim he must have a decree for specific performance of the contract so far as it remained unperformed. But as the defendant had admitted that the Belgian patent had lapsed, and as it appeared from the evidence that the French patent was not valid, there must be a reference to

ascertain what deduction the plaintiffs were entitled to have made from the £3,000 which remained unpaid in respect of these two patents; and the plaintiffs must pay the costs of the counter-claim.

Our Office Table.

The Dublin Sanitary Association has just published a pamphlet upon the sanitary arrangements of dwellings, being a modified issue of a paper read by Dr. Chapman before the Public Health section of the British Medical Association at Cork in 1879. The pamphlet deals with some very ordinary evils, and proposes the remedies for them. For instance the author suggests that "rat-holes" are sure indications of imperfection of the sewerage, and that their presence may be taken as evidence that a source, or more than one source, of ingress for sewer-gas exists. The practice of throwing deodorants down sculleries or water-closets is singled out by the pamphlet as a useless make-believe. Temporary relief from "bad smells" may be obtained, but the sewer-gas is not rendered innocuous. Amongst its conclusions are that water for drinking should never be taken from a cistern; that the basement of every house should be well above the level of the ground; that walls should be papered with smooth paper; and that the gutters of the roof should be cleansed at least once a year.

One of the last links connecting the existing period of art with that of 50 years ago has been severed by the death of Miss Martin, on the 23rd ult., at an advanced age. She was the eldest daughter of the celebrated John Martin, the painter of "Belshazzar's Feast" and other well-known works of remarkable power and genius. His daughter was a lady of great intelligence and vigorous intellect, and won the admiration of all the artists and men of letters who attended her father's periodical *soirées*. Mr. Joseph Bonomi, the celebrated Egyptian archæologist, Curator of the Soane Museum, had married a younger sister, and when he was enfeebled by infirmities during the later years of his life, Miss Martin materially assisted him in his official duties by her active co-operation in the superintendence of that interesting collection of antiquities in Lincoln's-inn-fields, where she won the respect and confidence of the trustees by her thorough administrative qualifications. She had a wide circle of literary, scientific, and artistic personal friends, who deeply regret her loss.

Nine years have passed since we drew attention to the Corrugated Metallic Venetian Window Blinds, then lately introduced by Messrs. Hodkinson and Clarke, of Birmingham, and it is satisfactory to know that the public voice has unanimously endorsed the opinion we pronounced. We have now before us a new price-list issued by the firm, in which, amidst much other matter worth notice, will be found an illustrated description of their "Queen Anne" blind. This blind can be made in any wood, used anywhere with advantage and elegance, and will, without doubt, altogether supersede the ordinary ugly and inconvenient Venetian blind, in houses where any pretensions to comfort or substantiality prevail.

The arrangements for the Technological Examinations of the City and Guilds Institute are now complete, and notice has been issued to all Secretaries of Science classes throughout Great Britain and Ireland of the system to be adopted. These examinations are worked concurrently with, and on the same system as, those of the Science and Art Department. They will be held on May the 12th, on which day also part of the Science examination is held. By thus availing itself of the existing organisation of the Government, the City Institute is enabled to hold its examinations all over the kingdom, as there are now no places of importance at or near which there is not a centre for the Government system. There are thirty-two subjects of examination, covering all the chief industries of the country, all at least in which the application of science is such as to enable theoretical knowledge to be tested by examination. Any workman, or any person connected with any manufacture included in the scheme, wishing to obtain a certificate testifying to his knowledge of that manufacture, has merely to apply to any one of the numerous local Secretaries of the Science and Art Department, and ask him to return his name as a candidate to the Office of the Institute at Gresham College. When the day for examination arrives, the candidate will have to present himself at the centre where he has sent in his name, and he will find a paper of questions ready for him. If he succeeds in answering these, he will in due course receive a certificate. There are now over fifty classes in different parts of the kingdom, in which students are being prepared for these examinations, but the examinations are also open to any person whoever who likes to try for a certificate or for one of the prizes given by the Institute. Further information can be obtained on application at the Halls of the Companies of Mercers, Drapers, and Clothworkers.

The promoters of the Ecclesiastical Art Exhibition, having been unable to obtain permission from the Metropolitan Board of Works to maintain the intended temporary building—which we illustrated on the 5th of last month—for more than two years, have decided to erect a permanent structure. Having been well supported, the committee felt justified in taking an eighty years' lease of the site on the Victoria Embankment near Beaufort-buildings, and this was signed on Monday week. Mr. John P. Seddon, the architect, has remodelled his plans to suit a brick and stone structure, with co-operative homes adjoining, and a contract will very soon be entered upon. The title of the undertaking will be "The Ecclesiastical Exhibitions and Museum," and it is intended to invite loan exhibits for summer and winter displays.

CHIPS.

A new lighthouse is being built for the Trinity Board at Langness Point, near Castletown, Isle of Man. The lighthouse, dwellings, and storehouses will occupy a site of 3½ acres, situate about 350 yards from the extreme point of land, and close to the coast line, and will be surrounded by a 5ft. stone wall. The buildings, being on high ground and greatly exposed, are very solidly constructed, the greatest height being 20ft. to apex of roofs, except the lighthouse, which will be 45ft. high. The latter is 31ft. internal circumference at the base, with a 4ft. thickness of wall, and has now attained a height of 14ft.

Mr. G. Martin Hindes, surveyor, died at his residence at Margate, last week, aged 76. For nineteen years Mr. Hindes acted as town surveyor, a post he relinquished in 1872.

The corner-stone of a new chapel at Haslingden, for the United Methodist Free Church, was laid on Good Friday. Mr. Edward Potts, of Manchester and Oldham, is the architect, and Messrs. Williams and Hope, of Dinting, near Glossop, are the contractors for the masonry. The other work is being done by local tradesmen. The cost of the building will be between £3,000 and £4,000.

Mr. Geo. Donger, a railway contractor well-known in the Eastern Counties, died suddenly at Ipswich, on the 16th ult., aged 52.

Mr. J. Whitehead has been appointed assistant-master of Derby School of Art.

A meeting was held at Sandford, near Dublin, on Monday, to take into consideration the proposed enlargement of the Episcopal church. It was stated that the chancel and one aisle were in course of rebuilding, under a contract which had been taken at £1,500, and by resolution it was decided to add a second aisle, and thus complete the alterations at a further cost of £1,000. The architects, Messrs. Patterson and Hemphill, were accorded thanks for professional advice and help gratuitously given.

By a fire which broke out in Towcester Town-Hall on Monday, the clock-tower and roof of the building were destroyed.

A new organ, built by Messrs. J. W. Walker and Sons, of London, was dedicated at the parish-church of Thornhill, near Wakefield, on Easter Tuesday.

The work of restoration at the large Perpendicular church of St. Mary, Bury St. Edmunds, is to be continued, as an effort is being made to restore seven of the windows on the south side of nave. Mr. Cottingham is the architect, under whom this and other contemplated works are to be carried out.

The parish-church of Ashby-de-la-Zouch was reopened, after restoration and enlargement, on Wednesday, the 31st ult. A new organ has been built for the church by Mr. A. Kirkland, of Wakefield.

At the last meeting of the River Eden Conservancy Board, the clerk was instructed to take proceedings in order to compel the Corporation of Carlisle to desist from discharging into the river Eden the sewage of the city, and a Committee was appointed to interview the Mayor and Town Council on the subject. At the present time the Corporation of Carlisle have made an application to the Local Government Board for power to borrow £10,900 to purchase land on Willow Holme, which is to be used for sewage disposal works.

In accordance with a report from their surveyor, the local board of Hornsey, N., have decided to pave the leading thoroughfares in the district with Victoria stone, at an estimated cost of £15,000.

The Metropolitan Board of Works, at their last meeting, accepted by 14 votes to 5 an offer from the Société d'Électricité de Paris to continue the electric lights on the Victoria Embankment and on Waterloo Bridge for a further period of twelve months at the rate of 2½d. per light per hour, being a reduction of ½d. on each on the previous rate. Contributions of £250 and £350 were voted towards the cost of widening of Grove-road, Mile End, and Fairfield-road, Bow, in connection with the rebuilding of bridges over those thoroughfares about to be carried out by the Great Eastern Railway Company.

The corner-stone of the new town-hall at Hastings was laid on Wednesday week by the Mayor. The new municipal buildings are being erected from the plans of the borough surveyor, Mr. Andrews, and are estimated to cost from £14,000 to £15,000.

The Rotherhithe vestry have accepted the tender of Messrs. Booth and Wheeler for paving works required during the next twelve months in the parish of Rotherhithe.

On Tuesday Lord Chancellor Cairns laid the foundation-stone of a new church at Bournemouth, which is to be dedicated to St. Paul, and is intended to accommodate some 700 worshippers. At present only the chancel, choir, transepts, and one bay of nave are to be built, at a cost of £2,000. Messrs. Hales and Sons, of Salisbury, are the builders, and the cost of carrying out the entire scheme of building is estimated at £6,000.

The new parish-church of St. John at Swansea, was consecrated by the Bishop of St. David's on Tuesday. The edifice has been built at a cost of £5,200, is Perpendicular in its style, and the materials are native stone for the walling and Bath stone for all dressings.

The West Ham local board have completed negotiations for the formation of a new main-road from Stratford to Canning-town, including a bridge 30ft. wide over the Great Eastern Railway at Abbey-road. The scheme was originally opposed both by the railway company and by the Metropolitan Board of Works, and a Local Government Board inquiry has been held as to the desirability of the proposal.

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MEETINGS FOR THE ENSUING WEEK.

Monday.—Society of Arts. Cantor Lecture No. 1, "The Decoration and Furniture of Town Houses." By R. W. Edis, F.S.A. 8 p.m.
Royal Institute of British Architects. "The Polychromatic Decoration of Various Buildings." By J. P. Seddon. 8 p.m.
Society of Engineers at 6, Westminster-chambers. 7.30 p.m.

Tuesday.—Builders' Clerks' Benevolent Institution. Dinner, Guildhall Tavern, Gresham-street. 6.30 p.m.
St. Paul's Ecclesiological Society. "Gems of Architecture." J. P. Seddon, at the Chapter House. 7 p.m.
Society of Arts. "Art in Japan." By C. Pfoundes. 8 p.m.

Wednesday.—Society of Arts. "Buildings for Secondary Educational Purposes." By E. C. Robins, F.S.A. 8 p.m.

Thursday.—Society of Arts. "Recent Improvements in Benzine Colours." By F. J. Friswell, F.C.S. 8 p.m.
Civil and Mechanical Engineers' Society. "Teredo and other Insects Destructive to Wood in Marine Works." By T. Cole, A.M.I.C.E. 7 p.m.
Society for the Fine Arts. "The Influence of Dramatic on Pictorial Art." 8 p.m.

Friday.—Architectural Association. Members' soirée. 8 p.m.

Saturday.—St. Paul's Ecclesiological Society. Visit to St. Paul's Cathedral under the guidance of F. C. Penrose, M.A. 2 p.m.

THE BUILDING NEWS.

LONDON, FRIDAY, APRIL 9, 1880.

THE EASTBOURNE TOWN HALL COMPETITION.

WE have seen the competitive designs submitted to the Eastbourne Local Board in competition for their proposed public offices. Two have been selected by the Board, the authors of which will receive the premiums of £75 and £50. The first premiated design bears the motto "Forward," and the author is Mr. W. Tadman-Foulkes (Town-hall Chambers, New-street, Birmingham); the second, under motto "Labore," is by Messrs. T. D. Barry and Son (Commerce-court, Liverpool). This selection has been made, we understand, after a careful examination and analysis of the 22 sets by Mr. W. C. Schmidt, the building surveyor to the Board, who has made an elaborate report on each of the designs with respect to the accommodation provided and the approximate cost of execution. The instructions to architects issued by Mr. Chas. Tomes, the town surveyor, left the competitors quite free as to the general arrangement and style, a schedule of the accommodation required being only supplied. The requirements included a board and justices' room 70ft. by 40ft., two retiring-rooms and lavatories, a committee-room, surveyors and clerks' offices, room for the medical officer and inspector of nuisances, a collectors' room, accommodation for a caretaker, lavatories, and a waiting-room; besides 12 cells. A more recent and supplementary instruction, issued by the surveyor, required the plan to be capable of sub-division into three wings, the first division comprising a board-room with retiring-room and lavatories, with provision for cells below, the other wings to be built as necessity required, and a general condition stated was that provision had to be made for as many other rooms as could be built at a cost not exceeding the £20,000. We cannot speak very highly of the architectural merits of any of the designs; neither do the plans generally display any remarkable power of distribution or economy of arrangement; but probably this is owing to the rather indefinite nature of the board's instructions which left competitors to their own devices, as to the general principle of the arrangement.

"Forward," which has been placed first, shows a well-distributed plan; the main frontage is centred to face South-street, and the office block is a parallelogram in its general outline. One decided merit in the plan is that the departments are divided into sections, and can be built as required; each has its own entrance; the surveyors' and other offices of the local board have a distinct entrance at the Mead's-road end; there is a central public entrance to hall; and at the north end the police department has a separate entrance, besides a fourth at the end. The cells are placed in the rear, approached by a back corridor, and have airing-yards; another parallel corridor gives access to kitchen and charge-room. These departments are divided structually by straight cross-walls which admit of easy separation. The author has given larger areas to the local board and building surveyor's offices than necessary, and the medical officer also seems very amply provided for. On the first floor in front, there is a town-hall over the police cells, kitchen, and charge-room, 73ft. by 40ft., and a board-room, retiring, and committee room; but the area allowed for these, together with the waiting and cloak-rooms, is in excess of the requirements. The town-hall extends from front to back, and is lighted on both sides. A large ink perspective accompanies this plan, which the author naïvely describes as "Renaissance and Late Tudor." We are glad the author has relieved us from the duty of defining the style; the details are somewhat incongruous and heavy, though the elevation is broken up by vertical quoins and pilasters, pediments and terminals, between which the windows alternate in width. There is a square tower over the entrance, crowned by a cupola, of quadrangular shape, apparently stone; but we are at a loss to call the upper-tower windows, with their ogee label members, anything else but Saracenic, and the same features occur in the labels of the upper windows of façade. We take exception also to the heavily-carved caps, which carry cornices, and there is a jumble of detail in parts. Brick and stone are the materials, and the author estimates his design at the sum of £19,000, a sum much below the mark if we cube the building at 1s. a foot. The author shows tube-ventilators over hall, and air-channels to cells. We may mention the author places the stabling and cart-shed in the rear, along the north boundary, between which and the main building there are large yards. With a few slight alterations in the arrangement, we believe the plan is capable of meeting the requirements of the board.

"Labore," the second premiated design, shows a main front block parallelogrammic in form with a return wing on the south-west end. There is a long middle corridor leading from the main entrance, which is rather on one side. The local board department occupies the right-hand side of front block; the town-clerk, collector, and medical officer and inspector are located in rooms along the front, with a committee and general waiting-rooms behind, on the other side of main corridor. The wing at the left end, which partly projects in the rear, contains the board and justices' room of the required size; the lighting of corridor, partly by a yard, is sufficient; and a grand staircase faces the main tower entrance. The arrangement, however, does not admit of sub-division so well, and we notice that the surveyors' offices are on the first floor, which is not so convenient as the ground-floor, for these functionaries. The police-cells are placed in the basement, but are not provided with conveniences. The author adopts Gothic for style; the composition is weak, and the detail tawdry and spiritless; the row of acutely-pointed windows lighting the ground-floor offices are sadly out of place, and do not at all harmonise with the windows above, which have square heads, turned at the corners. There is a tower over the entrance.

"St. Valentine" is a parallelogram-shaped building, with a large centre hall and stairs, but the space is wasted, and the departments not convenient for access or well divided. An elevation (tinted), with some good detail, shows a Renaissance design with lofty windows, and a centre tower springing out of roof. "Beachy Head" is the motto of a set of large drawings drawn to a 3-16ths scale in a Renaissance style; but the principal elevation shows a large gable end to board-room filled with elaborate ornamental detail, and the general façade is frittered in effect with pilasters, pediments, and other meaningless enrichments of Queen Anne character. The author has not complied with conditions as regards plan, the two corridors inclosing open area for light and the stairs, is an expensive and unnecessary expedient for public offices on a limited scale; the prisoners' cells are not well arranged, and many of the departments are in excess of the conditions. How can the author seriously think such a design can be carried out for £20,000? "Gardez bien" is a meagre Gothic design with centre tower and coarse detail; the section showing ceiling panels with figure subjects is wasted labour. In plan the hall is too large, to say nothing of the distribution of official departments. The plan is T shaped, the town-hall occupying the principal area with a range of offices along the front, a type of plan which seems to have been suggested by the surveyor in his original scheme for the offices. "Menu" is a Gothic set, with an elevation designed in a flashy style, and at the end looking very much like a chapel; the proportions are not good, and the detail is meagre. In the plan the author breaks his blocks, places his town-hall along the left-hand boundary, and his offices are not aligned to face South-street, but follow the crooked boundary of site. The artist who drew the perspective of "Tenez" would have wisely contented himself with a plain elevation, for he evidently ignores the law of perspective as regards vanishing lines in retiring points, nor is he more successful in the arrangement of his plan. In a second room several other designs are placed, but they are not relegated to it on account of quality, for we find as much variety and merit as in the first room. The first we look at is a huge, ponderous-looking ink perspective, with a melange of French Gothic and other detail, which impresses more by its mass than elegance of distribution. The motto is "Alpha X." The detail of the front is chiefly composed of heavily-shafted windows, between which is a series of figures under canopies, and above these the façade is fringed with lumpy pinnacles of preposterous size, flanking gables, while above the building rises a tower in three stages, with pinnacles of the same calibre. The whole design has a Brobdignagian look, and among the other sets it looks a colossus or a "Triton among the minnows." The detail is equally bulky and coarse. In plan the building occupies a square area, and the board-room is made a feature on the first floor in front, but the arrangement of offices is confused. "Cavendo Tutus" is a design, chiefly of red brick, in a Late Gothic style, well grouped, but not characteristic of public offices. It is shown in a half-finished washy perspective, and there are good points in the detail. The plan is on the surveyor's model, a large hall, 70 by 40ft., running rearwards from a front block of offices; the cells are placed queerly in a detached building on the north side, and are approached by a long corridor on one side of hall, but the official and sanitary offices do not comply with the requirements. The only cleverly-drawn design in Italian Renaissance is under the motto "Brick and Stone." The façade is well balanced and symmetrical, and has a centre projecting tower of considerable altitude. It is enriched by stone pilasters resting on a red brick basement, terra-cotta panels with subjects are introduced in the string-courses and friezes; but the design is far too ambitious for a range of local board offices, and the estimate would much exceed the stipulated amount. Brick and Bath Box-ground stone are proposed. In the plan the parallelogram has been taken with a longitudinal corridor, giving access to the offices in front, and a large hall and staircase opposite the main entrance. No attempt is made to subdivide the departments. "Palma Perseverantia" is too like a town mansion. A Classic square exterior of red brick with pediment over the front are the main features, but the plan is ill-disposed, and the corridors badly lighted. "Unit," in Late Gothic, is clever in the coloured perspective; the design of elevation is symmetrical, with a centre tower, and the plan follows suit. The hall appears to be ill-lighted, and the offices are all isolated by corridors, and would

be uneconomical in consequence. "Sussex" shows an Italian design of one story and order, suggestive more of a market than public offices. The plan comprises a central hall with a projecting demi-peristylar portico and two wings, or radiating blocks, retiring from the centre, so that the front is not in a straight line. The façade is of one order. The board and justice-room forms a centre cross-block, approached by side corridors, and the lateral wings are appropriated to the offices. We do not know the "Byzantine style of Italian," but that is the designation given to this design. "Experientia" is also Renaissance, with light and free detail, and a tower, well broken in the elevation; the board-room is made a cross-block at the end, and the offices on 1st floor in the main front building, but these and the committee and justices' rooms are not conveniently related for business. We can only glance at a few other designs. "Athenæum" is by no means characteristic of its motto, being in a flashily-vulgar Gothic dress, with a tower, and a badly-disposed ground arrangement. "Denzil on Shield" has not worked out his areas correctly, and his design is an *olla podrida* of Gothic features in red brick. It is much too fantastic. "Justitia" is another Gothic design with tower and spire, the latter of stone; but the plan is not well divided, the board-room is on ground-floor, and the police department in basement. "Spero" is Carpenter's Gothic, and has an ill-digested plan. "Fortis" suggests a chapel in its side elevation; the Gothic is Late, and a heavy tower entrance projects in front. The vestibule and stairs take up a large area in front of the justices' room with its corridors, and the offices are mixed up confusedly and are not *en suite*. "Prosperity to Eastbourne" is more ecclesiastical than official-looking; the elevations are tawdrily coloured, and the towers and general features heavy, while the plan is cruciform, with a central board-room. "Eastbourne, 1880," is a crude attempt at Renaissance, with a monstrous gable and pediment of hybrid Jacobean detail adorning the assembly-room; no departmental order is manifested in plan.

The chief fault in most of the designs is that the three departments of the building are not separated. The board and justices' room require its own public entrance; the surveyors', clerks', collectors', and sanitary offices should be arranged with its own entrances and means of communication, while the police department should be placed by itself in some easily accessible position.

The site has a commanding frontage, and when the design for the new hotel opposite is completed, and the contemplated widening of South-street is carried out, a good architectural position will be created, and whatever design is selected will either have a redeeming effect or be prejudicial to the position. We understand Mr. C. Warwick Tomes, the son of the borough surveyor, has prepared the design for the new hotel referred to. We append a list of the competitors:—

1. Messrs. Bromilow and Cheers, 409, Strand, London, "Experientia."
2. Mr. J. B. Carter, 3, Middle Pavement, Nottingham, "Eastbourne, 1880."
3. Mr. F. Denzil Thomson, The Oaks, Woodside, North Finchley, "Denzil" on shield.
4. F. T. Mercer, Bedford, "Fortis."
5. No address sent, "Sussex."
6. Alpha X, 7, Somerford Terrace Park, Tottenham, London, "Alpha X."
7. Messrs. Waterson, 9, Denman-street, London Bridge Station, "Spero."
8. Mr. H. Hammon, 82, Harley-road West, Upper Holloway, London, "Palma Perseverantia."
9. Mr. J. Johnson, 9, Queen Victoria-street, London, E.C., "Brick and Stone."
10. Mr. W. Fox, C.E., Durham, "Gardez Bien."
11. Mr. G. Fuller, 15, Cornfield-road, Eastbourne, "Justitia."
12. Mr. F. O. Ferguson, 12, London-road, Tunbridge Wells, "Unit."
13. Mr. J. H. Hirst, F.R.I.B.A., F.S.A., 8, Small-street, Bristol, "Athenæum."
14. Mr. Woodman, 2, New-road, Brighton, "Cavendo Tuto."
15. Mr. A. B. Roberts, 36, Tweedale-street, Rochdale, "Prosperity to Eastbourne."
16. Messrs. P. W. and W. W. McCarty, 11, St. James's-square, Notting-hill, London, W., "Menu."
17. Mr. P. Ogden, 25, Dickenson-street, Manchester, "St. Valentine."
18. Mr. F. O'Connor, C.E., Town Hall, Ennis, "Tenez."
19. Messrs. T. D. Barry and Son, Commerce-court, Liverpool, "Labore" (2nd premium, £50).
20. Mr. W. Foulkes, Town Hall Chambers, Birmingham, "Forward" (1st premium, £75).
21. Mr. J. R. Richards, 17, King-street, Cheapside, London, E.C., "Beachy Head."
22. Mr. B. Pyke, F.R.I.B.A., Ashford, Kent, "Faith."

WORKMEN AND ARTISTS.

ONE of the most obvious reasons why English art-workmanship does not hold the place we willingly accord to the work of Italian, French, and other foreign artists, is that the art-workman has been too long kept in the background. Every important work, be it a building or a piece of furniture, is done by contract; the architect undertakes to design and carry out in its completeness a building at a certain percentage on the cost; a builder takes his work by the lump, and, in every kind of occupation, we find the "lump" system prevails, to the exclusion of the actual artist or producer from a participation in the share of the credit commensurate with that he actually had in the work. If we go into the show-rooms and saloons of our leading manufacturers and decorative artists, and admire any piece of work, or any spécialité of workmanship, we often encounter a remarkable reluctance on the part of the head of the establishment to give us the name of the real artist or designer. That nameless and obscure individual, "our own artist," is credited with any merit of design or excellence that may be apparent, or we feel that the inquiry is evaded as intrusive or officious. On the other hand, when the work has been designed by an artist of repute, though unconnected with the regular staff of the house, the same reluctance is absent, and the object, furniture or wall-paper, is vaunted forth as Mr. So-and-so's design. In the preparation of architectural designs, it is hardly necessary to say that the system of delegation is carried so far as frequently to make it impossible to attribute the merit of a design to the reputed architect, and the evil goes on increasing under the present imperfect mode of conducting competitions. Can we safely venture to affirm that any of our recent Government buildings, possessing architectural merit, may be placed to the credit of the nominal architect? Can anyone deny that some of the most satisfactory results in the works of architects of large practice are, in part, due to those who work in the shade of obscurity? In Germany this kind of militarism or drill is found to be killing art. In decoration and sculpture, as in the accessory arts of architecture, the effect of the system is the production of a sort of expressionless design, and we find this character the more pronounced as the artists' interest becomes impersonal. How can we complain of the want of expression and decorative character in the work of our carvers and art-workmen so long as they labour unknown and unrecognised. Let us take the case of a large architectural façade in which the architect has provided for panels of bas-reliefs or bands of sculptured ornament. A given sum is perhaps included in the contract for the performance of the work. The contractor bargains with a carver to do the work at a certain price so that he may clear a profit. A carver is found, but can we guarantee his ability as an artist? Under the system, however, that does not much matter. The architect has shown something—wreaths, foliage, sprawling cherubs—it matters not what; the carver has to translate the rough sketch into stone sculpture. He is probably left to his own resources, but he has no personal interest in his work, as the builder gets the credit after the architect. In work of a superior character an architectural sculptor is employed, and although probably the rough idea of the sculptural details emanates from the architect, the sculptor follows his own nose, and turns out either work of artistic merit, or spoils the building by an extravagant excess of sculptured detail of the most indifferent quality. Wherever we find good sculptured detail, we discover the artist has a reputation that has been acquired by years of independent study of the best models; and further, that he is free to work out his individual ideas, and not the mere mechanical tool of the contractor, who is ready to carve any quantity of wall surface by the yard, or for that matter, by the acre if required. To estimate the difference in the skill of the two artists, we have merely to observe the sculptured detail in keystones and spandrels in some of the London streets. We might point to instances in the Strand, Fleet-street, Cheapside, and Oxford-street, where the architect's work has suffered from the irresponsible hand of the routine carver, and to a few other examples where the architect's work has been heightened and intensified by the introduction of foliage and figures; we may instance some of the carving in the New Law Courts. An incompetent artist is invariably the most ambitious and prolific. His compositions lack the moderation dictated by situation, and the purpose of the building; balance of light and shade is lost sight of, grouping and symmetry are ignored, and the sculpture is often as dull and expressionless as the handling is wanting in precision and delicacy. Very often we have to complain of the over-naturalness of foliage, of the coarse realism of figure-groups, and the want of coherence and congruity between the architecture and ornament. Misapplied ornament is never ornamental; as, for instance, when we see keystones loaded with coarse foliage, or pilasters filled with wanton arabesques. In ordinary decoration there is a self-assertion also that destroys the repose and effect of the whole design; and the quality is more strongly marked in the works of incompetent craftsmen. In the Greek and Mediæval periods the ornament is never misapplied, never self-assertive; and it is only the revivers of these styles, and some Jacobean artists, who are so thoughtless and lavish as to give us the cheaply-bought labour of workmen who have never conscientiously studied any art-school. Renaissance ornament is frequently misapplied in our modern buildings and furniture, and we scarcely ever see a panel treated with the delicacy and refined taste of the specimens preserved in the Italian Courts, or the South Kensington Museum, casts from originals in the Vatican, and other Italian examples; and perhaps for the very reason that they have been copied so often as to have lost their value, and cramped the workman's power of doing better. We have not only to give the workman independence, but to make him an artist. We must afford him facilities to acquire the rudiments of his art. He must be taught technically the nature and properties of wood and stone, iron or brass, textile and other fabrics in which he has to work; but he must learn also the principles of ornament as applied to buildings and furniture. He should be taught to discern the difference between idealism and realism, between decorative and pictorial art; the line at which direct imitation of nature should cease for decorative purposes; he ought to understand that there is a decorative value in plants apart from their natural beauty, and that ornament should be modified according to the circumstances of each case. In the study of the human figure the art-workman ought to learn the difference between the artist's model and that of the architectural sculptor, and especially the

mode and limits of application to architectural purposes, before he can attain to the position of a Phidias or Praxiteles in the art of sculptural decoration. Decorative figure-work must be studied by a reference to the works of Greek, Etruscan, Middle-Age, and Cinque-Cento artists. Style must not be overlooked, though it should never hamper, as the same general principles of composition hold good in Classic as in Mediæval design; the influence of "authority" and antiquity has, perhaps, done as much to fetter originality as the bondage of the "lump" system of contract, in which a man works in the dark without profit or pleasure.

Let us take the beautiful sculptures to be found in the friezes and the tympanum and other parts of the Tomb of the Judges, and of unquestionably Byzantine Greek character, and examine the flat undercut delicacy of design and modelling of the foliage. Have we anything modern so characteristic, so sharp, or so delicate? Violiet-le-Duc illustrates the beautiful sculptures of some of these parts in his "lectures." Or let us take the Golden Gate at Jerusalem, which he attributes to the age of Herod the Great. Can any modern sculpture compare with the acanthus-leaves in the capitals below the arch, either in beauty and vigour of design, or crispness and delicacy of execution? In the arch which springs directly from these capitals we find a series of similar conventional ornaments, composed of the palm and acanthus, equally sharp and delicate in the handling. All these sculptures are clearly the work of artists imbued with the right principles of art, left free and independent instead of fettered by the meaning of some foreign style, and by the individual fancy of the architect, like our modern artist groans under. The beautiful sculptures at St. Mark's, at Venice, over which Mr. Ruskin goes into raptures, were carved by artists trained in the same school and under similar conditions.

The craze for "little bits," transferred from some distant and antiquated structure to modern town-buildings, has been mischievous in destroying what little spirit and vitality the workman can throw into his work. But beyond this, the prescribed forms used by artists seriously interfere with a point which Mr. Ruskin has dwelt upon with much truth and force: we mean the proper kind and quantity of ornament. He observes, in his "Seven Lamps," p. 179, that "those styles of architecture which are picturesque with respect to sculpture—that is to say, whose decoration depends on the arrangement of points of shade—rather than on purity of outline—do not suffer, but commonly gain in richness of effect when their details are partly worn away; hence such styles, pre-eminently that of French Gothic, should always be adopted when the materials to be employed are liable to degradation, as brick, sandstone, or soft limestone; and styles in any degree dependent on purity of line, as the Italian Gothic, must be practised altogether in hard and undecomposing materials—granite, serpentine or crystalline marbles." These observations might, with advantage, be extended to details in other styles, but we quote them chiefly to show the value of technical and artistic culture for our rising artists. In the Middle Ages, which have been so appealed to for all excellence in workmanship and design, every workman was an artist, and in no period was the decorative value of figure or foliage so well understood. Much as we may laugh at the anatomical ignorance committed, yet in Gothic figure work we find the crudities still copied, saints with wry necks and protruding eyes, and feet flattened out in ludicrous perspective, while the value of line and shadow, the decorative unity and balance of the compositions, are ignored entirely. Ruskin condemns strongly the degrading influence of modern society and art upon the operative, which is converting him into a machine, and in his "Stones of Venice" he somewhere observes, speaking of division of labour, that it is not the labour that is divided, but the men which are broken up into "small fragments and crumbs of life." We feel that there is much truth in the observation, and that the purposeless kind of art we have been dwelling upon, and which is now manufactured wholesale in our midst, is owing chiefly to the evils we have mentioned: the sinking of the art-workman in the nominal decorative artist or contractor, and the absence of facilities by which he may become a competent competitor in works of decorative or artistic character.

A RECENT VISIT TO RUSSIA.—IV.

ON our northern way, from Riga to the shores of the Gulf of Finland, we will beguile the journey with a discourse upon the geology, the physical features, and the vegetation of the country, and upon the construction and maintenance of the railways.

In the south of Russia in Europe we are surprised to find it a series of sandy plains, and the native rocks strewn over with vast deposits of glacial detritus. This is the character of the ground from the Baltic to the Black Sea; here and there we find deposits of loam or sandy clay, from which bricks are plentifully made; but their quality is not such as to render them suitable for facing purposes. Of stone, other than the produce of the primitive rocks, as Silurian limestone, we find but little evidence, and these are mostly used towards the north, or, in other words, towards the quarries of the native rocks which abound in Finland.

The land is more or less strewn over with glacial blocks of variant size, increasing in a perceptible degree as we journey north, until, as on the shores of the Finnish Gulf, they assume colossal proportions—a detail we shall have occasion to notice in connection with the statue of Peter the Great at St. Petersburg. These boulders are cleared from the land by blasting, breaking, or burying, and the cultivated portion in the south shows few signs of them, except in the hill-sides, the railway cuttings, or trenches, or amidst the trees on the waste or forest lands. These boulders are largely used in the basements, or lower portions of the buildings, and we are of opinion that before the introduction of bricks, which was certainly prior to the thirteenth century, the principal buildings were constructed of rubble masonry with raised or random joints. The evidence of this is given in the church of St. Basil at Moscow, where the outer walls are treated in this manner, the groundwork being coloured red and the joints white or green. This church, erected in the time of our Henry VIII., is of brick, the outer face being plastered and lined with random joints to represent rubble masonry. If bricks are left out of the question, the nature of the country dictates the adoption of this primitive class of building. In the north of Russia the native rocks are largely present on the surface, and the country is more or less a series of mountains and lakes. These rocks are of volcanic and aqueous origin, and they are largely drawn upon as building materials in St. Petersburg and the towns and cities on the Finnish Gulf. These rocks are mainly red and grey granite, a class of stone but slightly faulted or broken, from which fact monoliths of fabulous size are hewn therefrom, some of which we shall have occasion to notice in reviewing the public buildings of the metropolis.

Following these we find basaltic and trappean rocks, which, wrought and polished, make beautiful statuary, after the Egyptian type, or, tooled and laid in courses, form substantial basements to the better class of buildings. Following these we have marbles of variegated colours, the geological position of which is identical with the serpentines of England. Some of these, as pavement blocks, washed by the molten snow, afford pleasing examples of colour as you walk the streets of the cities. Following these we have stratified limestone of Silurian origin, which, from its high state of crystallisation, is used as a native marble; but from its blue veins, or bedding marks, is not to our mind a pleasing material. Lastly, we find a buff sandstone; but from its rarity as a building material, we infer that it is but sparingly quarried. Of its position in the rocks we know but little; its ferruginous character suggests that its place is amongst the upper beds of the Carboniferous series.

The richest quarries are in Finland, and the richest mines are in Siberia, the northern part or portion of Russia in Asia. We shall make no allusion to these latter rocks, further than to note the decorative class of gems or stones they produce, in the form of lapis lazuli, and malachite, the former an azure crystal found in the silver-mines, and the latter a vernal stalagmite found in the copper-mines, both of which we shall have occasion to notice in due course.

So far as the

VEGETATION OF RUSSIA

is concerned, we shall have no need to travel beyond the range of timber-trees. Over the whole of Russia the Scotch-fir and the spruce-fir abounds; but as we have noted these woods in connection with the trade of Riga, we shall pass them by, simply remarking that, where forest-grown, they are fine specimens of vegetation, and being evergreens, they lend a colour to the winter landscape that is both weird and strange. With these trees, throughout the whole of their range, the silver birch is found, a wood of fine clean growth, one but sparingly imported into this country, for clog, brush, and bobbin making, and for general turnery purposes, owing to that of Sweden being so much nearer the English market. For fuel it is accounted the king of woods, and its bark is used for lining purposes after the manner of our felt. In Moscow we noticed its use for damp-courses in the lower part of the brick walls. In the south of Russia the oak, the lime, and the ash abound. The oaks are clean grown; but by no means remarkable for size; the branches partake of the straight character of our elm, the elbows and zig-zag lines common to the branches of our oak, being singularly absent, from which we infer that botanically they are the *Quercus sessiliflora*.

The lime being so abundant has associated the people throughout all time with the management of bees, and southern Russia is a land literally flowing with honey. The wood of this tree is highly prized for its mild texture, and the easy manner in which it can be wrought into furniture and coopery for domestic ware. The inner bark is largely woven into matting for linseed and other bags, which in the end find their way into England as packing mats for furniture, and for horticultural purposes. The ash is less prolific than with us in England, and in this northern clime it loses its quality of toughness, which renders it so valuable to our makers of agricultural implements; it thus falls into the place of the American ash, being largely used as a joinery and cabinet wood.

In St. Petersburg, where it appears to live down the oak, it is used for the framing of outer and inner doors, for lobbies and house-fittings, and for floors laid in squares of various patterns.

From this large intermixture of deciduous trees in the forests of the south, they much

resemble those of our own country, with the exception that the trees are straighter, and of a greater altitude; but in the north, where the fir, the spruce, and the silver birch hold sway, you need no reminder that you are far away from the woods and forests of old England.

From the level character of the land in the south of Russia in Europe,

RAILWAY CONSTRUCTION,

except where the great rivers have to be crossed, is a simple operation. Tunnelling is practically unknown; the only one we noticed being a brick construction through a hill, or bank of drift, near Wilna, a point about 170 miles to the S.S.E. of Riga. The ground through which the railway cuttings are made is of a troublesome class, and the slopes rarely admit of being so steep as 45 degrees, and evidence is not wanting where landslips have occurred on banks of 30 to 40 degrees. The mode in which the engineers deal with this troublesome class of ground is very suggestive; the banks in most cases are marked out in a series of diagonals, and along these lines rows of stakes are driven into the earth level with the turf. In other cases a broad terrace is formed half-way up the slope, and in this a series of wells are sunk to catch the top or surface water; the bottom of these wells are connected with the open drains on either side of the permanent way, which drains are invariably lined with planks.

At Dunaborg, about 130 miles east of Riga, our guide was an old Scotchman, who, years ago as a contractor, left England with his savings of £5,000, and operated successfully in Denmark, Prussia, and Russia, in the construction of railways. His last contract was in Finland, where the rocks to be pierced were of the most crystalline character; but these did not deceive him so much as crossing the valleys of the rivers, the banks of which, for a great width, were fine quicksand which swallowed everything he placed upon them, an act that ended in devouring every shilling of his capital and driving him penniless from the works. He is now in the sere and yellow leaf, an operative in a wagon-works, sighing for a sight of "the ould countrie," to which his wife, who has buried two children in their cheerless clime, refuses to return.

We were told that most of the Russian railways are the work of English contractors, and that the great lattice-girder bridges crossing the rivers were framed at the English ironworks.

With few exceptions the lines are single, the metals, chairs, and sleepers, being the same as is common with us in England. The gauges, for military or strategical purposes, are variant, and in no case where they touch the frontier are they the same as those across the border. The engines, with the exception of having no "cow-lifters," are truly American, being constructed for burning wood. The carriages, in all their details, are alike trans-Atlantic. The first class are saloons, the second class are about on a par with our first, and the third of the same type as that with us. The doors open into lobbies at the ends of the carriages, and the conductors have free passage through the length of the train. The centre of each carriage has a recess, on the one hand for a large stove, and on the other for a retiring closet. The windows are double glazed, and the internal temperature is kept up to 15 degrees of heat, Reaumur (66 Fahr.). The fuel of the stoves is fir-wood, and, after the stokers have trimmed the fires through the length of the train, the outlook in the night is truly satanic, for the path of the train is marked by gushes of steam and millions of fiery sparks. The rate of travelling is slow, and as the distances are great, the passengers who bring bed pillows with them, live day and night on the line. At the principal stations ample time is allowed for refreshments, which are cheap and good in quality; spacious halls are devoted to the joint accommodation of the first and second class passengers, with which are incorporated the dining-halls and the refreshment-buffets. These halls are fitted with double doors and windows, the former in the form of lobbies. The warming is effected with gigantic porcelain stoves, fixed in each corner of the rooms, and a summer atmosphere is steadily and regularly maintained. The floors are invariably of oak and ash, laid in squares of about 12in., but from their bad condition, and the extensive ways in which nails and screws have been inserted, they go far to convince us that floor-facings of this character are unsuitable for the ground level, the wood being humid beneath, and dry on the upper face.

The commoner floors are of cement, in which are bedded, in bands or patterns, fragments of granite, trappean, and other crystalline rocks.

The working of these railways in the winter season is a costly process, owing to the length of line to be kept open, and the tendency of the cuttings to fill with drifted snow. The labourers on the line are clad in sheepskin caps and coats, with the wool on the inside, their feet are buried in high felt overboots, and their hands in wadded gloves. Their place in the early winter is on the top of the embankment, where, if our blooming hawthorn would thrive, they would be little needed. Their work is to build, to fix, or to erect, hedge-like snow screens, which from their variant character are remarkable works; here you may see wooden sleepers piled in zig-zag pattern, or reared up in close file and banked on either side with snow, or we find them formed of posts, upon which are nailed sheets of wood formed of thin boards. In other instances you may see hedges formed of branches of spruce-fir stuck in the snow, or rude walls built of blocks of snow cut into squares with wooden spades or shovels. The snow lies but thinly on the land, and hence, in ordinary seasons, these primitive screens are capable of dealing with this evil.

(To be continued.)

REPAIRING MAIN ROADS.*

EXTENDING only over twenty-one pages, and costing but sixpence, this little pamphlet contains more practical information than many a volume of fifty times its bulk and price. Its author is the Surveyor to the Holland Division of the county of Lincolnshire, and the information now published was compiled by him at the request of the magistrates of his division, for the information of the highway surveyors in that part of the county. The applications for copies have been so numerous that, with the consent of the magistrates, it has been reprinted for general circulation.

It has been so clearly demonstrated that good roads well kept are less expensive to maintain than bad ones, and that the art of roadmaking is just as much a trade as bricklaying or plumbing, that the wonder is that in all parts of the country highway surveyors are allowed to go on in the old rule-of-thumb fashion, using bad materials at the wrong time, and unskilled labour; apparently with the idea that anything harder than a rotten cabbage-stalk was good enough to make a road with, and any worn-out pauper from the union-yard good enough to lay it down. Not, of course, that the fault is in all cases with the highway surveyor. In many cases local ignorance and mistaken notions of economy must divide the blame; but to whichever cause it may be due, the fact exists that some of the main roads near the capital itself—almost suburban in fact—are in a condition that would discredit the inhabitants of our youngest colony. To those who are responsible, we earnestly recommend the perusal of Mr. Wheeler's pamphlet.

The first conditions of a good road are, of course, level surface and hardness. Ruts once allowed to form, and all possibility of the maintenance of a good road is gone. Mending the ruts disturbs the road, and the surface, instead of being hard and unyielding, gives way with the first heavy load that passes over it. The prevention of the formation of holes and ruts by the frequent application of small quantities of material should, therefore, be the first care of the surveyor. The time at which to place the bulk of the annual supply required for the restoration of the surface is another important matter. If not put on in the early part of the winter, no matter how well bedded and set it may seem in the spring, the material will inevitably work loose in the summer. Of course material must sometimes be put on at other times than in the early winter to repair bad places. When this is the case, the surface of the road in the defective place should be broken with the pick, the material drawn on one side, and the new granite placed in the hollow thus formed, and covered with the loose material or any road-scrapings or road-dust that may be handy. A bad place thus repaired will soon become firm and level, and if a little attention is paid to it a month after, will generally keep so. When ruts and tracks have been formed, it is essential that the roadmen should not be allowed to put the new granite down in all three tracks at once. If this is done, the horses must walk between two of the rows of fresh stone, and all the weight of the wheels being concentrated on one place, fresh ruts are quickly formed, and the road is soon squeezed out of shape. Sometimes, in districts where roads are not kept level, the men are allowed to let the water off after heavy rains, by dragging openings in the sides of the ruts with a sharp-pointed hoe. This is about the shortest and most effective method out for completing the ruin of the road. As Mr. Wheeler points out, where the grip is, there will always be found adjoining it in the rut a hole into which every wheel jolts down, making the road uneven, and opening a way for the water to sink below the surface material. Moreover, the grips themselves are dangerous to horses. Bad as ruts are, they had better be let alone altogether than repaired in this fashion.

The contour of the road is an important element in its capacity of duration. Many roads are too round, and the consequence is that, in addition to the legitimate wear and tear from the downward pressure of the wheels, there is a lateral wear from the tendency of the wheels to slip sideways; and so the sides of the road are continually being ground out of shape. On too round roads, moreover, the traffic has an inevitable tendency to follow in the same track along the middle of the road, that being the only part where the vehicles can remain upright, and thus ruts are formed, and depressions by the horses' feet, so that the road wears worse, and is always wetter, than a flatter road, on which the traffic is more evenly distributed over the whole width. The proper form of a good road should undoubtedly be elliptical, that is, with a small inclination in the middle, and a much steeper fall at the sides to the gutter or water-table. Mr. Wheeler gives a total fall from the centre to the sides at the rate from half to three-quarters of an inch in every foot of the part metalled as sufficient for a good road. This would be 5in. fall each side in a road 20ft. wide, and

* Hints to Highway Surveyors on the Repair of Main Roads. By W. H. Wheeler, C.E, Memb. I.C.E. London: E. and F. N. Spon.

proportionally for roads of greater or less width.

With regard to materials, we agree altogether with Mr. Wheeler that nothing is so efficient or so economical as granite or whinstone. It is only *apparently* dearer in its first cost, for it covers much more ground and lasts far longer than gravel or limestone. There are now few parts of the kingdom where granite cannot be procured, and where anything like heavy traffic prevails its use, or that of whinstone, should be insisted on. Slag from the iron furnaces, with which in many parishes it has become the practice to repair the roads, is a very deceptive material. In spite of its apparent hardness, it is very brittle, and is soon reduced to a slimy mud. As a foundation, or to help in binding the granite on a sandy bottom, it is useful, but its want of toughness and wearing surface renders it a very expensive and unsatisfactory staple material. Material should be always carted on to the roads in the summer. Traffic over the roads in winter is saved, the material is ready to hand when wanted, and in far better condition than if but just carted, inasmuch as granite, like most other stones, hardens by exposure to the sun and wind. Under no circumstances should material ever be shot out of the carts on to the road. If this is allowed, wherever the heap falls, the smaller pieces of stone and the dirt will be allowed to remain, the results being an uneven distribution of material, and consequent unevenness of surface. When, from any cause, it is absolutely necessary to put material on to the road from the cart, it should be shovelled out and carefully laid on.

The proper formation and maintenance of water-tables is most essential to really good roads. A proper water-table or gutter should be formed with an edge cut in the grass like that of a garden-path, openings being left at intervals to let the water get away to the ditches. Roads thus kept, certainly dry more quickly than when kept otherwise, and however much some persons may be disposed to sneer at the idea of keeping a road with its sides as neatly trimmed as those in a gentleman's park, it will, in the end, be found cheaper than the plan followed in some districts of chipping the whole of the grass off the sides of the road from the granite to the ditch. The latter plan allows the surface material of the road to squeeze out laterally; in the former the sides of the water-table support the road and prevent loose stones from being kicked into the ditches. Water-tables lose half their value if they are not well kept and cleaned out annually. The best time for the latter operation is in the fall of the year, and as soon after harvest as possible. The roots of the grass and weeds are then destroyed, and will not grow again before the wet winter weather sets in, when the gutters are most wanted. Some useful hints are given by Mr. Wheeler as to the best method of cleaning out the gutters and the cost of the work.

On minor matters connected with road-maintenance, such as mud-scraping, loose stones, &c., he has also considerable information to give, and an appended copy of instructions as to claims for part of the cost on the county authorities will be found useful. Every highway surveyor should get a copy of the pamphlet, and in large districts a few dozen copies distributed among the foremen and the more intelligent of the roadmen would do good.

A new Baptist chapel and schoolroom were opened at Martham, East Norfolk, on Easter Monday. The building is Gothic in style, with open roof to chapel. The woodwork throughout is pitch-pine, varnished; the windows are glazed with tinted cathedral glass, and in place of a pulpit is a platform, with baptistery in front. Mr. Robins, of Norwich, is the architect, and Mr. Moore, of Martham, the builder.

THE DECORATION AND FURNITURE OF TOWN HOUSES.—I.

MR. ROBERT W. EDIS, F.S.A., F.R.I.B.A., delivered, at the Society of Arts on Monday evening, the first of a series of six Cantor lectures on the decoration and furnishing of houses. The lecture was of an introductory character, the history of furniture in all ages being traced to enforce the principles that truth, fitness, and beauty in decoration, and use and suitability in furnishing, are the bases of all good and artistic work. Mr. Edis explained at the outset that he was desirous of putting forth no dogmatic rules, of laying down no stringent laws; but rather to offer practical hints to those seeking to depart from the common-place and the vulgar in the decoration and furnishing of modern houses. He should not enter into a battle of styles, believing that true beauty and art forms were dependent upon no particular style, and that the first essential was that everything in the home should be as fitting as possible, and that extravagance and so-called "high art" should be subservient to comfort, truth of construction, utility, and general convenience. He presumed that his audience did not wish to make show-places of their homes, in which the fashion of an hour should be exemplified in the various monotonous dreariness of sage greens and peacock blues in papering, or in quaint eccentricities of design and form in furniture, and which in a few short years would be looked upon as crude and tasteless. In this country, where the love of home-life and its teachings of domestic comfort specially pertained, all questions of decoration and furniture were influenced by these conditions, and we could not expect in this age to obtain unity of taste or to have the strong harmonious feeling which brought about the great schools of religious painting in the middle ages. He could not but think that the fashion now prevalent amongst some artists, of decrying all modern art, arose from a feeling of shame in the workers at their own incompetence and a desire to slur over the ignorance by feeble attempts to copy the art of other countries. Our aim should be to adopt the artwork in our homes so that it shall be beautiful, fitting, and suitable. Thanks to the great progress made in architecture and painting during the past quarter of a century, to the general advancement of technical education throughout the country by the establishment of the Government schools of design, and to the great number of loan collections at home and abroad, there had been increased opportunity of studying art of all kinds, and especially of the offshoots known as the "decorative arts." The exhibitions in this country and on the Continent had exercised an immense influence on the taste of the public, and especially on that of the working classes, and had imbued every grade of society with a desire and love for the beautiful and a discontent for crude vulgarities and hideous forms. In passing the author spoke highly of the efforts made by the Society of Arts to foster and encourage the cause of art and science; alluding to its connection with the establishment of the 1851 Exhibition and the Government Schools of Design. In praising the present Schools of Art, he took exception to some of their teachings, especially to the continual use of geometric forms in which there were neither artistic feeling, beauty, nor life, and which tended to engender stiffness and conventionality of treatment in after work. Art-work should not be mere machinery of the hand, mere slavish repetition of some set pattern, but should be the skilful and artistic rendering of ornament treated with some variety of colouring and drawing. At the same time he did not agree with some eccentric artists who considered that no line or shade should be repeated, or with those who held that we should make our walls "studies" in particular shades of colour. Unfortunately, the decorative arts seemed likely to depend rather on luxury and fashion, than on any real love of art, and there had arisen a race of art-decorators who were creating a fashion in design worse than the dreariness of the dead days. While there had been a revival in ecclesiastical art-work, the subject of house-decoration had, until quite recently, been signally uncared for. He regretted that our decorators were not content to study the art-work of other nations without seeking to plagiarise or to adapt their forms and colours into our own manufactures.

Nothing could be more beautiful in itself than the art-work of China, Japan, and India, whether applied to textile fabrics, carved and painted woodwork, pottery or porcelain, gold and silver, or lacquer work; but nothing was more atrocious than the European imitations. From Oriental art could be learned skill and grace of design and workmanship, and power and beauty of drawing and colouring, but the art-workers of this country were not able to imitate such productions, and all attempts at copyism were but wastes of time and money. It was lamentable to see, in the late Paris Exhibition, the numerous examples of mongrel work of Oriental ideas, travestied in European hands, and worked out under totally different associations and traditions. This was especially noticeable in the Prince of Wales's collection, in the way in which the native chiefs, despising their own arts, had had literal copies executed in solid silver of the latest Birmingham imitations of Indian teapots and centrepieces. Indian rugs and shawls had degenerated under the same bad influences, and carpet-making had been damaged by the Government practice of forcing prisoners in Indian jails to manufacture carpets, thus extinguishing the caste weavers and their local traditions. The carpets thus made were poor in quality compared with the old examples, and the colours and pictures were crude and bad. As Dr. Birdwood had observed, the exhibition in the shop-windows of Regent-street and Oxford-street of electrotype reproductions of Burmese, Cashmere, Lucknow, Cutch, and Madras silver and gold work along with Manchester, Coventry, and Paisley imitations of Indian chintzes, kincobs, and shawls, was simply depraving and debasing to English manufactures and taste. The right and fruitful use of looking at superb examples of Indian jewellery, tapestry, and pottery was, as the same author remarked, not to make literal copies of them, but to kindle the sense of wonder and imagination in us to nobler achievements in our indigenous and industrial arts. It was, indeed, the lecturer considered, impossible to slavishly copy the varieties of Oriental decorative arts with any satisfaction in our own work, but we could learn much from their exquisite design and treatment, and could then adapt them for the decoration and ornamentation of our own homes. Just as a man might be judged by his friends, so could his artistic culture and love of beauty be arrived at by the nature of the things with which he surrounded himself in his home. Unfortunately, in many houses might be found decoration and furniture in which there was no element of beauty, in which costliness and vulgarity seemed to run together. Some of the art teachers of the day fell into eccentricity and grotesqueness of design and colouring; but as in the well-dressed women of our acquaintance, so in all art decoration, general harmony and simplicity of effect should be the impression left on the mind. The hangings, fittings, and general furniture of a room should not only be suitable for their uses, but in harmony with the general decoration of the walls; and this decoration should depend, not upon any fashion, but on the general appreciation and adoption of colour and beauty of form, and on a home-like feeling, made more interesting by the imaginative taste and daily art education of those who lived in, or visited, the home. House-decoration was not a mere matter of style, but a constantly-recurring pleasure. Large sums were, however, too often expended on internal decoration and furniture, without much idea of taste or common-sense; money was frittered away in pretentious extravagance, for gaudy decoration, elaborately-carved and inlaid furniture, and expensive hangings. In olden days good art did not mean prodigality of colouring and endless covering of wall and ceiling-space with meaningless pattern-work in various colours, but was made consistent with the requirements and associations of the period. Notwithstanding the fashionable tastes of the day seemed to decree otherwise, furniture of thoroughly good art-design, comfortable in shape and sound in workmanship, could be made without any extravagant outlay; and the plain polished or painted deal furniture of good design, was better than all the elaboration of Chippendale fretwork or Queen Anne ornamentation. The late Viollet-le-Duc, in his "Mobilier Française," expressed a hope that we should see a return to true taste in furniture, so that a thing should appear to be what it was, and not what one would wish it to be; and in this, un-

doubtedly, was epitomised one of the principles of sound taste. In amusing, if somewhat highly-coloured, terms, the lecturer pictured a house furnished after the fashion of 20 years ago, and asked if anything could be more terrible than to spend one's life amid such surroundings—confronted in the dining-room with dull monotonous walls, covered with garish flock-papers, or imitation *moire-antique* silk, with red curtains hung on a gigantic pole, blossoming out at the ends into bunches of flowers, or turned to resemble enormous hyacinth-bulbs; these curtains trailing on the floor, forming receptacles for dust and dirt; table-cloth and carpet alike brilliant in colour and sprawling in pattern, the furniture of the stiffest but most fragile kind, and the enormous glass in gilt frame over the chimney-piece matched by that over the so-called sideboard, and every feature miserably elaborated and inartistically gorgeous. But a true knowledge of decoration and real feeling for things artistic was not to be obtained at once; only by a constant study of nature and of really beautiful things of art did the eye become educated to perceive and appreciate. Foremost in the rudiments of art was the axiom that absolute truth must be the foundation of all good work; that ornament should consist of the enrichment of constructional lines, and that decoration should be added for show and effect, but should possess in itself fitness, proportion, and harmony of design and colouring. All striving after imitation and unreality was utterly at variance with good taste in decoration as in life. The author of "Recreations of a Country Parson" had pointed out that houses ought to be and could be pretty as well as healthy, and that since it was the will of the Creator that both beauty and utility should go hand in hand, the hope might be cherished that with the progress of art cultivation the time was not far distant when "every human dwelling should be so built and placed as to form a picture pleasant to all men to look at." In decoration and in furniture the great aim of the designer should be simplicity and appropriateness of form and design with harmony of colour, and to show that the cheapest and commonest things need not be ugly, and that truth in art and design need not involve costliness and lavish expenditure. It had been well said that "design is not the offspring of idle fancy; it is the studied result of accumulative observation and delightful habit"; and by careful regard to this our homes might be made, if not absolutely shrines of beauty, at least pleasant places where the educated eye would not be offended by gross vulgarity and gaudy common-placeness. It fell to the author's lot to review many of the exhibits in the last Paris Exhibition of trades specially cognate to art, and the opinion he formed therefrom was that although there was much art design and skilled workmanship, he found little or nothing which solved the important problem of providing really good and artistic furniture at a moderate cost. There was no reason why soft-wood furniture should not be made at a price within the means of all. Morris and Co. had designed an excellent chair in stained wood, comfortable and artistic if somewhat rough in make, for 9s. 9d.; and plain buffets and book-cases were made in deal, at the cost of a few pounds, which looked well and answered every purpose. Cretons and chintzes of excellent colouring and pattern could be bought for a few shillings a yard, and well designed and drawn paper at a mere nominal cost compared with the expensive French imitation silk and gold examples of a few years back; plain furniture of good form and appropriate design could be obtained from almost any really good upholsterer; and Oriental rugs, in combination with painted floors or Indian matting bordering, were as inexpensive as Brussels or Wilton carpets laid all over the floor. For more than a century the fashion of furniture, like that of architecture, had been continually changing, and they had had works either adapted or imitated from ancient Greek or Roman examples, or in later years based on Mediæval specimens, degenerating, as a rule, into vulgar and meretricious commonplaces, in which seeming quaintness, stiff angularities, and eccentric cuttings and projections did duty for the elaborate, though equally uncomfortable, finishing of the real work. The age of Batty Langley produced furniture as false as the rooms it was designed to fill. The later *rococo* period of pseudo-Italian work, in which stucco did duty for real stone, brought back the vulgarity and senseless imitation of the worst period of French upholstery. In still later days arose the fashion of so-called Mediæval furniture, based on no real knowledge of the actual specimens of furniture of the Middle Ages, which would itself be no more suited to the domestic habits of the nineteenth century than the cramped and ill-arranged smaller house of the Middle Ages would be adequate to the requirements of present times. In the eighteenth century the work of English upholsterers was much influenced by the designs of Chippendale, Sheraton, Adams, and Pergolesi, and in these were to be found general utility and comfort, combined with skill and delicacy in design and excellence of workmanship. So far, the present fashion of architecture had caused us to hark back to the work of these designers, and in much of the furniture of the present day their influence was clearly shown. As an architect, he could not but regret that, in these days, the designing of furniture was, as a rule, handed over to the upholsterer, and that houses were ofttimes filled with articles utterly incongruous in design, bad in taste and form, and often thoroughly commonplace and uncomfortable. This criticism did not apply to some of the principal manufacturers of this country, who were striving to lead the public into more artistic thoughts, and had provided for them work at once good in design and treatment, graceful and pleasant in form, and finished in the highest way, both as regarded artistic character and skill of handicraft. But like other artists, these men had a cloud of imitators whose works, while aiming to be cheap, were equally commonplace and nasty, and were fitted with carvings of execrable character, or with miserable painted daubs bad alike in drawing and colour, and eccentric in design. In the 16th century, furniture practically became more solid and less movable than had previously been the case, for there was now less insecurity, and, consequently, less need to prepare for sudden surprises. From this period dated the designing and making of elaborate inlaid and carved furniture of every description, until, in the time of Louis XIV. was inaugurated an age of pomp and luxurious magnificence in all articles of furniture and decoration, leading to the whimsical extravagence and ugliness of form, and to the costliness of metal chasing and elaborately gilt-bronze decoration known under the name of the inventor, "Buhl." In later days they saw a return to the purer work of the Renaissance. In the 17th century the use of porcelain, of Oriental design and make, was largely employed, until under Louis XVI., the beautiful plaques of Sèvres were substituted for Oriental panels, and the delicate colouring and exquisite painting of these intermingled with veneerings of various coloured woods and finely-wrought bronze-work. About this period were made, too, many of those marquetry cabinets in which various woods were skilfully inlaid in various designs and shapes. These kinds of furniture had great beauty and charm, but they were eminently costly.

In thus briefly sketching the history of furniture, the lecturer said he had no idea of suggesting its influence on modern work, but simply as an introduction to his subsequent lectures, in which he proposed to offer suggestions for the economical treatment of decoration and furniture, and the adaptation of both to modern necessities, rather than to discuss with what elaborateness and gorgeousness decoration and furniture could be made where money was no object. He should be satisfied if he caused many of his hearers to think more about art decoration and furniture than they had done hitherto, and if he could show them art was not necessarily costly nor a mere fashionable plaything, but something which rightly carried into every day life led to higher, nobler, and better thoughts. The present revival in furniture in good hands was working back to truth of construction, boldness of composition, and treatment, and strength and force of drawing. Thus might they hope that English art in decoration and furniture would eventually return to those days in which truth and study of nature, combined with knowledge of use and suitability, were the chief attributes of all good and pure design. And now that the Government was dealing with the art education of the people, one might hope that the fine arts, as applied to the internal decoration of our homes, as well as to architecture, sculpture, and painting, might be felt as the higher intellectual agents in fostering and moulding the well-being of man.

THE POLYCHROMATIC DECORATION OF VARIOUS BUILDINGS.*

I DO not intend to treat this subject, on the present occasion, *ab initio*. My present object is to bring forward, for the purpose of consideration and discussion, some broad general principles which should, I think, guide our practice as to the application of colour more than, as it appears to me, they have hitherto done. So long as architecture was a living, original and progressive art, the use of colour was both universal and profuse in all countries and all climates. Nature likewise seems to abhor absence of colour, as she is said to do a vacuum. No sooner does the annual coat of whitewash render glaring walls and roof alike of a Welsh cottage than she sets to work to convert it into a "harmony in greys" or some other delicate tints; and she soon mantles over with rich lichens and mosses the freshly-scarped side of a quarry or the garish slope of a railway cutting. The application of colour to architecture during the whole period to which I have referred, by every nation in succession, was simple, vigorous, judicious, and, in fine, right; almost as certainly so as it is in each landscape, beast, bird or flower that we see around us. But the "Renaissance," as it was called, of the dead languages of art at the close of the 15th century in Italy, turned architecture into a science of copyism, a compilation by the learned, an amusement for the dilettanti. Then all principles as to the application of colour to buildings seemed, as it were, to evaporate. The practice of it became a matter of mere individual taste; guided, it is true, for some time by artists of consummate talents, such as Raffaelle, his compeers, and immediate successors. Afterwards, however, as art became corrupted, this department of it fell under the caprice which individual want of taste might dictate. The result now is that in Italy the colouring flaunted outside its villas is shocking to every refined eye; while in England, safety has been more wisely sought in ignominious flight, and negation of colour altogether has come to be accepted as the *ne plus ultra* of educated and refined taste. Yet, even down to the present day, in the far East, whither the Renaissance has hardly penetrated, and had happily but slight effect, the old healthy natural feeling for colour survives; and it may continue to do so, until Manchester cotton goods, and the efforts of Europeans to teach the Orientals Cockney villa-building, succeed in effectually stifling it. The contents of our Indian museums and South Kensington loan collections show us that the unsophisticated natural instinct of mankind for colour is just and true, and that the practice of it, unbiassed by false theory, can be and has been handed down from generation to generation with faultless accuracy. It is obvious, therefore, from the briefest survey of Nature and past art, that there must be some principles which could and should guide us, if we could only rediscover them. And the possibility of contributing, in any degree, to so desirable an end has been the main motive for my having brought this subject before you. In consequence of the unfortunate perishability of polychromatic decorations, we know but very little as to what the artistically gifted nation of the Greeks thought and did with respect to it. We have but recently come to the conclusion that far from eschewing it, as our purist fathers fancied that they did, they, in fact, actually revelled in it. If we could but glean sufficient and reliable precedents from their works, we might save ourselves the trouble of endeavouring to concoct any theories of our own upon the subject, and content ourselves with accepting their practice as perfection, in the same manner as we recognise it to have been, so far as their aim extended, both in architecture and sculpture. It is perhaps, therefore, fortunate that we have escaped becoming entangled in such leading-strings in this department of art, considering how different the circumstances under which they worked were from our own. It certainly is so, if the crude tints given in some published illustrations as representative of

* By John Pollard Seddon, F.R.I.B.A.; a paper read before the Royal Institute of British Architects, on Monday last, the 5th inst.

what has been discovered of the colours employed upon Greek buildings, had authority in fact. A glimpse has been obtained here and there upon a few marble fragments that analysts tell us was cobalt, and lithographers have straightway been set to work to give us pure cobalt with a vengeance, and thence it has been assumed that the Hellenic polychromy must have been what we feel we could not ourselves digest, and had, therefore, much better avoid: and so but a little knowledge has become a dangerous thing. Perhaps the following extract from Professor Symonds's "Sketches in Greece and Italy" gives as good an idea, as can now be obtained, of what the Greek system of colour decoration really was:—

"To realise by fancy the many coloured radiance of the temples and the rich dresses of the votaries, illuminated by the sharp light of a Greek sun, which deprives outline of shadow, and gives value to the faintest hue, would be impossible. All that we can know positively about the chromatic decoration of the Greeks, is that whiteness, artificially subdued to the tone of ivory, prevailed throughout the stonework of the buildings; while blue and green, in distinct, yet interwoven, patterns, added richness to the fretwork and the sculpture of pediment and frieze. The sacramental robes of the worshippers accorded doubtless with the general harmony, wherein colour was subordinate to light, and light was toned to softness."

But time need not be lost in speculations as to what may have been the practice in classical times, and we can assert in passing, without lengthened comment, that Egyptians, Assyrians, Persepolitans, Indians, and Chinese all alike decked their buildings, without and within, with bright and yet harmonious colouring; and when we turn to the Eastern productions of the present day, we find, still universally, refinement and harmony both in the colours used, and in the the manner of combining and applying them. The evidences and remains that we possess of the polychromy of the ancients and of the Oriental world may be taken as certain testimony of the sense held therein as to the absolute necessity of the employment of colour, as the proper completion of works of architecture, and also of the acknowledgment of its power. What then, we may well ask, is that power? As an answer to this question, I venture to quote from some valuable notes on this subject, lent me some time since by Mr. Henry Conybeare, and to which I am also considerably indebted for several suggestions incorporated in this paper:—

"Polychromy in architecture can either increase or diminish the apparent scale of an interior; it can render it light or obscure; it can alter its proportions or accentuate them; it can produce the effect of distance or of approximation; it can amuse or fatigue; it can conceal defects or exaggerate them: it is a fairy who is prodigal either of good or evil, but who is never neutral; at her will she thickens columns or attenuates them; she heightens pillars or lowers them; she elevates the vaulted roof, or brings it down nearer to the eye; she enlarges surfaces, or diminishes them; charms or offends; concentrates the thoughts upon one idea, or distracts and pre-occupies them without cause; with the stroke of a brush she destroys a work that has been wisely conceived, yet at the same time she can convert the humblest edifice into a work of art full of attraction; she can change the coldest and most naked interior into a pleasant place where one loves to dream, and of which one preserves an ineffaceable remembrance."

It is, in fact, an instrument of such tremendous power that, while one searches anxiously, and, as it were, lovingly, for all traces of its use upon works of old, one is inclined to shudder when one sees it grasped by the hands of a contemporary. And why should we be able to trust so implicitly in the one case and yet be so faithless in the other? Because the artists of old acted according to a system founded upon experience and common-sense; and the decorator of to-day according to no system, but on experiment, and to please his individual taste. In the former case, success could be predicted, and in the latter, failure as the more than probable result. The isolation of the several branches of art has destroyed the strength that they once possessed from combination, just as the fabled bundle of sticks became powerless, when separated, to resist the force which had failed to break it when united. Polychromy, which absolutely requires complete understanding between the designer of the building and of the decorations, so that one mind, or at least minds of the same order, should direct and control both, has become entirely unsystematic, and a matter of mere individual caprice, the consequence of which is that the public are quite at sea as to whom they ought to intrust work of this character. So long as it is a question of a building of any importance, it is the usual custom to seek the assistance of members of the architectural profession, and they are then expected to find builders to execute their designs. But when it comes to the painted window to be inserted into the same building, or decorations to be applied, architects are naïvely asked what tradesmen they would recommend for the purpose; and should they reply, as would be most reasonable, with the advice that such work should be intrusted to themselves, or some other discreet and learned member of their own profession, the advice would be received with incredulous amazement, and, in nine cases out of ten, not followed. The existence of such a state of things, which is in no degree exaggerated, is of serious effect to our profession, and needs the utmost consideration; but what is of far more importance, it is of vital interest to the public, as the result of such things now is simply disastrous and destructive of their taste and good sense. Our cathedrals and churches throughout the country have by this means been turned into museums for the display of the most execrable parodies of art, which have produced colour-blindness, and I might almost say atrophy of intellect in the nation at large. It is but a few weeks since that a clerical friend of mine promised me, as a treat, the inspection of his church in the suburb of a large town, boasting that every window of it was filled with good painted glass. As I knew him to be a man of more than usual cultivation and refinement, I hoped, almost against hope, that something better than ordinary would be shown me. Alas, on entering, I could not help doubting the sanity of a congregation that could sit facing so constantly daubs of so wretched a description. The real truth is that people do not look at them in any fashion, not to say critically, but even observantly; otherwise they could not endure the glaring colours and grotesquely bad drawing that they would scout in the cheapest lithograph. They are content if patches of bright light and colour are thrown athwart the walls and pavement, and produce a generally brilliant effect which is due to the light and not the artist (forgive the misappropriation of the name) by whom the work was executed. But we need not travel so far for examples, when our own glorious Westminster Abbey is disfigured in like manner, and its scale diminished by the colossal size of the figures in the modern windows in the clerestory.* And with regard to modern buildings, we all know and deplore the costly fiascos which are of constant occurrence, whenever anything out of the ordinary routine, and even within the ordinary routine, is attempted; when the office of the architect to decorate his own building, which he has designed to produce certain effects, has been usurped by men, untrained to know even the use and purport of architectural features, and who look upon his walls, as they would upon canvases, as mere space whereon to indulge the wildest imaginations. Unfortunately architects, as a rule, are not credited, by the world in general, with being competent to undertake this branch of their art—dare I make such a suggestion, in this august assembly of the profession, that all architects are not so, and that there is some ground for this rather widely-spread opinion? At any rate, I fear we must admit that we have not any definite and recognised system among us, by which we can insure a right result, and that our practice is founded rather upon our own individual taste and fancies, which we have no right to impose upon the public as possessing indisputable authority. Then as to our painters and sculptors, whose artistic powers are far greater than our own, and who have achieved world-wide reputations, it may seem bold on my part to deny that they are not fit to be intrusted with the decoration of buildings. Yet I do so emphatically. I fully believe that if they would work in concert with architects, they would succeed. But, as a rule, they are wholly ignorant of architecture, and practically, if not theoretically, despise it. They are intolerant of the necessary conditions and limitations of true decorative painting. They cannot use restraint as regards foreshortening, perspective and aërial effects. Their nearest attempts to what is wanted are but gigantic pictures which need to be inclosed with frames, and so framed off, as it were, and separated and made distinct from the buildings they are supposed to decorate: and where this has not been done they have resolved the walls appropriated to their work into empty space, and so far as their work has extended have ruined the buildings. The few attempts made by eminent painters in designing stained glass have been great failures, from Sir Joshua Reynolds downwards. In fact, the pictures and statues of our noble English school of painters and sculptors are admirable so long as they are confined to their frames and their pedestals, but are an offence when intruded into buildings with which they have no necessary connection. Of late it seems to have been thought that architectural decoration is the special province of a few amateurs and trade decorators. In the case of St. Paul's Cathedral and in other instances, at the advice of amateurs, decoration has been taken out of the hands of architects, to be handed over into those of painters, to carry out with certain modifications the design of a sculptor, which I have no hesitation in pronouncing to be thoroughly unsuitable for the purpose. In other cases, again at the instance of amateurs, works of this character have been intrusted to decorators, who have been trained by and gained their position through architects, but who do not hesitate now to supersede them; and though the results may have a certain superficially correct effect, are wholly destitute of artistic feeling, and can only be counted as fine opportunities spoilt. It would matter little or nothing to the public who the parties to be engaged on such work should be, so long as they are found to be competent. Whether architects now be so or not, I think it capable of proof that they only can become so, and that neither painters nor decorators without them ever can be. But I pass from these remarks, which I have felt called upon to make, unpalatable though I know they must be to some, to try to show the remedy for the evils I have been pointing out and deploring. And where are we to seek it? Classical precedents being, as already pointed out, mainly conspicuous for their absence, we are almost compelled to fall back upon Mediæval precedents, and fortunately we shall not have to seek in vain. We shall not be able to discover the names of any great masters to whom even the *chefs-d'œuvre* of the polychromy of the middle ages are due; for it is not occasionally, here and there only, that success was attained, while failure or uninteresting mediocrity was stamped upon the majority of the attempts made; all seemed alike excellent and in good taste. We can, it is true, discern various degrees of merit and sometimes of demerit in the manner of drawing the figures introduced into the general scheme of coloured decoration; but the scheme itself and the character of its treatment were invariably good and the colouring harmonious. We may roam through scores of out-of-the-way villages in Norfolk and find in them church after church filled with mutilated fragments of richly-painted rood-screens. All of these are exquisite in design, charming in colour, and covered with most delicate and refined ornamentation. There is in the Institute Library a volume of highly-finished tracings from drawings made in some of these churches by Mr. Wardell, presented at my request by the late Sir William Tite, which may be studied with advantage. There are also monographs by Mr. Winter of the fine screens in Randsworth and Barton Turf Churches in Norfolk, in our collection, which convey a good idea of them. On the panels of these screens there are numerous painted figures of angels and saints, which are all good in general conception, and the draperies are ably drawn and designed in excellent style, while the heads, hands, and feet vary much in point of merit. In some cases heads (as at Barton Turf) may be found quite rivalling, while differing from, the productions of the early Italian School; and yet the extremities of the limbs of the same figures are uncouth even to grotesqueness. This fact proves the existence of an admirable system, by means of which decoration of a high order could be carried out and good effects produced, mainly by common workmen at moderate cost and under ordinary circumstances—a great desideratum at the present day. We may see the results of a like system if we take up a set of Chinese plates,

* The old windows in the clerestory of the apse have the figures in them of the proper scale always adopted in the middle ages, viz., less than life size.

in which we shall find upon close examination that although the general design, throughout the set, corresponds, the decorative effect being right in all, yet that the drawing and finish of the separate details vary considerably; one, or a few, out of the whole number being noticeably superior to the rest. The obvious conclusion thence is that a master hand set out the work, and that pupils or under workmen completed the others from the pattern given them, and that some system has been conformed to which has prevented any of the workers from travelling out of the right groove. That remnants of such a system in connection with coloured decorations still exist, may be inferred from a statement made in Curzon's "Monasteries of the Levant." That author relates that happening to visit some church at Mount Athos, he saw its whole interior decorated in an almost incredibly short space of time (some few hours) by a master painter, accompanied by several pupils, each armed with a different appliance. The master drew in the outlines of the historical subject to be represented, and his pupils followed and in succession filled in with brushes from pots of pigments of different colours, the portions of the several figures or of the background as evidently determined beforehand. All obviously knew exactly what they had to do, and did it, without waste of time in experiments. The result was, as may have been expected, conventional and stiff, yet yet the general effect was good and harmonious. There are several churches in Norway which still retain, nearly intact, the whole of their original Mediæval coloured decorations. These have been fully and well illustrated in a work by M. Mandelgren, a copy of which is, I believe, in the Institute Library. This book is worthy of particular attention by students of polychromy, and it is a mine of information besides upon the iconography of Christian art. It shows the system adopted in the middle ages, and its adaptation to buildings of quite a humble character, and that with a degree of completeness which it is almost hopeless to expect to find in any of the larger and more important buildings of Christendom, which have been more exposed to destructive agencies. There are, however, many scattered examples of polychromatic decorations in England and upon the Continent, now tolerably well known, which it would be tedious to enumerate. I shall refer only to a few in detail, as typical among them, and in order if possible to gather from them some idea of the system under which they were produced. The principal object with which the simple coloured decorations of the early Mediæval periods, known in England as Norman and Transitional, were applied, was in order to emphasise, make distinct and clear, the constructive parts of a building. These, it must be remembered, were very simple in themselves, consisting of broad spaces, with a few and bold but not deep mouldings. Breadth in colouring was therefore appropriate to this architecture. Projecting parts were accentuated by light warm tints, and hollows by dark and retiring and cooler ones. Stencilled borders were employed to throw up cornices, strings and vaulting ribs. The plain spaces of walling were made to appear solid and flat by decorations consisting of lines, suggesting but not directly imitating construction, together with other unobtrusive ornaments such as diapering, &c., with panels inclosed with borders for occasional pictures or figures, almost equally simple and conventional in character. The pigments employed in these early works were few and simple, and their medium merely size (that is they were *tempera* paintings), and they could not fail to harmonise agreeably. The earth-colours, red and yellow ochre, black and white, with a quiet-toned slaty blue, formed the moderate but sufficiently comprehensive palette for the purpose required, for the red mixed with black made chocolate, and with white formed rose; the yellow with black or with blue gave greens, and with white a creamy tint; then the black and blue mixed with white gave various greys. It is astonishing what variety can be obtained with these few simple colours and by judicious contrasts of warm with cool tints, and of dark with light. Mr. James Colling, in his "Art Foliage," pleads for a far more extended scale of colour, and calls attention to the numerous shades intermediate between the primaries to be found in nature; but my advice is to the student, at any rate to commence and be content with the simple system until complete mastery has been obtained over it: in fact, to follow the safe example set us by our Mediæval ancestors, of making sure of each step taken in advance in succession, rather than to adopt the lawless license introduced with the Renaissance, which needs genius and talent of the highest order, and not always at command, to control it; and which has led our ordinary decorators into a slough of despond from which they are unable to extricate themselves—the multitude of illsorted and uncongenial colours with which they attempt to deal only serving to embarrass them. Proceeding with our analysis of the system of polychromy of the middle ages, we find that as Gothic architecture developed in the 13th century, which it did in a truly marvellous manner, a corresponding change took place in the coloured decorations applied to buildings, in order to adapt it to their altered construction, their mouldings and other details. Every step in this course of progress was thoroughly consistent with common sense, and the result of profound judgment and observation, which seem to have been universal and shared by the whole body, and not either local or confined to individuals. The colouring was still in due subordination to the architecture, and the main object of its application was still in order to emphasise and enhance the effect of the construction. The greatly-deepened hollows and the far bolder projections of the mouldings of our Early English and the corresponding styles upon the Continent obviously called for more vigour in their coloured decorations, for the purpose of giving each separate member of them its proper and appropriate value at a distance. The introduction of richly-painted glass into the windows, by the very fact that it diminished and modified the light, necessitated the use of more vivid and stronger colours throughout the interior of the buildings, in order to prevent the openings from appearing as isolated patches of powerful colour. Consequently the whole of the polychromatic treatment had to be raised up to an altogether higher key than had prevailed previously. Deeper and richer blues, which had been carefully avoided before, began to be employed, and gilding, which was found to be the appropriate contrast to blue, was almost needed to support its intensity. Then all the reds, the purples, and the greens required to be increased in strength, in order to enable them to hold their own in such company, so that other colours than the simple earth-colours and other mediums than in the tempera paintings were introduced into practice. Still, while the general effect was thus greatly enriched, strict harmony was carefully maintained throughout; and in order to prevent indistinctness and confusion, the heraldic principle of not allowing colours of one kind to be placed in juxta-position with those of another, without the invention of black, white, or gold, was adhered to with excellent result. These more powerful materials and the traditional system of employing them enabled the decorative painters to deal with the more complicative perspectives of interiors as successfully as, though in some degree differently to, their predecessor's method with the simpler problem. The multiplication of shafts and members of the piers, and those of the arch mouldings and vaulting ribs, demanded and received more vigorous application of colour in order to accentuate and render distinct all the numerous portions of their several members of the construction. Nevertheless, it was even more necessary than before that great restraint should be used, and the decoration kept to a sternly conventional character. Otherwise, had the painters allowed themselves, or been allowed, to give rein to their fancies and imagination, and to indulge in naturalesque or picturesque representations, the utmost confusion would have been the inevitable result. The numerous small portions into which the wall-space and spandrels of vaulting, &c., had become subdivided, if covered with decorations which did not respect and even emphasise the fact of their being solid and flat, would have resolved themselves into separate, disconnected, ill-shaped, pictures; and the whole interior would have become an intolerable jumble. The common-sense and good taste of the Mediæval painters prevented any such attempt on their part to overstep the proper limitations of their art, when employed to decorate the works of architecture. No thought of representing distance, aërial effects, or perspective, occurred to them; anything at all approaching the pictorial was, in the first place, clearly marked out and confined within borders, so as to appear as panels upon the wall-space, and the painting was all kept strictly in one plane within these borders, to avoid making the panels appear, as they otherwise must, like holes in the wall. Such limitations and conditions, however, left ample scope for appropriate artistic treatment of the highest class, and it was only what was obviously contrary to common-sense and injurious to the general effect that was eschewed.

(*To be continued.*)

ART IN JAPAN.

By C. Pfoundes.*

THE history of art in Japan can only be very briefly spoken of. Indigenous to the place it most undoubtedly is. It is too distinct altogether from that of other Orientals to have been otherwise. On the original stock there may have been engrafted, from time to time, some foreign ideas; but long ages, and the profuse originality and independence of the native artistic mind, free of all trammels of any art canon, had produced a distinct stamp of nationality, in which foreign ideas do not seem to have ever maintained any permanent foothold.

The potter's art can unquestionably be traced back to ages more remote than six centuries before the Christian era. It is recorded in Japanese annals that, in the century B.C., clay figures were substituted for human immolation on the occasion of the death of great personages.† Chinese classical literature and the Chinese written character came into general use at this period. In the second century A.D., silk weaving was taught by natives brought from the adjoining continent, and pottery manufacture and other arts had made great progress.

About A.D. 436, Ishigara and other painters arrived in Japan from Corea; a century later, one Donchio made paper. About the same time a pagoda was erected of bricks. Another century elapsed before tiles came into use. These were evidently designed after the old method of roofing, with sections of bamboo stems split in two, and arranged with the concave and convex surfaces placed upwards alternately. Shinglee, split wood, and thatch were, and still are, in common use. About A.D. 668, fans were first made; then, as now, of 25 slips of wood, "Hi uo ki" (*chamaecyparis obtusa* or *retinispera obtusa*). It is said that a bat's wing suggested the idea of paper fans of the ancient form. In 701, a bureau was formed for the control of the artistic decoration of the Imperial residences, and eminent artists filled the official positions in it. In 724, a Buddhist priest, named Gioki, introduced the potter's wheel; he is also credited with having projected the erection of bridges, and also with the construction of the enormous figure of "*Dai Butz*" (or Great Budh), of bronze, which was then constructed and used in Japan. The first coinage, a small copper coin, was called "*Wa Do*" (Japanese copper); and this was, after a time, superseded by a gold, silver, and copper coinage. It is noted that efforts to print books were made in 770; "*Dara-Ni*," Pali prayer, being the first issued. A native Indian introduced cotton about the same period.‡

* Part of a Paper read before the Society of Arts on April 6.

† Formerly "Junshi" (to accompany the dead) was practised, singularly like Suttee and other heathen rites of pre-historic times. When the chieftain died, his wife and most faithful retainers prepared to follow him. Later on, about the beginning of our era, Haji no Tsukune made figures of clay as a substitute for those who would immolate themselves. Although the rite was prohibited, it was still, at times, practised in defiance of the law. In the days of Confucius (Confucius born B.C. 519), images were buried with the dead, and the "great master" predicted that eventually men would be again sacrificed, and men of ability become scarce. His prophecy was verified. When Haji initiated a check on this terrible custom, great improvement took place. Native annotators on the classics note this. About A.D. 3, "Suinin Ten-O" bestowed the "Sei Haji" on Nomi no Tsukune, who is credited with bringing about the abolition of the custom of burying the living with the dead (see "*Juh shi*," page 96). The derivation of the word is "Ha," the Chinese character for clay, "*ji*" or "*shi*," first of the two characters "shisho," teacher—teacher of clay images.

‡ In the year 818 Kobodaishi, the compiler of the present Japanese syllabary I, Ro, Ha, taught the tenets he had learned in his travels abroad. He was conversant with much of the Pali, Sanscrit, and Chinese literature, especially in Buddhist classics. The Devanagari alphabet of 47 characters bears a strong resemblance to the Bon ji—Priests' letters—of the present, and it may be fairly in-

In the ninth century, a modification of the Chinese character came into use, and was tabulated by a Buddhist priest. About 1223, Kato and others visited China to glean information about pottery and other arts. There are numerous records of visits of foreigners, and of natives having travelled afar, to the advantage of arts and of civilisation, in Old Japan about this time. In 1243, the Budh priests had extensively circulated books—chiefly religious, printed from slabs of cherry wood and stone—in the Chinese character. In 1308, the Chinese style of art was fashionable in Japan for a time. In or about 1443, the Ashikaga Shogun Yoshimasa introduced ceremonious assemblies, drinking powdered tea; these meetings tended to the elevation of artistic thought amongst the higher classes.

In 1588, *cloisonné* enamel ware was manufactured in Owari. My impression is that the origin of this ware was an effort to imitate the ancient votive offerings of articles inlaid with uncut rough jewels. The most ancient *cloisonné* ware has not a smooth surface, and the old name, which may be translated, "The seven jewels," or "The seven precious things,"* is another link in the evidence in favour of my theory. Whether poverty or dishonesty, or both, prompted this, I cannot say.

Between 1573 and 1591, the Tosa style prevailed again. This Yamato, or Tosa style, was originally noted for clearness of outline, minuteness of detail, and delicate treatment. It gradually lost much of its vigour, but gained in beauty (that is, from a native point of view), the fineness of the strokes of the brush increasing. This gave place, for a time, to the Chinese styles of the "So," and "Gen," a sketchy outline, in a few hasty strokes, being its characteristics. "Uki-yo-ye" (popular pictures) were often in the Tosa style.

Foreigners were present in Japan from the first quarter of the 16th to the middle of the 17th century, but do not seem to have exercised much influence on the art of the people, however largely their orders for certain articles may have affected the productions for exportation. About 1627, the use of tobacco became general, and the metal-workers of sword mountings had a new field opened to their industry in the fabrication of tobacco-pipes, and of pouch and other mountings.

It was not until 1682 that two swords seem to have been worn by the ruling class. Sword-mountings formed a most important object for art work in Old Japan. Recently, large quantities have been broken up for the sake of the precious metal, the cheaper sorts being converted into pipe-mountings, and even into the metal-work ornaments for furniture. It often occurred to me that some of these gems of artistic metal work might have been made up into beautiful jewellery for ladies in England. The "Katana" (sword) has always been considered the badge of gentle condition in Japan, and has ever been associated in the minds of foreigners with the "yakunin" (official) or the "samurai" (daimio's armed retainer). The rules of observances connected with the wearing of the long and short sword, or the single sword, were most minute, but have fallen into disuse. The ordinary length of the "katana" blade was 2ft. 0·89in.; the small sword, or "wakizashi," worn with it, 1ft. 0·8in. In full dress, the colour of the scabbard was black, with a slight tinge of green or red in it; the binding of the hilt, blue silk; the mountings of the guard and hilt "shakudo" (alloy of copper, gold, and silver). The mountings were numerous, and the making of them is a special and honourable trade. Goto Yujo was a celebrated maker of the 15th century, whose descendants still exist. The work of this family is is called "Iyebori" (the families' chasings). The first group, called "articles of three places," comprises, first, the ferule on the head of the hilt, and the ring behind the guard; second, the two pieces of metal interwoven with the silk binding of the hilt, used to hide the hole of the rivet, and to insure a better and firmer grasp of the sword-hilt; and third, the small knife and skewer-like pieces of metal inserted into the scabbard, so as to be drawn out for use at pleasure. The small knife was used to throw at an enemy, the skewers to attach the heads of slain enemies to the girdle. The guard ("tsubu") is often a wonderful piece of workmanship in metal. "Nanban" (southern iron) was considered the best, but they were often made of valuable metal, and worked up with gold, silver, &c., into a detailed picture of battles, hunting, or scenery. Nearly every article connected with the sword will be richly inlaid to correspond. Guards are also made of several thicknesses of leather or raw hide called "neritsuba," "shakudo" (copper and silver alloy), "shibuichi" (one-fourth silver, three-fourths copper). Silver and gold are used as well as iron. "Seppa" are the washers, of which there is one or more above and below the guard, made of flat pieces of metal—brass, silver, or gold. "Habaki" is a ferule on the "forte" of the sword, extending about an inch below the guard, made of the same metal as the "seppa." "Kojiri" is the ornamental ferule on the lower end of the scabbard, often very expensively inlaid to match the other mountings. "Kurikata" is the small cleat on the scabbard through which the "sage wo," or silk cord, is rove. This is made of various materials, and generally made with the scabbard. "Saguri" is a small hook on the scabbard, to prevent the sword slipping too far through the girdle. "Tska ito" is the silk cord bound crosswise on the hilt. There are several styles of binding, "maki," "dashi me nuki," "katatemaki," "heomaki," &c. Some swords only have shark-skin hilts, without silk, but generally the silk binding is over the skin ("same"), those pieces having the largest nodules being most valuable. The sheath or scabbard ("scia") is made of a wood called "ho," generally varnished. Black and dark colours are preferred; gaudy crimson and variegated colours are affected by the old "swashbucklers." Leather covers are worn over the handsomely-lacquered scabbards; shark-skin ground down, inlaid with shell-work or peculiar kinds of lacquer, is sometimes seen on scabbards. "Sage wo" is the long silk cord, of various kinds and colours of sennet, about 5ft. in length, for large swords, half that for the short sword, used to bind up the sleeves preparatory to fighting. On journeys, the gentleman's sword-bearer carried the honoured blade, covered with the "shiki hada," a sword-case of leather or cloth emblazoned with the owner's crest.

Between 1688 and 1702, Hishigawa Monobu, of Yeddo, made the Tosa style once more popular; he was succeeded by numerous celebrated artists. Modern artists do not seem to have been much esteemed.

Taiko, the great general of the 16th century, was himself a man of artistic tastes and some skill, and was renowned as a liberal patron of art.

The manufacture of artistic bronze is quite modern, dating from the end of the 17th century.

In 1695, printing in colours from wood blocks was so far perfected that five colours were used. Within the memory of citizens of Yedo, Chinese painters were the guests of the Shogun, and executed flowers and rural scenery. Now, Italian artists have been hired to teach modern art in Japan.

Such is the result of indiscriminate change—a rush of a parcel of wilful schoolboys to overturn and demolish everything their astute forefathers had matured; and this in the most naturally artistic country under the sun.

When it is considered that the very first effect of the introduction of Japanese art-production in England was a wholesale effort to reproduce it, and copy it; when it is seen that this has had a most marvellous and widespread influence upon our own decoration, design, and colour, for household, dress, and architectural purposes; it must be admitted that there is something worthy of attention in the civilisation of a people whose art could thus produce such an effect. It is to be rejoiced at, rather than deplored, that the effort to copy and reproduce Japanese design has ever signally failed.

Let us rather continue to look to Japan for its beautiful ware, and let us also learn to duly appreciate its best work, and endeavour to induce its people to go back to their old art, rather than continue to sink, step by step, in producing a meretricious hybrid style of manufacture, that is neither Japanese nor English.

Art patronage in Japan was centred at the old court Kioto. The leading ruling clan, the Tokugawa, and the great nobles vied in supporting art. The lesser nobles, the gentry, and the wealthy traders also contributed largely to its universal spread. An artist of repute was ever welcome and well received, and was never left with an empty purse. The old nobility had amongst their retainers numerous clever artists, and, at their entertainments, these would exhibit their skill for the amusement of the patron and his guests. Whether residing at their own provincial fortified residences in state, or during the period of their enforced residence in the city of Yedo, a numerous following of men of letters and artists always surrounded the great personages. Much of the old art-work was a "labour of love," and the leisure occupation of poor gentlemen; sometimes of rich amateurs. Every detail was carefully executed; there was no eager haste to get rid of it in exchange for the money of the hated foreign intruder. The object would be seen by art-patrons and admired, whereas the article for foreign sale brought no reward beyond the pecuniary recompense; it went away amongst strangers, it was never seen by those who could appreciate its best points, and it is, therefore, not to be wondered at that it was inferior to the article made for the native art patron. The beautiful work made for the Japanese themselves would be submitted to a circle of admiring fellow-countrymen. The art-collector would have around him friends who, like himself, appreciated the best efforts of their own people. This praise from compatriots of high position, men of refined tastes, good culture, and great influence, affected the art-worker in Japan as it would the artist of noble aspirations in any other country. Art-objects were handed round the circle at such social *réunions*, passed from hand to hand with due care and elaborate ceremony, duly and intelligently criticised, wiped with soft silk, and carefully returned to their silk and padded packing-boxes, and restored to the care of the fireproof storehouse at once. Thus it is that these treasures have found their way to us in such a perfect state of preservation. It only remains for us to fully understand now what was the intent of the designer and artist.

(*To be continued.*)

CHIPS.

A new Odd Fellows' hall was opened at Launceston, on Monday week. It is Romanesque in style, and is built on freehold land given by the Prince of Wales. The materials are best red bricks with Portland stone dressings. The principal room is 35ft. by 25ft., with open king-post roof of pitch-pine. Mr. C. P. Wise, of Launceston, was the architect, and Mr. W. Burt, of the same town, builder; the cost has been £700.

New groynes are about to be extended at Hastings, opposite Denmark-place and Eversfield-place, from the plans of Mr. Andrews, borough surveyor. Mr. Winser is carrying out the work under a schedule of prices at an estimated cost to the town of £800.

The vestry of Battersea decided, on Friday, to purchase the Earlsfield Estate, 34 acres in extent, as a site of the proposed new cemetery.

Mr. W. H. Lascelles intends exhibiting at the Exhibition of Building Appliances, to be held at the Agricultural Hall, next week, amongst other things, a floor of concrete, constructed on the system he has recently advocated, of bringing the materials on the ground dry and fit for use.

Mr. Alma Tadema has been elected an honorary member of the Incorporated Society of British Artists.

ferred that the I, Ro, Ha was formed on this plan for convenience, at a period when Chinese was little known in this country except to the priesthood. "A Gongio" is the name of the book of prayers, from which the Chinese characters are said to have been taken arbitrarily, by him, from which he formed the Iroha, which has two forms. The five (5) vowels are combined with nine (9) consonants, giving a table of $10 \times 5 = 50$ syllables, or, rather, 45 syllables and 5 vowels. These historical notes will be extended in a paper to be read at the Royal Historical Society on the 15th inst.

* "Shippo" is the Japanese name for *cloisonné* or enamelled ware. The meaning of the word may somewhat explain the origin of the art. When the Buddhist religion came from India, many of the altar decorations came with it, and these were often inlaid with precious stones.

The Seven Jewels are "*Sango*," pink coral; "*Kohaku*," amber; "*Shako*," mother-of-pearl; "*Ruri*," emerald; "*Mono*," agate; "*Shinju*," pearls; and "*Suisho*," crystal. "*Kin*," gold, and "*Gin*," silver, are both usually included in the term. Some natives say the name originated in the fact that the article must go through the furnace seven times.

Formerly, this ware was enamelled exclusively on a copper foundation, upon which a thin thread of metal had been soldered, forming the outline of the design. It is easy to distinguish between the old ware, which was rarely found in large pieces, and the modern ware, which is made from the size of a common bead up to that of mammoth vases, and other articles. Within the last few years, this work has been executed on porcelain, and of late some very beautiful and even large pieces have been produced.

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ILLUSTRATIONS.

NATIONAL SILVER MEDAL DESIGN FOR A CATHEDRAL.—OLD FONT COVER AT ROTHERHAM CHURCH.—CAPITALS FROM STE. CHAPELLE, PARIS.—HOUSES AT TELFORD-PARK.

OUR LITHOGRAPHIC ILLUSTRATIONS.

DESIGN FOR A CATHEDRAL CHURCH.

This design was submitted in the National Competition of last year, and obtained the Silver Medal, the highest award in the kingdom given for architectural design during 1879. The drawings will explain fully the general design and arrangement of the building. It will be seen that the plan is in the form of a Latin cross, with nave, transepts, and north and south aisles. A Lady-chapel, vestry, and presbytery are arranged at the east of the high altar, and a chapter-house at the north of the choir. In elevation and plan there are six bays to the nave, but the perspective view shows an extra one; this addition was thought afterwards to be desirable, as it gave a greater length and a more dignified proportion to the exterior. In architectural treatment it is a study based upon the architecture of the earlier part of the fifteenth century. The materials proposed are: stone with smooth facings, both externally and internally, for all the walls, towers, and the central spire; for the roofs, lead; the windows to be filled with appropriate painted glass, and for the decoration of the vaulting of the choir mosaic might be judiciously arranged. The design, which was exhibited with others at the National Competition at South Kensington in August last, and was fully criticised in the Building News about that time, is the work of Mr. Arthur Marshall, a student of the Nottingham School of Art.

ROTHERAM CHURCH FONT.

I am glad to find, from the letter of your correspondent, Mr. Hems, that the font of Perpendicular date is in existence (as I have for some time suspected) at Greasborough. From the drawing accompanying his letter, I observe it is like other fonts of the same date in the district, and the profile has a family likeness to some of the mouldings in Rotheram Church, and was probably drawn by the same hand. I trust none of your readers have credited me with being a party to the absurd story anent "a font of black oak," which appeared in the local papers. As correspondent here for the Society for the Protection of Ancient Buildings, I drew attention to the reprehensible removal of the old Jacobean font-cover from the church, during the recent restoration by the late Sir G. G. Scott, thinking it possible the authorities might be induced to interest themselves in having it brought back again, and happily my anticipations have been justified. I have much pleasure in placing at your disposal the accompanying carefully-measured drawing of the cover, which I venture to hope, some at least, of your readers will agree with me is anything but "a weak-looking affair with bastard flying buttresses, &c.," and certainly preferable to the most correctly-designed specimen of our XIXth century Gothic (save the mark!). I found on dropping into the church last week to take some final notes, that the cover was back again in its old corner in Jesus Chapel, after four or five years absence; but I fear there is good reason for Mr. Hems' statement that when fixed at Greasbro' a portion of the base was cut away. Old parishioners speak also of a pyramidal finish to the whole, and certain blocks behind the crowning cresting possibly have received the base of the spire. I have suggested by dotted lines taken from a coeval cover at Bloxam Church, what may have been the form of the base before the mutilation, and would draw attention to the fact of its fitting exactly the upper diameter of the font 2ft. 8½in. as given by Mr. Hems. The material is oak, and stoutly put together, and under the thick coat of paint, which at present covers the whole, I detected traces of gilding and colour.—Charles Hadfield, Corn Exchange Chambers, Sheffield.

CAPS FROM STE. CHAPELLE, PARIS.

This sheet forms another of the Royal Architectural Museum Sketching Club series, and is by Mr. T. Fredk. Pennington, whose drawings are already well known to our readers. The designs illustrated to-day—of capitals in the well-known chapel attached to the Palace of Justice, Paris, "a perfect gem of French 13th-century architecture," as it has been termed,—are among the most interesting in the Museum collection.

HOUSES AT TELFORD PARK, STREATHAM HILL.

Messrs. Sutton and Dudley, who have secured this estate, have started operations with a number of "double-fronted" detached houses (see variety A on the accompanying plate.) The front was to be 40ft. and the depth 33ft., within which they required the number of rooms shown on the plans, without any projecting outbuildings. It has been sought to solve this problem, and, at the same time, to avoid and improve upon the stupidly-symmetrical arrangement of the regulation "double-fronted" villa. The lighting of the landings is not obvious from the plans, but it is provided in all the houses by an ample window above the bath-rooms, as well as from other sources. In planning the semi-detached houses, the first thing was to avoid the usual everlasting nuisance of having the chief living-rooms next the party-wall. In the construction, recourse is had to cast concrete, of a pleasant warm colour, with red brick for the fronts, chimneys, &c. Where the roofs are only required as a *lid*, grey slates are used to a quarter pitch; but where a second floor is formed in the roof, Broseley tiles are the covering. The second floor of some of the houses includes a large billiard-room, with special ventilation through the "bull's-eyes" in the gables. There is no stint in the finish of the houses, as, for instance, Garrard's tile linings to the vestibules, specially designed grates, and marble or hard wood chimney-pieces and over-mantels with bevelled mirrors, bath-room fittings, various panelled plaster ceilings to the principal rooms, and a choice of good wall-papers. Neither has anything been spared in providing separate water-services and proper sanitary arrangements, including Mr. Norman Shaw's system of soil-pipes, and there will be no drains under the houses, even when built in terraces. The proprietors, who are practical builders, have addressed themselves to sound construction and to an external treatment that will not require much repainting of exposed woodwork, &c., nor the possible repair of picturesque features. It should be remarked that all the designs have been registered.

Edward J. Tarver.

The new parish-church of St. John, at Hafod, near Swansea, was consecrated on Tuesday week. The church is in the Perpendicular style, and is built from the design of Mr. Woodzer, of Greffham, who received instructions from the Vivian family to take as his model St. Mary's, Truro (now the pro-Cathedal). It consists of nave, south aisle, and chancel, provision being made for a north aisle, to be added hereafter. It is of native stone, with Bath-stone dressings; the woodwork of pews, roofs, &c., is of pitch-pine, the pulpit of Bath stone, and the Communion-rail of Baltic oak. The church seats 650 people, and has cost £5,200. The contractor was Mr. David Morgan, of Brunswick-street, Swansea.

AN ARCHITECT'S EVENING WITH SHAKESPEARE.

It is not often that papers read by members of the architectural profession are entirely interesting to a general audience, however they may be to members of that body themselves; but we have much pleasure in recording that the possibility of such readings being made generally interesting has been undeniably proved at a recent meeting of the members of the Liverpool Architectural Society and their friends.

Mr. Thomas M. Lockwood, of Chester, who is well known in that ancient city as an able reader, and who has devoted a considerable part of the small leisure which a professional life allows, to the study of Shakespeare, was induced by Mr. Henry Summer, the President of the Liverpool Architectural Society, to read "The Story of the Battle of Agincourt," as told by Shakespeare.

The story was prefaced by a paper in which the reader drew attention to the state of England during the fourteenth century, and the manners and customs of its inhabitants. This was made more interesting by illustrative pen-and-ink drawings of the buildings of the fourteenth and fifteenth centuries, and the dress and costume of these times. These drawings, which were 24 in number, of large size, where half of them devoted to the buildings, and the remainder to the dress of the period; these were described in the preliminary paper, and allusion was also made to the literature of these times, and quotations from Chaucer's works introduced, showing that a great light had arisen, who, by his graphic descriptions of English life and character in the fourteenth century, was able to bring down to us, who live 500 years later, the manners and customs of these early times.

Having alluded to the beautiful buildings our fourteenth-century ancestors have handed down to us, their exquisite taste and fancy in dress, and their literature, which, even now, is read and enjoyed by thousands, and, as it were, having imbued his audience with a true appreciation of the character and feeling of the times, Mr. Lockwood then proceeded to tell, in the words of our great dramatist, the story of those men

"Who drew their sounding bows at Agincourt,"

and read his condensed version of the play of "Henry V.," in which the story was well and graphically told, and all extraneous matter omitted: this abridgement of the play was evidently made with great care, and was read with considerable force and emphasis, being listened to by the audience with every evidence of interest.

At its conclusion, Mr. J. A. Picton proposed a vote of thanks to Mr. Lockwood for his able, interesting, and well-illustrated paper, and expressed a hope that some of their own members would take the hint and produce some papers similar in character, which might be made interesting not only to the profession, but to their friends; it was noteworthy that this was the first occasion upon which ladies had been present at the reading of papers at the Architectural Society's meetings, and it was desirable that their proceedings should, on some occasions, be made interesting to those outside the profession.

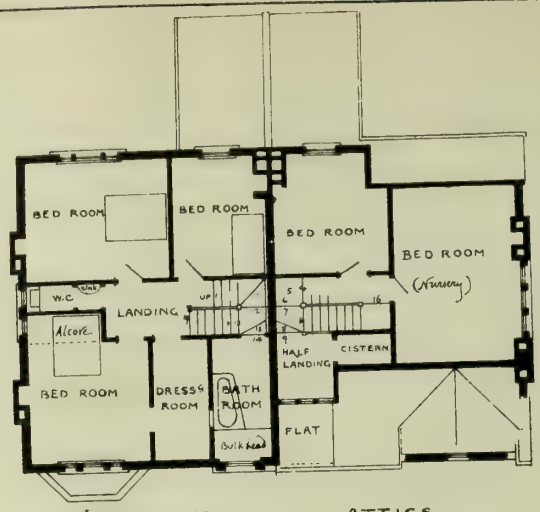
Mr. Hay then seconded the vote of thanks, and said that there were various other plays of Shakespeare, notably that of "King John," which would prove interesting to this Society if similarly treated and illustrated.

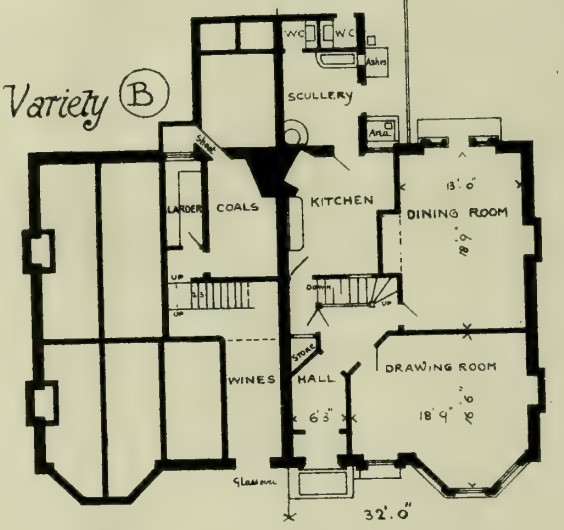
The vote of thanks was then formally put by the President, and carried with great acclamation, and the proceedings terminated.

The parish-church of Little Easton, near Dunmow, was reopened on Easter Sunday, after complete restoration. The ceiling has been removed from nave, and replaced by an open roof; a new north aisle of three bays added, having an oak ceiling, pine-block flooring, and fitted up with open benches. The organ has been removed from the Maynard chapel to new aisle, and hot-water apparatus has been introduced. Mr. Stock was the architect.

While a party of young men from Scarborough were enjoying a carriage-drive in Forge Valley on Friday afternoon, they were met by a band of Tory roughs, who stopped the carriage and fired at it with catapults. One of the missiles struck David Petch, junr., in the face, and knocked out an eyeball. The victim of the outrage is the eldest son of Mr. David Petch, architect, of Scarborough.

LIBRARY



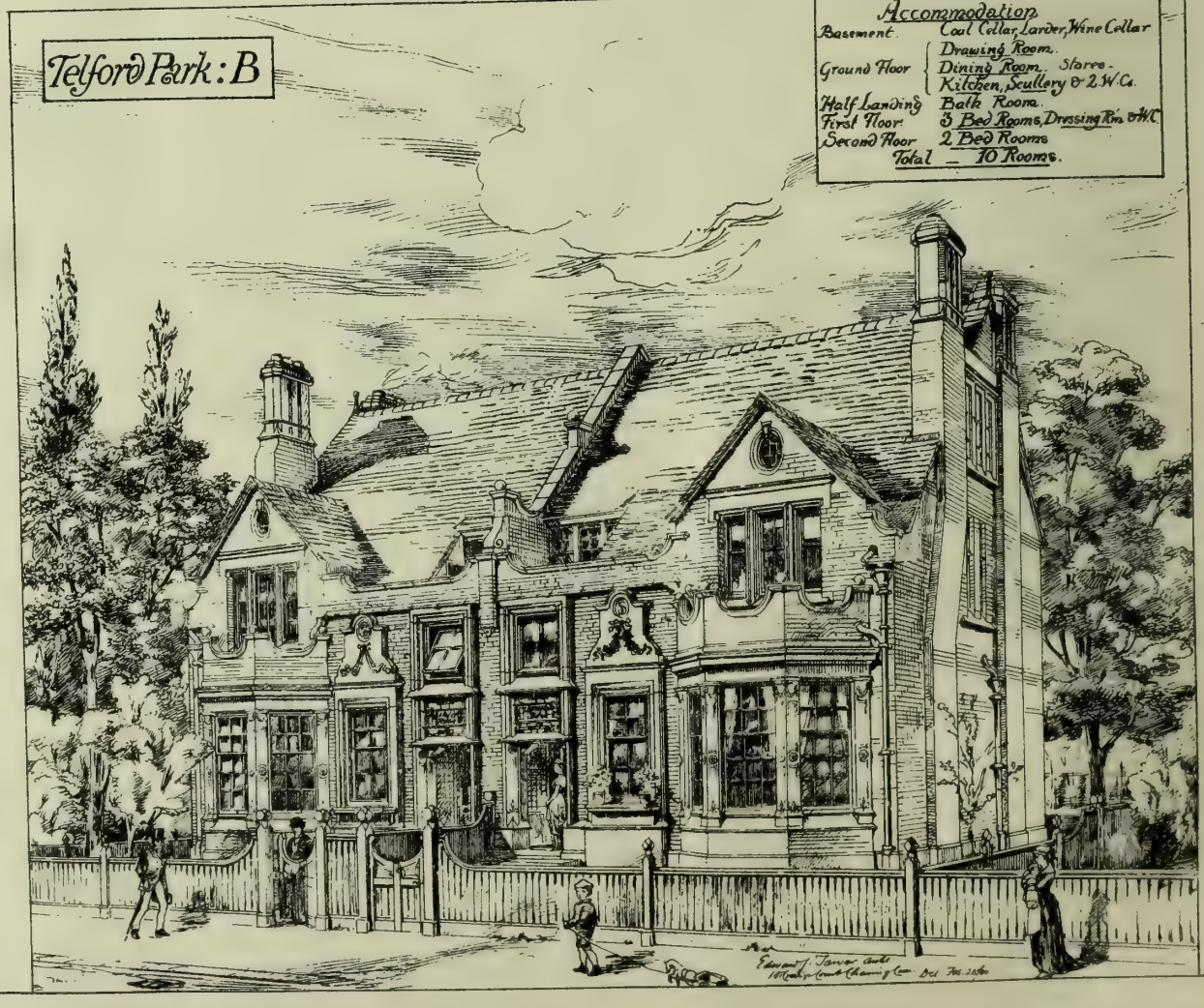


Telford Park: A



Telford Park: B

Accommodation	
Basement	Coal Cellar, Larder, Wine Cellar
Ground Floor	Drawing Room. Dining Room, Stores. Kitchen, Scullery & 2 W.Cs.
Half Landing	Bath Room.
First Floor	3 Bed Rooms, Dressing Rm & W.C.
Second Floor	2 Bed Rooms
Total	10 Rooms.

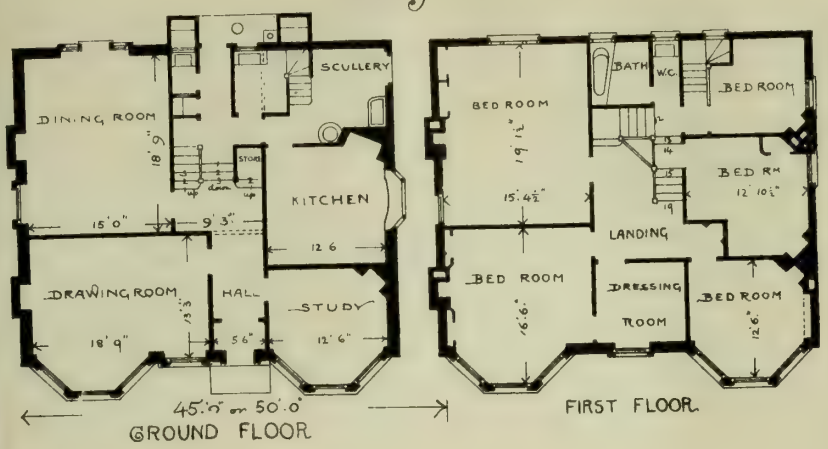


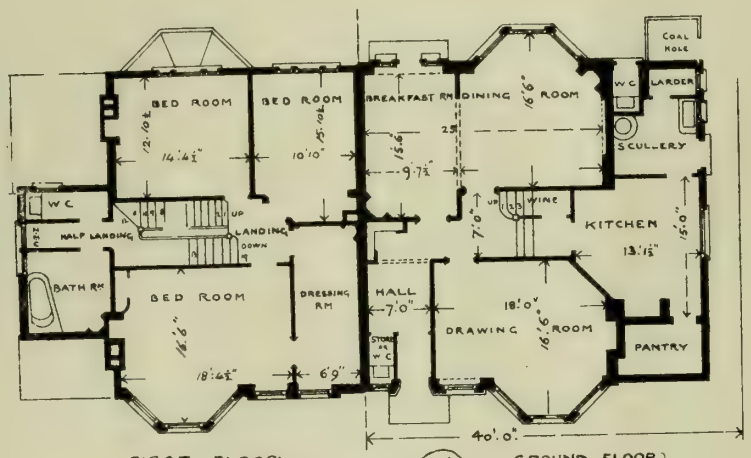
Accommodation.

Basement	Coal & Wine Cellar, Larder & W.C
Ground Floor	Drawing Rm, Dining Rm, Study. Kitchen, Scullery & Pantry Stores, W.C & Lavatory
Half Landing	Bath Rm, W.C & 2 Bed Rooms
First Floor	3 Bed Rooms & Dressing Room
Second Floor	2 Bed Rms & Billiard Room
Total	14 Rooms



Variety (A)





Variety (C)

Telford Park: C

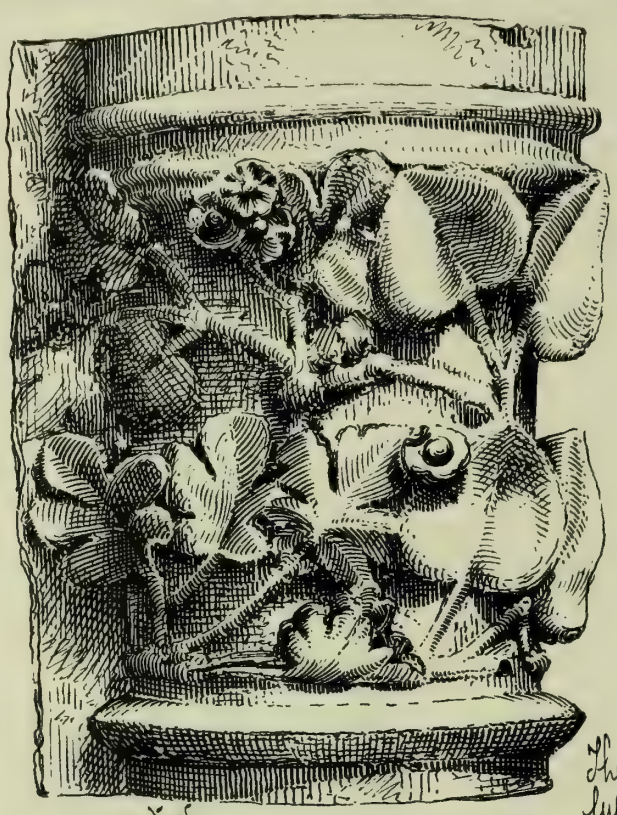
Accommodation.

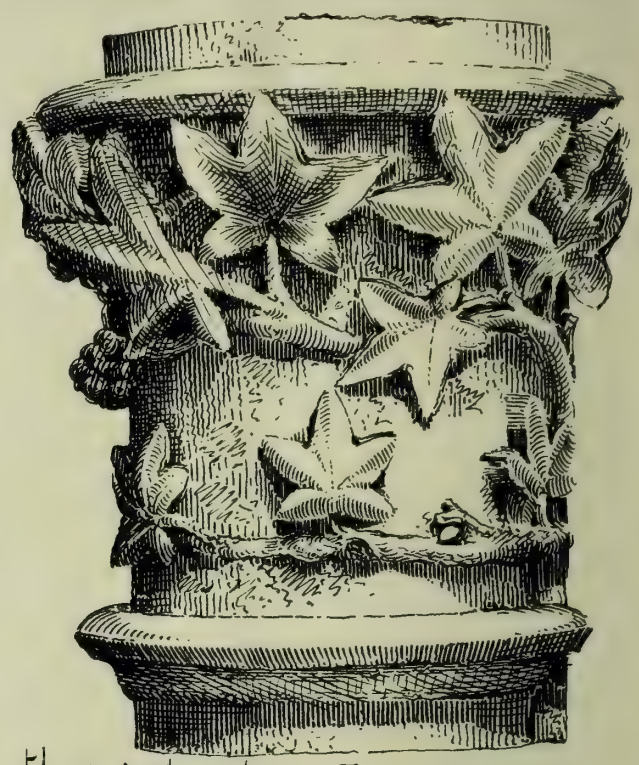
Basement	None -
Ground Floor	Drawing Rm, Dining Rm & Breakfast Rm - Kitchen, Larder Scullery, Pantry, Stores, W.C, Cellar.
Half Landing	Bath Rm, W.C & House maid's C.
First Floor	3 Bed Rooms & Dressing Room
Second Floor	3 Bed Rooms
Total	12 Rooms.



Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C

ROYAL ARCHITECTURAL MUSEUM SKETCHING CLUB.

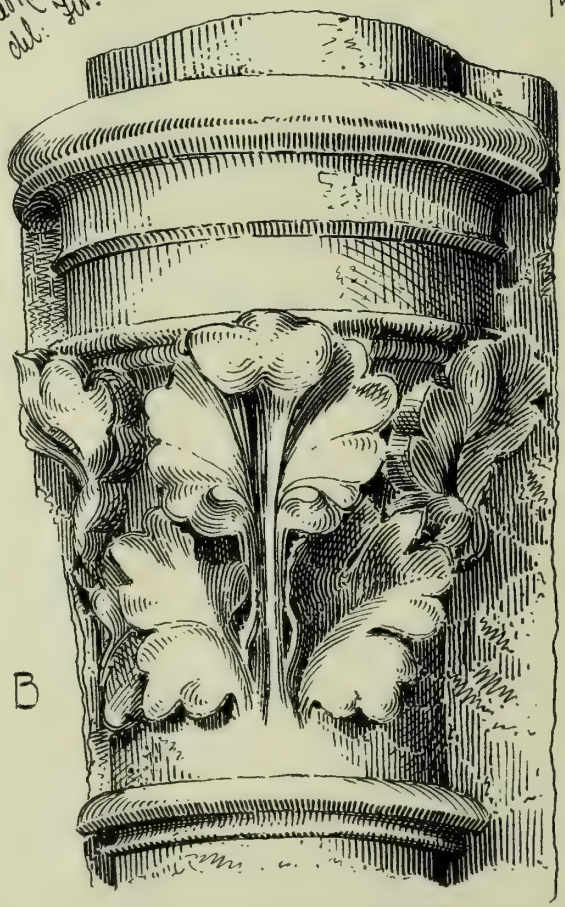




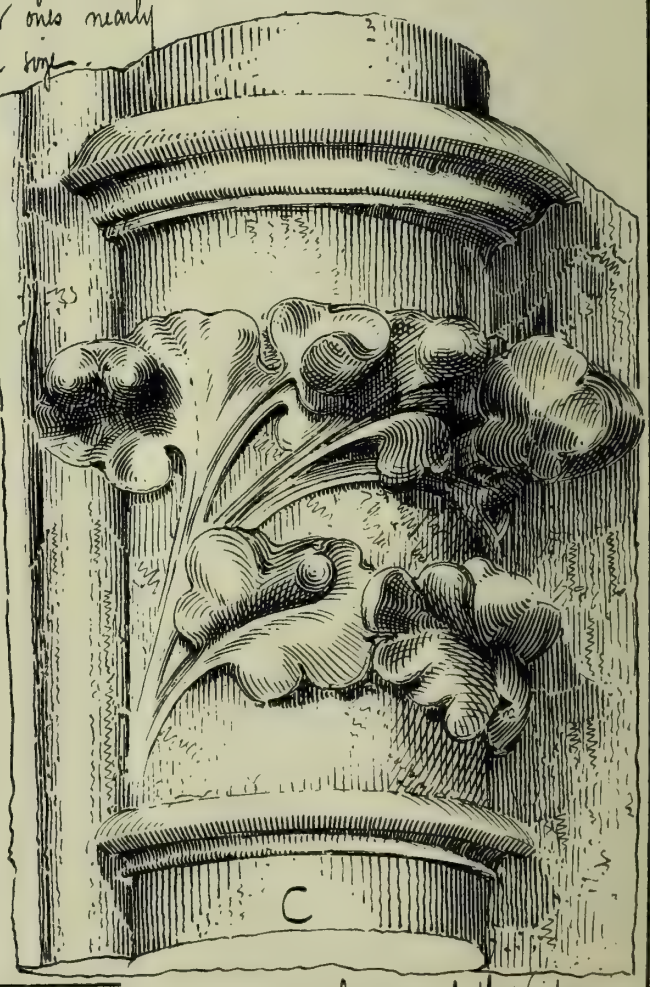
The top ones are drawn to full size and the lower ones nearly full size.

A

N. Inett. Lamington. del. Feb. 1880.



B



C

STE CHAPELLE: PARIS. CAPITALS.

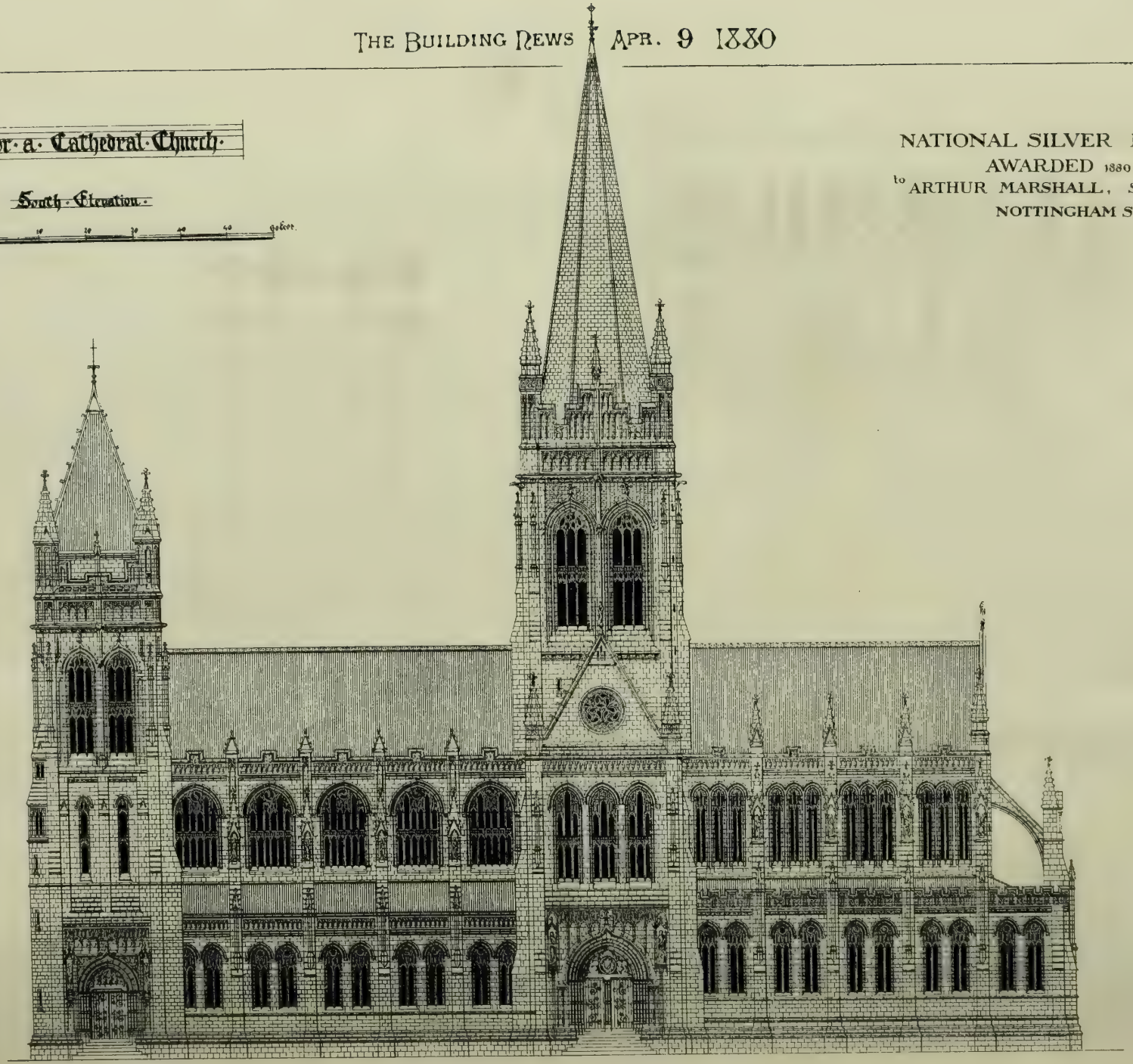
A.B and C are from one of the Windows in Apse.

Photo-Lithographed & Printed by James Akerman, 6 Queen Square, W.C.

Design for a Cathedral Church

South Elevation

NATIONAL SILVER MEDAL
AWARDED 1880
to ARTHUR MARSHALL, STUDENT
NOTTINGHAM SCHOOL OF ART

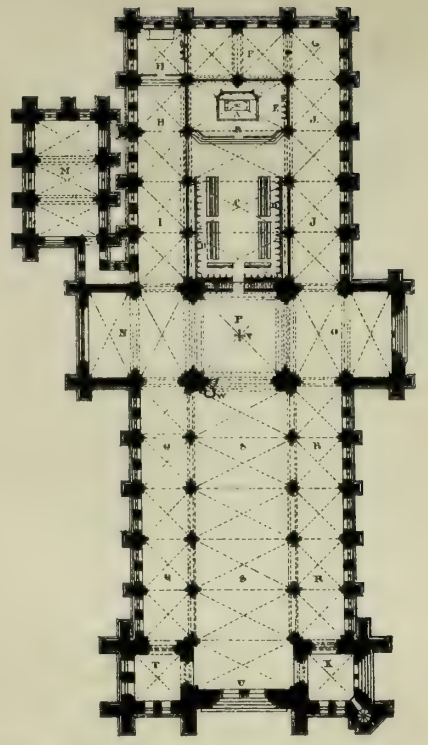




East · Elevation ·

Explanation:

A High Altar
B Sacristies
C Choir
D Presbyterial Stalls
E Sedilia and Piscina
F Presbytery
G Vestry
H Lady Chapel
I N Clois Aisle
J S "
K Stairs to Organ
L Stairs to Tower
M Chapter House
N N Transept
O S Transept
P Tower
Q N Aisle
R S Aisle
S Nave
T Baptistry under NW Tower
U W Entrance
V Lectern
W Pulpit
X SW Tower and Entrance

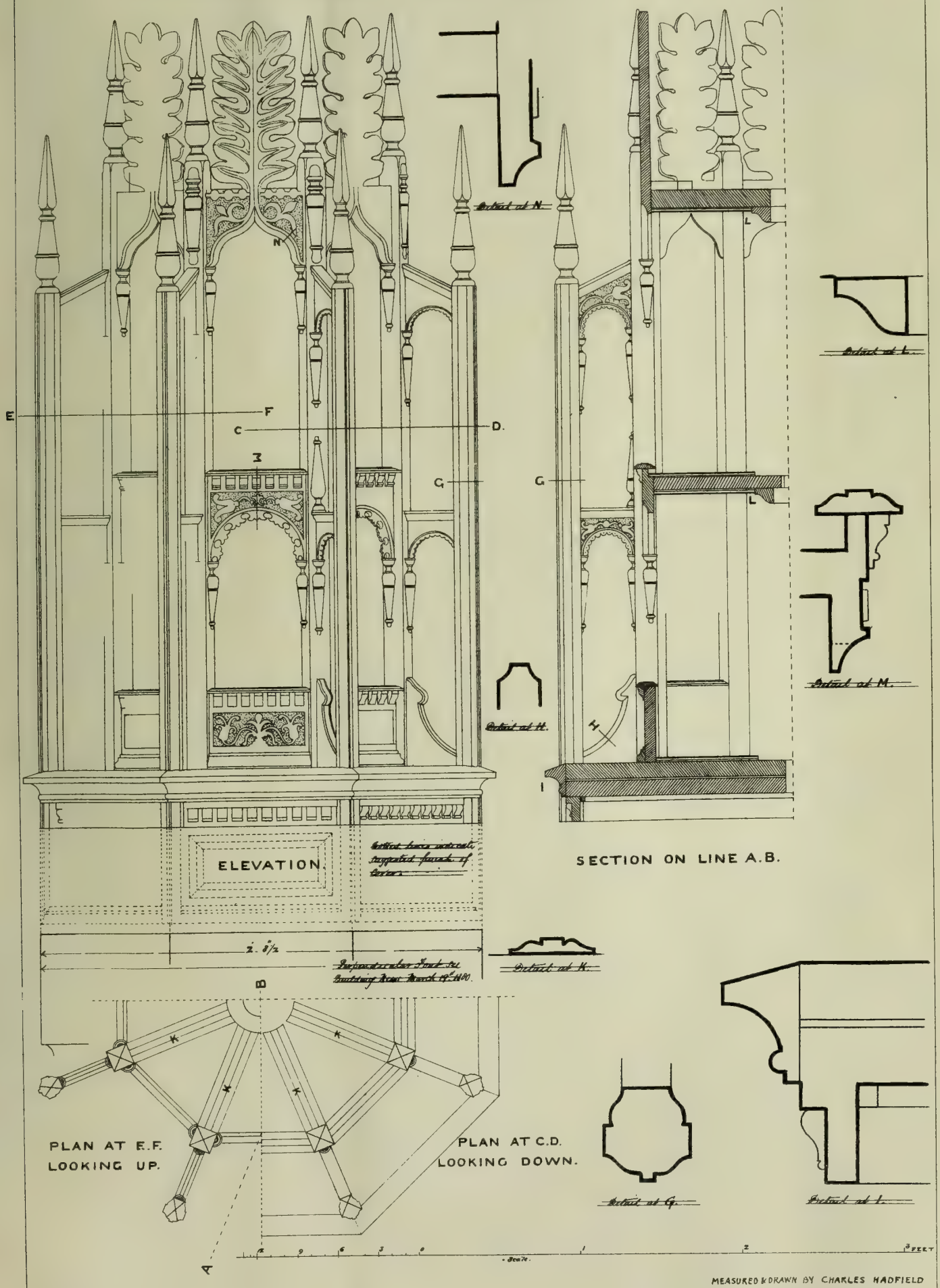


Plan.

Photo Lithographed & Printed by James Akerman, 6, Queen Square W C

ROTHERHAM CHURCH YORKSHIRE

MEASURED DRAWING OF OLD FONT COVER



MEASURED & DRAWN BY CHARLES HADFIELD

Photo-Lithographed & Printed by James Akerman 6 Queen Square, W.C.

BUILDINGS FOR SECONDARY EDUCATIONAL PURPOSES.*

By E. C. Robins, F.S.A.

THE inconsistency subsisting at the present time, with reference to the supervision and control of educational buildings, will be obvious to all whose attention has once been drawn to it.

While in elementary schools, workhouses, and lunatic asylums, restrictions are imposed, and rules and regulations are enforced, which prescribe the minimum superficial area and cubical space to be allotted to each inmate, in secondary and higher class school buildings no such supervision exists, and the middle and upper class boys and girls of the period are allowed to be packed away in close, ill-ventilated, badly-arranged apartments, without any controlling authority, in premises not originally constructed for educational purposes, and with none of the appliances common to every Board-school. A private house, originally intended for the accommodation of less than a dozen persons, is seized upon for a middle-class school for several hundred pupils.

Humble as yet may be the educational results of the London School Board curriculum beyond the three R's, the social and moral influences of their ample provision of space, suitable fittings, and sanitary arrangements, cannot be otherwise than considerable.

The older educational endowments for higher education are associated with buildings erected at a period when sanitary laws were little understood. As Mr. Robson observes:—

"Our old foundation grammar-schools furnish us with few ideas as to the future planning of public middle-schools; their sole provision was usually a single, lofty, and noble hall of oblong form, in which the whole of the boys might be seen engaged in their various lessons, learning by 'art,' or carefully plodding with grammar and dictionary within sight of the master, who was placed on a raised platform. No class-room ever, until quite recent years, spoiled the simple dignity of these architecturally excellent school-houses, and their fittings were of the rudest and simplest kind.

Through the action of the Endowment Commissioners, many of these old institutions are being remodelled, and schemes for their wider use and development are constantly being thought out, as new buildings are required to meet the increasing demands for space. Opportunity is thus occasionally given to exercise the ingenuity, which has been so well displayed in primary school-houses, on middle-class school buildings."

Private schools in particular, as we have already observed, usually suffer from the disadvantages of being located in houses not specially constructed for them. Public schools will inevitably become more and more popular as the teaching power improves, and as the opportunity for proper classification—which is increased with the larger numbers to be taught in one and the same building—is recognised. Public schools for boys have always been more or less in vogue; but public schools for girls are a modern innovation, calling for special contrivance in the buildings appointed for their use.

Concerning public day-schools for girls, and with respect to their suitability for the purposes contemplated, Miss Wolstenholme emphatically says:—

"The experiment of large day-schools has been successfully tried, and the results are conclusive as to the superiority of the system, from whatever point of view we regard it; their superior economy is obvious. Morally, we believe the gain to be also great. We want, in every considerable town in England, a high school for girls, which should offer the best possible education on moderate terms—one which should serve as a model to all those private establishments for which in future, as at present, there will no doubt be abundant room. To such a school as this it would be very easy to attach all manner of appliances and apparatus in the way of lectures and special classes, which might be attended from private families, or smaller schools."

Since these words were penned, eighteen schools for girls have been established by the Girls' Public Day-schools Company, originated by Mrs. Gray, who sagaciously hit upon this commercial means of extending this new system of education for girls, but which is equally applicable to boys; and a Boys' Public Day-schools Company would not fail to achieve a similar success.

The resources of the company have, as yet, been chiefly employed in the establishment of new schools, and they have been obliged to hire houses for school buildings. Except at Croydon and Blackheath, which are very creditable examples, I am not aware that they have erected any new schools. At Gateshead and Oxford new schools are projected.

I am myself engaged in the preparation of plans for a new school-house for the St. John's Wood branch, of which I was one of the original promoters, and in which I am desirous of giving an inexpensive illustration of the principles hereafter advocated, adapted to a school for 300 pupils.

The system of teaching adopted in these schools is very similar to that elaborated at one which may be regarded as the mother of girls' day-schools, viz., the North London Collegiate and Camden School for Girls, founded by Miss Buss nearly 30 years ago. The remarkable success of these day-schools is proverbial. They now contain nearly 1,000 pupils, several hundreds more patiently awaiting their turn for admission as vacancies occur.

On the application of the Brewers' Company, the Charity Commissioners projected a scheme whereby certain valuable educational endowments, belonging to that company and the Clothworkers' Company, have been devoted to the development of these schools, thus enabling the trustees, to whom Miss Buss had handed them over, to erect, for her foundation, representative buildings of their class.

As the architect to the trustees for carrying on the said day-schools, I shall have occasion to point out the peculiarities of their construction, the drawings of which are exhibited on the walls, as also my design for the Harper Trust Girls' Day-school, at Bedford.

With these preliminary remarks, I now proceed to offer some practical suggestions, with the view of popularising a subject not generally too well understood. It may be convenient if I arrange what I wish to say under two general heads:—

1. The general arrangement of the buildings as a whole.
2. The particular planning of the parts.

PART FIRST.

We will take it for granted, if you please, that the site is all we could desire, with a hard gravel subsoil, slightly elevated, well drained, surrounded by play-grounds, chiefly extended towards the sunny side, the aspect being such that a few northern-lighted rooms may be obtained for artistic purposes; but the main class-rooms to be east by south, or west by north, that they may not be too cold in winter nor too warm in summer, and may at all times be bright and cheery. The class-room windows to be not less than 50ft. from any opposite buildings, and their area of light not less than one-fourth of the floor-space, and, if the windows are on one side wall, the opposite wall should not be more than 25ft. distant, so that the farthest desk may have sufficient light; 15 square feet is the maximum area required for each pupil, and 14ft. a maximum height; the minimum area should be 12 square feet, and 12ft. high. Inlets for fresh air should be opposite the foul-air extracts arranged for use in the varying proportions required in summer and winter, and entirely under the control of the teacher; some, at least, of the extract-shafts to be heated at the base, and some, at least, of the inlets for fresh air to be capable of being warmed on its passage into the room.

However contracted the site, it is to be hoped that room will be found for a fives-court, and for the simpler kind of gymnastic exercises, both covered and uncovered.

With reference to the general arrangement of school buildings, they naturally divide themselves into two distinct classes, viz., boarding-schools and day-schools.

Boarding-schools.—With reference to the first, it is not my intention to say very much, because it is not in this direction that the extension of educational buildings is likely to be so very greatly increased; nevertheless, it is very important that the improvements made in day-schools should be imported into boarding-schools, and the accommodation required for residentiary purposes should not overbear or prejudicially influence the educational department and appliances.

It has been one of the drawbacks to the proper development of voluntary schools, that the promoters were too often willing to sacrifice the school conveniences for the sake of obtaining space for popular lectures and general assembly rooms, and the Education Department very properly set their faces against innovations of this sort wherever their influence extended. At the same time, the great cost of extensive dormitories and domestic offices in boarding-schools renders it essentially necessary to bear in mind the double purpose of such buildings, so that each may be economically arranged, and the provisions necessary for the one purpose may not lead either to curtailment or extension beyond the requirements of the other.

As an example of the kind of building which, in practice, has been found to answer the ends proposed, I will draw your attention to the plans on the walls, which illustrate Milton-mount College, Gravesend. The educational division of the building occupies the ground-floor of the main block, consisting of a southern front and eastern and western wings, over which are two stories of dormitories; the dining-hall—a single-story building, with an open-timbered roof—is situated in the centre, and is placed at right angles with the main building, and, being situated immediately opposite the entrance-hall, is easily accessible for public uses or school lectures and examinations, while, at the other and northern end, are the kitchen offices, quite distinct from the rest of the building, yet closely associated therewith by the corridor running on the side of the hall. The pupils' staircases occupy the internal angles at the junction of the main building with the wings, while in the centre is a service staircase, at the southern end of the corridor, connecting the main building with the domestic offices.

By this arrangement, the several parts of the building are in close connection and yet perfectly distinct:—The educational apartments, with the teachers' and pupils' dormitories above them; the kitchen offices, with the servants' dormitories over them; and the dining and lecture-hall between.

The architect of the London School Board, Mr. E. R. Robson, F.S.A., in his admirable work on school architecture, has chosen this building as an example of a middle-class boarding-school, and has given four illustrations of it. I cannot do better than quote his succinct description. He says:—

"Milton-mount College, Gravesend, intended for the daughters of Congregational ministers, and erected from the designs of Mr. Robins, forms a rare specimen of a carefully-considered school-house for 150 girls on the boarding principle. The sleeping apartments on the first floor are planned on the model of the ancient monastic dormitories, a central corridor down a large hall or room, leading, on right and left, to cells, chambers, or cubicles, formed by wooden-panelled or match-boarded partitions, 6ft. 6in. high, arranged along both sides.

"The Monks' Dormitory at Durham, erected in the 15th century, and now used as a library, was identical with this in plan. The advantage of the arrangement is that each scholar has a room to herself, while ventilation is promoted by the upper part of the room being entirely unencumbered by divisions. The cubicles measure 9ft. 6in. by 5ft. 6in., and occasionally two are thrown together, by the omission of the partition, for occupation by two sisters or friends. A drawing shows an interior view, supposing the partition removed for the purposes of a sketch.

"On the ground-floor are the school-rooms, class-rooms, teachers' and visitors' rooms, library and music-rooms; the last are fitted with shelves and portfolio lockers. The little practising-rooms each contain a piano, and it is found that sound from room to room is sufficiently deadened by the plan for the purpose in view. In each of the school-rooms book-closets are formed against the wall-dado, and surround the room.

"One school-room is fitted with a raised gallery and Dr. Liebreich's desks; there are four class-rooms, each for 20 pupils; the bonnet and cloak-rooms are fitted with separate closets for every three girls; the dining-hall is capable of accommodating 150 girls and eight mistresses.

"The arrangements of the dormitories on the

* Read before the Society of Arts, April 7.

second floor are identical with those of the first floor."

Now there is nothing in the design of this building which would not make it equally suitable for boys, excepting only the music-rooms, which might be converted into science class-rooms. The same may be said of another example of this description of building, viz., the Educational Home for the Daughters of Missionaries, Sevenoaks, now in course of erection, the foundation-stone of which was laid by the Right Hon. W. E. Forster.

In this building I have carried out the same principle of planning, but so varied as to suit the special circumstances of the case, as may be seen by the drawings exhibited. In this boarding-school 100 children have to be accommodated and divided into senior and junior schools, the senior occupying the left wing, and the junior the right. Cubicles are provided in the dormitories for the seniors, but not for the juniors, for which latter class nurses' rooms are required, and bath-rooms for all.

The dining-hall is in the same relative position as at Milton-mount College, with the kitchen, offices, and servants' dormitories in the rear; but in this case, and in consequence of the delicacy of children born mostly in foreign countries, it was thought desirable to form the building into a quadrangular shape, with internal courts on either side of the dining-hall, so as to be less exposed to northern winds, and more compact and warm, the corridors themselves being heated. Both here and at Milton-mount ample space is given for cloak-rooms and conveniences, which, in each case, are projected from the main building, under lean-to roofs, towards the internal courts; an unwise economy usually contracts the space allotted to cloak-rooms, lavatories, &c., so as to make them greater nuisances than conveniences.

The plans exhibited sufficiently explain themselves, and will render any tedious description unnecessary; for the same reason, I do not think it desirable to detain you by describing the Miss Lushington's mixed middle-class school at Kingsley, opened by Lord Selborne and the Right Honourable W. E. Forster, which is similar, but, for economical reasons, the kitchen offices occupy a different position, to enable a pair of existing cottages to be brought into use.

Day-Schools.—We now come to the general arrangement of middle day-schools. In considering these, it will be useful to observe the recent growth of elementary schools; for this purpose, I have exhibited drawings of Christ Church Schools, Battersea, which were erected by me many years ago for 600 children—200 boys, 200 girls, and 200 infants; they were designed on the old system, then required by the Education Department, and consisted of one long room and one class-room to each division, the classes in the long room being divided by curtains drawn out at right angles from the walls. This school was erected at the then stipulated cost of £4 per head, exclusive of the two teachers' houses.

On the establishment of the London School Board, many architects were engaged on the first schools projected, one of which fell to my share, viz., the Wapping School. The improvements very early made by the School Board are exhibited in this design for a school for girls and infants only, as shown in the more compact planning, the increase in class-room accommodation, the introduction of dual desks, &c.

This tendency towards the increase of class-room accommodation is in accordance with German examples, and one of the most approved by Mr. Watson and Sir Charles Reed is Haverstock-hill School, designed by Mr. Robson. In this case there are four class-rooms to each large school-room, all of which are on the ground floor, each of the large school-rooms giving space for as many desks as the four class-rooms belonging to it together contain; but with this striking peculiarity, that the central space, around which these school and class-rooms are arranged, is covered, and forms a hall of assembly, wherein the whole school meets daily, and in which examinations can be held, and through which access is gained to all the classes, the glazed doors to each of which are commanded from the dais in the hall. This hall was originally designed as a girls' covered play-ground, and is so described in Mr. Robson's book: but experience has proved its great convenience in administration, and it is no longer used as a play-room, but contributes not a little to the educational success of the institution, at which my wife is a visitor. The "hall-passage system" had thus an accidental birth.

In Jonson-street School, Stepney, designed by Mr. Thomas Roger Smith, the large school-rooms were thrown aside altogether and the one great hall alone retained, with separate class-rooms surrounding it on three sides and all in direct communication with it. This school was professedly based on the Prussian system, but is a great improvement upon it, and is the best example of what Dr. Abbott has happily termed the "hall-passage system," adapted to schools of more than one story in height. I look upon this as the culminating point to which primary school buildings have grown, and I take this as the starting-point from which progress is to be made in the future development of secondary schools. That I am justified in this opinion the latest design for a secondary day-school by both these gentlemen is confirmatory. And, through their kindness, I am enabled to show you Mr. T. Roger Smith's design for the Grocers' School, and Mr. E. R. Robson's design for the Blackheath School, of the Public Day-schools Company, both of whom have adopted the said "hall-passage system" in these middle-class schools, the one for boys and the other for girls.

Mr. Henry Clutton has also adopted the same principle in his design for St. Francis Xavier's College, at Liverpool, erected, in 1875, as a middle-class day-school for 500 boys.

The advantage of so planning a school building that the head-master may, with the least loss of time and trouble, have the whole school under his supervision and control, must be manifest to every one who thinks of the difficulty of personally controlling a school of 500 or 1,000 pupils and their various masters. A hall into which every class-room door shall open, where the pupils may congregate for prayers, for lectures, for examination, for separate instruction, in such groups as may be required by special circumstances, where they may meet and retire in an orderly manner to their several classes or to their homes, under the eye of the presiding genius of the school, is obviously an addition of no small importance to the welfare and discipline of the school.

The moment that you introduce the corridor you destroy the possibility of exercising the same kind of influence; the hall, if you have one, becomes a costly appendage, of a stately character, but of no daily practical use, reserved only for special occasions. The teaching being done in the class-rooms, it has not the excuse for its existence which the old foundation schools had, for in them no class-rooms were provided.

For these reasons, I prefer Mr. Smith's design for the Grocers' School to that which has been chosen and erected, a plan of which I exhibit, and by which it will be seen that the hall is carefully cut off from the class-rooms by a corridor, which effectually isolates it, and gives to the head master no personal control whatever of the movements of the school as a whole from such a vantage ground, and thus the hall is rendered an expensive and comparatively useless luxury.

In designing the buildings required for the North London Collegiate School, at Sandall-road, Camden-town, and the Camden School for Girls, at Prince of Wales's-road, Kentish-town, I laboured under the disadvantage of having to incorporate therewith existing buildings in each case, and in the former to complete the new portion before I touched the old, so that the pupils might be transferred from the one to the other; but, feeling very strongly the representative character of these schools, I endeavoured to bring them into subjection to the latest and, as I think, the best improvements in school planning. The task has been a difficult one, but success seems to be assured, even before the amended old part of the building has been entirely handed over for occupation, as in the case of the Sandall-road School.

Camden Schools.—The plans illustrate the general arrangements, concerning which, I may remark that the Camden School was first built and finished. The freehold of the Governesses' Institution, founded by Mr. Laing, was purchased for £5,500, and at a cost of some £7,500 was adapted to the uses of the school. In this case, for economical reasons, no hall was desired, it being determined that the Clothworkers' Hall at the Collegiate School should be jointly used by the two schools on prize days, &c.

The education given at this school is at a much lower rate than the former, and the classes number 50 pupils in each; on the ground and first floors there are nine such class-rooms, a gymnasium, a drawing-school, a lecture-room, library and committee-room, teachers' room, office, and caretaker's apartments; in the basement are the extensive cloak-rooms, drying-closets, dining-room, kitchen, and domestic offices.

The girls enter by the basement steps on each side, proceed to the cloak-rooms, thence pass up to their several class-rooms, where each has a separate desk to herself; the use of the gymnasium, drawing-school, lecture-room, and play-ground being timed with great precision. Both hot-water and open fire-stoves are used for heating and for drying clothes, and every class-room has arrangements for admitting fresh, and extracting foul, air, independently of the windows. Owing to the administrative abilities of the head mistress, Miss Elford, no less than the completeness of the arrangements, this school goes like clockwork.

North London Collegiate Schools.—The old portion of the North London Collegiate School for Girls was originally an emporium, or general store, and was adapted by me for school uses. It is now undergoing considerable alteration and addition, an extra floor and a new façade being constructed. The new buildings occupying the remaining portion of the site are finished, and were opened by the Prince and Princess of Wales last July.

It will be seen by the plans exhibited that the accommodation comprises the following:—

The great hall, presented by the Clothworkers' Company, and called by their name, 70ft. by 39ft., and 32ft. high, with a wide gallery at the end and a shallow one on the side at the level of the first floor, the raised dais and organ-recess being at the opposite end on the ground-floor. Three stories of class-rooms are arranged on one side of the hall. The five class-rooms on the ground-floor, and those over them on the first floor, are in direct communication with the hall by the ground-floor of hall and the side gallery. There are three class-rooms on the second floor, and a large drawing-school lit in a similar manner to the Gloucester Art School.

Under the hall is the dining-hall, and the kitchen, scullery, and housekeeper's room; under the class-rooms are the cloak-rooms and conveniences, the store-room, the teachers' room, the strong room, the head mistress's retiring-room, and the drying-room.

The basement and staircase are heated with fresh warm air by hot-water pipes in channels, to which fresh air is admitted in large quantities. The class-rooms have Boyd's School Board ventilating grate, and fresh air admission shafts and foul air extraction shafts are everywhere; so that the necessity for opening windows is not felt, though cross ventilation by windows is easily attainable, not only by the fanlights over the doors to the hall, but by windows in the same intermediate wall. The triangular space over the boarded ceiling of great hall forms a warm-air extraction shaft, hot-water pipes being placed at the foot of a vertical flue at one end.

There are two staircases to this new building, one at each end of the corridor. This portion of the school has been in occupation some eight months, and the advantages of the system have been fully proved; otherwise, in spite of the known administrative ability of the head mistress, it would have been impossible to have accommodated the whole school of upwards of 400 pupils without the use of the old part of the building.

It is an interesting sight to see the pupils come in through the basement entrance to the cloak-rooms, where they enter at one door and retire at another, changing their shoes as well as leaving their hats and cloaks, and passing up the staircases to the great hall, where they file in to their accustomed seats and await the organ peal giving forth the morning hymn, followed by the prayers read by the head mistress, at whose command each teacher leads her class to its class-room, and the doors are shut, and work begins within and also without, in the great hall and gallery, which, at present, supplement the class-rooms in the old building not yet handed over, but about to be next term.

The Old Building.—On either side of the main entrance to the old building are small triangular offices, at which inquiries may be made without further entering the building, at small windows provided; beyond these, on one side, is the head

mistress's rooms, and on the other side the general office and waiting-room, adjoining which is the board-room, which is also the library and museum. Over the board-room on the first floor is the science lecture-room, with a chemical laboratory adjoining; the other two rooms are respectively a class-room and the teachers' retiring-room and library. The old staircase is retained to reach this floor, but the new staircase gives access to the second floor, in which are two large and five smaller class-rooms, for music-lessons and practice. The caretaker's rooms are reached by a special staircase, and extend from the front under the turret to the back; a box-room is situated in the turret itself, and a lumber-room in the general roof. Behind the organ are passages on each floor, and a lift from the sub-basement and coal-cellar to the lift and cistern-room on the topmost floor. Two drinking-fountains are provided for each floor, supplied with filtered water, and lavatories and w.c.'s in addition to those entered from the cloak-room. The basement is occupied by a cloak-room 30ft. square, a cooking-school, kitchen, and scullery, &c.

It must be confessed that, upon this very awkwardly-shaped site, very little else could have been done had the buildings been rebuilt instead of only enlarged. The playground is much too small, and is partly occupied by the gymnasium, which is fitted with Stempel's apparatus; a fives-court is to be attached to the gable-end wall.

Such is the general description of these schools. I now come to consider one twice the size, which has recently been the subject of much discussion, viz., the City of London School.

I have exhibited on the walls my competition design for this building, in which you will see a further development of the same principle of planning which I have been advocating, but which was as fatal to my success as to Mr. Smith's in the Grocers' School competition. The public has not yet been educated up to the "hall passage system," and the selected plan in this competition repeats what I considered a defect in the former cass—the great hall is made a solitary apartment, carefully cut off from the uses of the school by the corridors surrounding it. In other respects the plan is suited to the site, but would be as complete without the hall, as with it.

In the design submitted by me, the hall is the centre of civilisation to the school; into it every door to every room in the building opens, and from the dais is commanded every part of the building and all the people in it. This hall is lit like the nave of a church, with a range of clerestory windows above the roofs of the class-rooms surrounding it. It takes away the necessity for close, stuffy, dark and dreary passages, and gives a cheerful hall and promotes light and ventilation. It has a gallery round it, at the level of the first and topmost floor. The class-rooms on three sides open into it, and the great lecture-room for 400 students is at one end, in easy communication with the chemical laboratories and class-rooms.

Under the lecture-room, on the ground-floor, is the dining-room, capable of being divided into four class-rooms, and supplied by a lift from the kitchen on the second floor, which is part of the caretaker's apartments.

Benches are provided for the whole of the school on the ground-floor, with aisles 10ft. wide running round and forming open passages of communication, never needing to be screened by curtains except on examination days, as experience has proved at Sandall-road School.

The head master's and secretary's room, the clerks' offices, and the board-room, with the separate waiting-rooms, are ranged on either side of the chief entrance from the Embankment.

The basement is almost entirely devoted to covered playgrounds and cellarage, the fives-courts and conveniences being planned carefully with covered ways to the latter from the staircases.

The head-master's private room overlooks the south-western corner, and the teachers' private common room overlooks the playground at the north-west corner, so that out of school the masters are in the best position for observing the pastimes.

Mr. T. R. Smith's design for the Grocers' School is most compact, and a glance at the drawings makes the arrangements quite clear, leaving little by way of description necessary. The class-rooms are arranged on three sides of the hall, with which they are in direct communication, similar to the admirable board school erected by him at Stepney.

Mr. Clutton's design for St. Xavier's College, already referred to, is also well illustrated by the plans and sections which he has kindly lent me. I was not aware of its existence till, in searching for corroborative examples of the principles I am advocating, I found an illustration of it in the Building News. I have written to the master to learn what his opinion is of the practical advantages to be gained from this arrangement, and the Rev. Father Harris replies as follows:—

"The opening of the class-rooms directly into the great hall has very great advantages. 1st, as regards general supervision; 2nd, as regards saving of time; 3rd, as regards all general discipline. It is, however, difficult to use the hall for any general purpose during school-hours; but, as far as the good of the boys, which is the principal matter to be studied in a college, is concerned, the system answers admirably."

I have also received the following note from Miss Buss, whose testimony is of great value:—

"During the time we have had the use of the hall we have found it exceedingly pleasant. The opening of the school-rooms directly out of the hall is certainly a great advantage. The supervision is much more easy, as is also the control of pupils while assembling and dismissing. The light and ventilation are excellent, far better and more complete than they would have been if you had given us a separate passage."

(To be continued.)

THE GLASGOW MUNICIPAL BUILDINGS COMPETITION.

A SPECIAL meeting of the Glasgow Town Council was held on Tuesday—the Hon. Wm. Collins, Lord Provost, presiding—for the purpose of resuming consideration of the proposed new municipal buildings scheme.

Preceptor Mathieson asked that the motion and amendment submitted to last meeting should now be read.

Dr. Marwick (town clerk) said he thought it right at this stage to read a letter which had been received from one of the competitors. In the letter referred to the writer stated that he had already been engaged in making designs according to the terms of advertisement and had made considerable progress with the work, and it was within his knowledge that others had also done so. He therefore hoped the Town Council would adhere to the terms of their own advertisement. If, he added, the whole arrangements were now upset the gentlemen who had gone into competition, relying on the good faith of the Council, would be very unfairly dealt with unless compensation was made for the work already done. The town clerk went on to read the minutes of last meeting, at which the Lord Provost moved the approval of the minutes of the committee on new Municipal Buildings; while Mr. Reid proposed as an amendment that the whole instructions as to plans be remitted to the committee for further consideration and report.

Mr. Smith then resumed the debate, and entered into a minute criticism of the plans prepared by the city architect. He complained of the omission of a library and a writing-room for the Council, and of the multiplication of water-closets and lavatories, and described the scheme as a "hollow square" concern altogether, and a Glasgow idea from the beginning. Passing on to other details, Mr. Smith said that Mr. Gale complained of having too little room for the Water Office, while Mr. Foulis said the Gas Department was dark. Then the Council Chamber was made in imitation of the delectable interior in which they were now assembled. The proportions of the chamber proposed were 60ft. by 30ft., somewhat like the proportions of the present one, and they knew what an uncomfortable room *it* was. Passing on to criticise the conditions of competition issued by the Corporation, Mr. Smith objected to architects being only required to design elevations, and said that for the handsome premiums allowed plans might also have been obtained. He objected further to the style of architecture being restricted to the Classic, and contended that the time at which designs were to be sent in should be extended beyond 15th June next. Then as to the limitation of price, he thought £150,000 was not sufficient. An honest architect, keeping the cost of the building within that amount, would give no ornamentation whatever; a dishonest architect would give ornamentation, but his building, although set down at £150,000, would really cost £200,000. Was it fair to ask the honest architect to enter into a competition on such terms? On the whole he thought it would be well to send this subject back to the committee in accordance with Mr. Reid's amendment. Mr. Reid's language was not unwarranted in any way when he said the whole thing would be a disgrace to the city of Glasgow. He would go a little further, and say that it would stamp the Lord Provost's reign with indelible disgrace.

Preceptor Mathieson dwelt upon the importance of the question, and confessed his astonishment and dissatisfaction at finding the instructions issued before they had been discussed by the Council. They had been issued in undue haste, which could not fail to be prejudicial to the ultimate result. There were three questions that ought first to have been considered—in the first place, whether these plans were to be strictly adhered to; secondly, whether they were the best that could be devised; and thirdly, whether they provided all that was necessary for municipal requirements both present and prospective. All these questions ought to have been considered before any final decision was come to. It appeared, as the instructions stood at present, that the plans of the internal arrangements were to be adhered to in every material respect as designed by Mr. Carrick. He thought this was a mistake, and the competing architects should have been left at liberty to act as their own genius and skill might suggest—they should not be tied hard and fast to Mr. Carrick's internal plans. Then the sum fixed for the building was too small; it was only £150,000, as against the sum of £600,000 spent by Manchester on its municipal buildings, and the £150,000 was sure to be exceeded. He also thought the time allowed for sending in the designs was much too short; a longer time than 2½ months ought to be allowed. He was afraid that no architect of eminence would compete under such conditions, and they could not afford to hand over such a work to any rising young genius who had yet to win his spurs. They must have an architect of the front rank. One suggestion which had been made was that 12 or 14 eminent architects should have been selected and invited to send in plans, for which they should have received £100 each, and he believed that suggestion would have been a very good one if the opportunity had been allowed for carrying it out. He condemned the want of provision in Mr. Carrick's plans for the accommodation of the sanitary staff, and contrasted it unfavourably in this respect with the Corporation Buildings of Liverpool. Provision ought to have been made in the new building for all the municipal requirements of the city; but instead of that, the ground to be covered was, in actual measurement, some 50 per cent. less than the ground covered by the Manchester Municipal Buildings, though the Glasgow buildings were to serve the requirements of a population 50 per cent. larger than that of Manchester. The city of Glasgow had largely increased in wealth and importance, but it had scarcely a single fine public building, with the exception of its grand old cathedral. That was a noble pile, erected by God-fearing men, and they might be sure that it was not done by contract. He only wished that some of the spirit which created that building could be infused into the town council at present. The cathedral was built in the Dark Ages, and had come down to us, but we were doing nothing at all for posterity. The council ought to rise to the occasion, and do something worthy of the present age. They knew that architecture was costly, but for a work like this money would not be grudged. Unfortunately, posterity had no voice in this question, but it would have to pay some of the money. The next generation, and possibly the next after that would have to pay its portion, and it should be the object of the present generation to provide something worthy of the future, and not dwarfed and stunted by purely economical considerations. It was impossible to estimate the educational influence of really fine and noble buildings in improving and elevating the taste and judgment of the people, and the work to be undertaken should not be set about in a merely commercial spirit. These buildings when erected

would express something of the life and character prevailing when they were built, and that should not be expressed in bad art or in no art at all—it should be expressed in a manner which would be worthy not only of ourselves, but of posterity, and ought not to be open to the reproach of being cheap and nasty, or commonplace. The people now living, as well as those to come after them, should have the opportunity of contemplating a good, noble, and a perfect thing. He trusted the Council would rise to the occasion, and not be governed by a purely economical, commercial spirit.

After sundry remarks by various members of the Council, the Lord Provost, in supporting the motion for the adoption of the minutes, as made by him at last meeting, remarked that if the Council were of opinion that it was desirable, for any reason whatever, to give the architects a month or two longer for sending in their designs, he did not see that that could affect the conditions of competition in the least, and therefore he would leave that as an open question. In reference to what Mr. Smith had said about a library, he thought it was very desirable that there should be such a room, and he saw no difficulty in the way of providing it. The members of Council would observe from the plans that in the Chamberlain's Department seven rooms were shown in addition to the public rooms. At present the Chamberlain's Department only occupied two rooms, so that there was considerable latitude for providing for this or any other requirement which might crop up. As to the style of architecture specified, the committee very carefully considered that question, and they resolved to specify the Classic, lest architects should prepare elevations according to styles altogether unsuitable for a public building. The Manchester building was regarded as a rock to be shunned rather than a precedent to be followed, and this not only in respect of the cost, but also of the style of architecture and general arrangements. With regard to the remarks of Preceptor Mathieson, they were altogether out of place at this time. If the Preceptor had made these remarks when the bill was before the Council, and everything a blank sheet, they would have been of service; but it was now too late to offer them, when everything had been settled, and a limit set to the expense. The sum of £150,000 was the sum estimated for the structure, but that would not include internal decorations and fittings, on which another £150,000 might be spent if the Council chose. The sum estimated for the structure would of course include the carrying out of the architect's plans, but any amount of money might afterwards be spent on internal ornamentation. Of course, though the estimate for the building was £150,000, there was always a latitude allowed to architects amounting to 10 per cent.; and making that allowance, and allowing also for extras which would be sure to crop up, and for necessary fittings the total sum to be spent would not be below £200,000, but would probably be above it. Under such circumstances it was a wise thing, especially after the experience they had already gained, rather to aim a little low than to aim too high. *Then, although three premiums were offered to architects, and a neutral architect was to award them according to the merit of the designs sent in, the Council had kept themselves distinctly free to exercise their own judgment afterwards, and would be at liberty to reject all three designs to which prizes were awarded, and to select one from outside. They were free, indeed, to choose the elevations of one architect and the internal arrangements of another, or, in fact, to come to any conclusion they chose in the matter.* The Lord Provost concluded by assuring the Council, as to any disgrace which he might be the supposed cause of bringing on the city, that if the designs submitted were not such as to meet the approval of the Council he would pay the premiums himself, and let them begin *de novo*. He also desired to point out that there still remained 8,000 square feet of unallocated space in the plan for the internal arrangements.

Preceptor Mathieson wished to know, before a vote was taken, whether the committee had not exceeded their powers in issuing and advertising instructions before bringing them before the Council.

The Lord Provost thought not.

Preceptor Mathieson wished to ask the town-clerk whether, if the instructions were altered, it would affect the Council legally in connection with the present competitors, who might be proceeding with their plans. He did not wish to insist on an answer to this question if it were considered unadvisable to give one in public.

The town-clerk thought it would be much better that legal questions of this kind should not be asked.

The council then proceeded to vote on the original motion and amendment, with the following result:—

For the motion—The Lord Provost, Bailies Scott, Laing, Farquhar, M'Onie, Mowatt, and Dunlop; Treasurer Hamilton; Messrs. Filshill, Einlay, Gray, Lamberton, Osborne, Stuart, and Watson—15. For the amendment—The Deacon, Convener; Messrs. Adams, Bertram, Bryce, Fairlie, Hamilton, Jackson, M'Laren, M'Pherson, Martin, Mathieson, Moir, Neil, Reid, Richmond, Shaw, Smith, and Young—18.

The amendment was accordingly carried.

On the motion of Mr. Hamilton, seconded by Bailie Laing, Mr. Reid and Mr. Smith were added to the committee.

The meeting then separated.

ST. PAUL'S ECCLESIOLOGICAL SOCIETY.*

Mr. SEDDON said he had selected the 50 photographic views which he proposed to exhibit on that occasion to give a comprehensive glance at the whole history of architecture, together with the sequence of its several styles.

In the first place was presented some exceedingly rich specimens of Southern Indian work as representative of Oriental work generally, ancient as well as modern. The outlines of the buildings were good and picturesque, and the details rich and elaborate. Three particular examples, the temple of Bobeneswar, near Juggernaut, and the temples of the great and little Corycocrum, were not of very recent date, but were in better condition to be photographed than the ruins of the works of olden times, and the character of Oriental art had changed little. Labour had ever been but of little account, and was lavished as in these examples, but with small intellectual and still less spiritual result. While on this Eastern ground, he gave as a contrast some later and more refined work from India, the tomb of Mullick Rhymam at Seerah, and that beautiful Taj Mahal, due to the Mahommedan influence which succeeded the previous Hindu fashion of thought.

Egypt was next represented by the Colonnade of the Temple of Isis, at Philæ, which, though a late, was a tolerably perfect and fairly representative example of the style, and the tomb of the Mameluki at Cairo was an exquisite work of Saracenic character, which, as the Taj in India, was marked by the refinement of Mahommedan civilisation.

Greece, as the adapter and improver of types chosen from the miscellaneous Oriental quarries of art, was first represented by a beautiful photograph of the whole Acropolis of Athens, which displayed its several temples as now remaining, covering, though in ruins, that magnificent site. Then the Temple of Theseus, as more perfect than the Parthenon, was given as a sample of the Greek Doric temple, and the Erectheum of the more delicate Ionic, with the fine portico of the Caryatides. Details of Greek architecture, from the Architectural Museum and the Elgin Room at the British Museum, were then shown and explained, and the statue of the Prince of Caria—Mausolus, from his famed mausoleum, was given as an example of Greek sculpture.

Roman architecture then was reviewed, with the Corinthian columns from the ruins of the Temple of Jupiter, at Athens, the Arch of Constantine, at Rome, and details of various Roman friezes, griffins, &c., and capital from the Temple of Vesta at Tivoli, &c., were exhibited.

Venice contributed views of the west front of St. Mark's Church, and of her Ducal Palace, and one of her palaces on the Grand Canal, of the Later Gothic.

Lucca, the rich Romanesque façade of her cathedral, and Siena gave a characteristic specimen of Italian Gothic, studded with artistic sculpture and mosaics, but standing to mask rather than to complete and adorn the structure behind it, and Milan Cathedral, the fantastic compilation of the detail without the spirit of the Gothic style.

France was then laid under contribution. The cathedrals of Notre Dame in Paris, Rouen, Chartres, Rheims, and Le Mans being presented in a series of fine photographs, giving the exterior and interior perspectives, their several portals and other details.

From Belgium, Oudenarde Town-hall and Bruges Cloth-hall and belfry, and Antwerp Cathedral, were successively shown, and, lastly, from England, York, Lincoln, Durham, and Carlisle cathedrals; and Tintern, Fountains, and Westminster abbeys were exhibited by Mr. Gough, with his excellent magic-lantern apparatus, and their several specialities and characteristics explained and compared by Mr. Seddon. On the conclusion of the lecture a vote of thanks was passed by acclamation to both the above-named gentlemen, on the motion of the Rev. H. C. Shuttleworth, M.A., minor canon of St. Paul's, the chairman on this occasion.

* Lecture entitled Gems of Architecture. By J. P. Seddon; illustrated photographically by Mr. H. R. Gough.

DINNER OF THE BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

The thirteenth anniversary of this deserving charity was celebrated on Tuesday evening last by a dinner (the second of the kind) at the Guildhall Tavern, Gresham-street, E.C. The President, Mr. S. Taprell Holland (Holland and Hannen) presided, and was supported by about 100 of the friends and supporters of the institution, including the ex-President (Mr. T. F. Rider), Messrs. T. Plucknett, Colls, Frank May, C. Fish, S. H. Trollope, Moser, Meakin, Doulton, Bayes, Major Brutton, &c. The President, in proposing the toast of the evening, "Success to the Builders' Clerks' Benevolent Institution," said, notwithstanding the presence of some very old members, such as Mr. Bishop, who drew the first cheque received by the institution, he would, for the benefit of those who sat at that dinner that evening for the first time, give a brief history of the institution. It was founded in 1867 by Mr. Thomas Peter Ward, who, being himself a builders' clerk, understood the requirements of his fellow-workers. The late Wm. Lawrence, then M.P. for the City of London, became the first president in 1867, and a few subscribers were secured. In 1868 Mr. Wm. Henshaw was chosen as president, the institution was publicly recognised, and for the first time administered a little relief. In the following year, under the presidency of Mr. Chas. Richardson, the institution got into working order, and the sum of £66 3s. 4d. was expended. There had been no flourish of trumpets, but the institution had steadily progressed, and year by year had gained in strength and had at length become a permanent success, so that last year, under the influence and presidency of Mr. Thomas F. Rider, the amount expended in relief and pensions was £179 5s., in addition to the purchase of a second nomination for 21 years at the Orphan Working Schools, at a cost of £262 10s., making a total outlay of £441 15s. The expenses had been carefully kept down, so that for rent, rates, and taxes, secretary's salary, and postages, only £83 7s. had been spent, so that it could not be said that the working expenses were extravagant. Great and satisfactory as had been the progress in charitable expenditure during the ten years, from £66 to £441, no one knowing the number of builders' clerks in the metropolis and their average earnings would say the work effected was sufficient. There were two or three deserving widows, now receiving temporary relief, of whom one would be elected to a pension in June; whether the others would have to wait for a time depended on the response of the evening. Their present position was that they granted one pension of £25 a year to a builder's clerk who was incapable of further work; eight pensions of £20 a year to widows, and supported two children at the Orphan Working School. This was out of all proportion to the necessities of the class, yet it was all they could do with their present means, although the working expenses were very low and the committee hard-working and harmonious. He would press the claims of the widow and orphan upon his hearers, and especially on builders' clerks themselves, for to one of that class wishful for the luxury of benefitting others no nearer nor more deserving subject could be found than the Institution, and it was in itself not to be despised as a mode of insurance, as every guinea subscribed was reckoned as a premium of ten votes in the subscriber's favour. At a later period of the evening the secretary

(Mr. H. W. Wheatley) stated that no deserving case had, as yet, been left unassisted by the committee, and that, in response to the chairman's appeal, £217 11s. 6d. had been promised in the room in donations, including sums of 20 guineas each from the president, from Messrs. Holland and Hannen, and from Messrs. Mowlem and Co., three sums of 10 guineas each from other firms, and many sums of a guinea or half-guinea from the class specially benefiting by the institution, and that £33 11s. 6d. had been promised as new annual subscriptions—an announcement received with applause.

EXHIBITION OF BUILDING APPLIANCES AT THE AGRICULTURAL HALL.

AN exhibition of architecture, construction, engineering, decoration, and furniture will be opened in the Agricultural Hall, Islington, on Monday next, by the Lord Mayor (Sir F. W. Truscott). The aim of the promoters has been to show the entire arrangement of a house from a constructive point of view, exhibiting the various processes and stages of building and furnishing operations, from the excavations for foundations to its completion and decoration ready for habitation. That the endeavour will be a successful one as an exhibition may be anticipated, as the whole of the space in the hall has been taken up by exhibitors. The display has been arranged under twelve classes; but these are not strictly adhered to in every case, as some of the exhibitors prefer, and are permitted, to show all their goods, where they are of small bulk, in the same stand. Class 1 includes wood and joinery, and in it will be found some displays from Norway, including the entire furnishing for a bedroom of a middle-class Norwegian family. Some laths and other exhibits are sent from Sweden, and America is also represented. In Class 2 are brick, stone, and concrete, and in the latter department almost all the leading concrete apparatus and block firms have exhibits, the list including W. H. Lascelles, Henley's Concrete Building Apparatus Co., Drake's, and others. A Wortley firm shows glazed tiles and terra-cotta, and the Victoria Stone Co. have a stand. Messrs. Ashton and Green occupy considerable space with slates, showing the cleavage and lamination. Class 3 occupies a large proportion of the area, and is devoted to machinery in motion, Messrs. Western and Co., Reynolds, the Hathern Brick Co., and others having prominent displays. Class 4—terra-cotta, glass, and china—is not so full, some exhibits being scattered in other classes. Class 5 is for builders' appliances. The next Class, 6, for sanitary appliances, occupies a considerable part of the exhibition. Here we recognise many well-known exhibitors, including Messrs. Boyle and Co., of Glasgow, and other ventilating firms. Class 7 comprises constructive ironwork, and here several well-known makers of corrugated-iron buildings have large displays. Class 8 consists of marble chimney-pieces and stoves, from the bulky nature of the goods, covering a large area, a whole fourth of the room being occupied by this class. We shall describe the exhibition in our next issue. The manager is Mr. John Black, of 161, Strand, W.C.

ART-FURNITURE.

DURING a recent visit to Messrs. Holland and Sons' showrooms in Mount-street, Grosvenor-square, our attention was directed to several objects of artistic furniture and decoration. Among them a cottage grand pianoforte may be mentioned for its treatment of case, made of American walnut, relieved by ebony and gilt mouldings, and for the introduction of small panels of ebony with boxwood carvings in imitation of cameos in the front above the keyboard. There are five panels treated in this manner, the heads of the leading composers, comprising Haydn, Mozart, Mendelssohn, Beethoven, being carved in boxwood and mounted on ebony panels, with an emblematically-composed subject in the centre. These light profiles have all the appearance of beautifully-carved cameos set on a black ground. Above the series of panels the front is finished with a deep cove enriched by a Japanese textile, which is divided vertically by ribs. The ends of the front are relieved by turned pillars with incised and gold members, and the keyboard is covered by a simply-panelled desk-like lid hinged with brass hinges. The end standards are panelled; the ordinary front legs are omitted, and the case has a solid effect, devoid of the usual fretwork and flimsiness of design characteristic of the common stock cottage. In the design of Messrs Holland's pianoforte the structural lines of the instrument are not contravened; the framing is strictly adapted to the purpose; we see no meaningless curved elbows and rococo, and the designer has been successful in adhering to constructive ornamentation without incurring the charge of producing a heavy piece of furniture. We notice, among other specimens of workmanship, one or two charmingly elegant book-cases designed after the Chippendale manner, with broken pediments richly inlaid, a mantelpiece in the Adams' style, with light painted ornamentation; a richly-inlaid drawing-table with stained satinwood, in a florid Italian or Louis XV. style, and one or two sideboards in the Jacobean taste, though without the extravagances of detail we sometimes meet with. A very suitable kind of wall decoration is a cretonne of light cinnamon tint enriched by a conventional foliage pattern printed in dark colours of quiet hue, which can be applied in the form of panels. These are but a few samples of Messrs. Holland's manufacture, and we can recommend a visit to their showrooms.

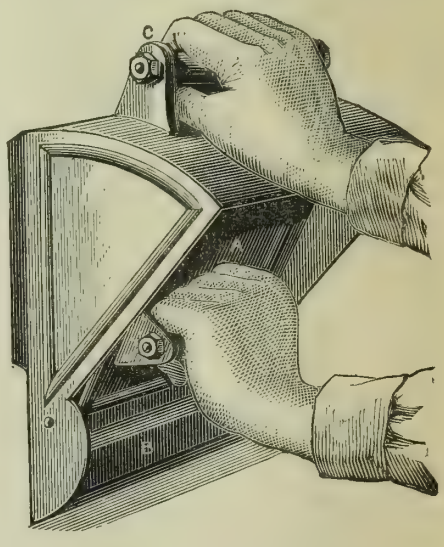
RATING OF GAS AND WATER-WORKS.*

WE have received a pamphlet, purporting to deal with the subject of rating gas and water-works, and the principles of compensation involved in the transfer of water undertakings from private to public authorities. The work is written by Mr. Joseph Quick, jun., M. Inst. C.E., who first enters into the vexed question of rent as regards rating. By the Union Assessment Committee Act of 1862, the definition of "gross estimated rental" for the purposes of this Act, "is the rent at which the hereditament might reasonably be expected to let from year to year, free of all usual tenants' rates and taxes, and tithe commutation charge." In the assessment of gas and water-works, the author explains the difficulty that occurs in the application of the above principle. In their case a hypothetical yearly tenant has to be assumed to arrive at the net rent, whereas, in the yearly tenancy of a house, the tenant is not required to incur any outlay or personal trouble in order to enable him to realise the rent to be paid to the landlord. In the case of a repairing lease, the nominal rent he would pay would be increased by a sum to cover the expense of repairs and insurance, and the rateable value is, in this case, the amount of rent actually paid, less an allowance to the landlord for depreciation depending upon the condition of the premises, length of lease, and other considerations. The schedule of the Metropolis Valuation Act, 1869, is given, showing the maximum rate of deductions from the gross value in calculating the rateable value for various classes of buildings; but in this Act, as the author observes, there is no attempt to apply the principles to gas, or water, or any public works. The author proceeds to discuss the question of the annual rent a tenant would give for a gas or water-works. Of course, the working expenses incurred, and the collection of the rents from parties supplied, would have to be considered, besides the capital necessary for stock of coals, machinery, &c. The gross receipts, less working expenses, and the occupier's share of the remaining balance, constitutes the gross estimated rental, from which have to be deducted the items the landlord can claim for the expense of maintaining the premises. These come under the term of "statutable deductions." To determine this, the "life" of each part of the works, and the sum necessary for a sinking fund, has to be calculated at the usual rates. In part II. the author deals with the principles of compensation in the transfer of water undertakings to public authorities, and discusses the basis on which valuations of such works should be made. Several cases are mentioned. We cannot enter here into the figures; suffice to remark Mr. Quick shows the ultimate financial gain to the metropolitan ratepayers that would be effected by a unity of management. The yearly saving is put at £100,000. In an addendum to the pamphlet the purchase of the Metropolitan water companies is briefly referred to; but we certainly dissent from the conclusion that the Government measure that has so lately called forth the indignant protests of all financial judges would be a benefit to the ratepayers. Instead of coming to terms with the water companies, the proper course would have been to appoint arbitrators to consider the amount of water stock to be paid, and whether the purchasers would get a fair *present* value for the purchase-money. It is especially necessary to consider the outlay demanded for new works that will be absolutely required, and which the author has considerably underrated. Mr. Quick does not prove his view of this transaction, nor can he show satisfactorily that the ratepayers would be benefited by the contemplated one-sided bargain.

* Remarks on the Rating of Gas and Water-works, and the Transfer of Water Undertakings, &c. By Joseph Quick, jun., M.I.C.E. London: E. and F. N. Spon, Charing-cross.

NEW PLASTERING MACHINE.*

THE annexed engraving represents a novel and simple tool which is intended to replace the hawk and trowel ordinarily used for plastering walls, and to facilitate the operation, so that a greater amount of work can be done in a given time than with the ordinary tools. The mortar receptacle is made in the form of a segment of a cylinder, and has a movable leaf or pressure plate, A, pivoted near the gauge-bar, B. The tool is grasped by the handle, C, attached to the convex end, and by the handle, D, projecting from the movable plate, A. The edges of the mortar receptacle are rounded at the ends to form runners which guide the tool smoothly over the wall. The gauge-bar, B, is made adjustable to regulate the thickness of the coating applied to the wall. When the presser plate, A, rests against the ledge at the rear edge of the curved end of the tool, the receptacle



may be filled with mortar. The machine is then applied to the wall with the gauge-bar downward, and, as it is moved upward, pressure is applied to the plate, A, through the handle, D, when the mortar will be forced out of the narrow opening at the bottom. The inventor informs us that a workman using one of these machines can perform the work of two men using the ordinary tools, and the work will be done with greater uniformity. This useful tool was recently patented by Messrs. G. Stevens and E. F. Guild. Any further information may be obtained by addressing Mr. Egbert F. Guild, East Saginaw, Michigan.

* From the *Scientific American*.

CHIPS.

A fire occurred on Sunday night at 230, Walworth-road, S.E., belonging to Mr. J. Tyerman, builder and contractor, whereby the workshop and stores, buildings of two stories in height, were destroyed, and the stock in open yard was greatly damaged.

The members of the Greenock water trust made on Friday an official inspection of the extensive new works in course of construction at Loch Thom for the better supply of water to the burgh; these works are being carried out from the plans and under the superintendence of Mr. Wilson, C.E.

At Penzance last week, Mr. S. J. Smith, Local Government Board Inspector, held an inquiry respecting an application from the town-council for a provisional order for compulsory purchase of land for widening Market Jew-street, and Albert-street, and for power to borrow £3,000 for the new Central-road, and £800 for works of water supply and sewerage. No opposition was offered.

COMPETITIONS.

Eastbourne Town-hall Competition.—In November last the Eastbourne Local Board invited designs for a new Town-hall and public offices. Premiums of £75 and £50 were offered respectively for the first and second-best designs, the right being reserved by the board to carry out the work under the direction of their own surveyor. Twenty-two sets of plans were sent in, and the first premium has been awarded to the design marked "Forward" (Mr. Wm. Tadman Foulkes, Town-hall Chambers, New-street, Birmingham), and the second to "Labore" (Messrs. Thomas D. Barry and Son, Commercial-court, Liverpool). A criticism of the designs submitted will be found on another page.

The Birmingham Free Libraries.—The Question of Open Competitions.—At the meeting of the Birmingham Town Council on Tuesday last, Alderman Collings moved that plans for the erection of a branch library at Constitution Hill, at a cost of £3,500, be approved, and that the committee be authorised to obtain tenders for carrying out the work. Alderman Manton seconded the motion. Alderman Heaton moved, as an amendment, "That the plans for a branch public library in Constitution Hill submitted by the Free Libraries Committee, be referred back to them, with instructions to have designs for the building prepared by more than one architect, or firm of architects, in order that the Council may have several plans to select from." He said he regretted that there had been any necessity for him to give notice of such an amendment. He had indicated, more than once or twice, that he thought it was unfair to the architects in Birmingham that all the work should be thrown in the hands of one firm. He was still of that opinion, and he should lift up his voice, as long as he remained in the Council for fair treatment among the architects generally. He had not one word to say against Messrs. Martin and Chamberlain—he esteemed them both—but he had a word to say in the interest of the other architects of the town. He contended that in what the committee were doing they were establishing a precedent, and the Council would eventually be told that nobody else could do the work. He denied that; there were plenty of architects in Birmingham able and willing to give the Council their experience without one farthing expense to the Corporation. There was a good deal of feeling on the matter outside the Council, and if they did not deal liberally with the profession they would regret it. He did not expect to carry this amendment, because certain trouble had been given to the architects, and they should be paid for what they had done; but it would have a salutary effect upon other committees, as showing that they should not throw everything into one channel without other people having an opportunity of competing for the work. Considerable discussion ensued, the opinion generally expressed being that while there was no doubt that the principle of public competition in designs was a sound one, the special case in point was one in which it did not apply, the work being only of a limited character, time being a matter of special moment, and the architects having been many times consulted on the subjects of land and light before the plans were prepared. Ultimately the amendment was defeated by 53 votes against 2, and the original resolution carried.

CHIPS.

Dr. Hardwicke held a coroner's inquest at Paddington, on Saturday, on the body of E. J. Humphrey, a zinc-worker, from Old Ford. Deceased, with a man named Hull, was roofing some houses in Sutherland-gardens, Maida Vale, and erected their own extra scaffolding. When crossing a plank resting on putlocks it slipped, and he, the deceased, fell 50ft., sustaining fatal injuries. A verdict of accidental death from imperfectly-fixed scaffolding was returned.

A Local Government Board inquiry was held at Paignton on Saturday before Mr. S. J. Smith, respecting an application from the local board for sanction to borrow £1,900 for purchasing and laying out The Gores, Holloway-hill, as a public cemetery.

The ancient parish-church of West Dean, near Chichester, is in process of restoration—altering and re-seating. The works are being carried out from the plans and specifications of Mr. Arthur Loader, architect, of Brighton and Shoreham; the contractor being Mr. R. C. Blaker, of Worthing.

Building Intelligence.

Belfast.—The memorial-stone of the new Belfast Academy was laid on Tuesday. The most striking feature in the new building is the large square tower which is placed in the centre of the façade. The whole of the exterior walls are executed in Scrabo sandstone, with tooled dressings of the same material. The whole building is relieved by richly-carved string-courses at different levels. The junction of roof and wall is concealed in front by an embattled cornice resting on an elaborately-moulded and carved eaves-course. The tower is also finished similarly; whilst the chimneys and pinnacles have smaller ornamental cornices. The works are being carried out by Messrs. Dixon and Co., and the architects are Messrs. Young and Mackenzie. The buildings when completed, will involve an outlay of £10,000.

Lincoln.—The chancel just added to the modern church of St. Swithin was consecrated on Monday week. The addition is 40ft. long by 24ft. wide, and is two bays in length, each bay containing a three-light window with wheel tracery in the head, and the east window is of three lights, and is filled with stained glass. Externally, the bays are divided by bold buttresses, the double buttresses at the angles being surmounted by lofty crocketed pinnacles. The roof is polygonal, panelled, with a timber arch marking the eastern bay. A sedilia, carved in stone, is placed on the south side of sanctuary. The chancel is separated from the nave, above which it is raised three steps, by a panelled wall surmounted by light iron railing, with gates in the centre. The stalls and quire desks are of oak. On the north side of chancel is a large organ-chamber with vestry attached. The cost of the additions has been £2,500. Mr. James Fowler, of Louth, is the architect, and Mr. C. Baines, of Newark-on-Trent, the builder.

Plymouth.—The foundation-stone of the new church of St. Peter, which replaces a building opened in 1850, was laid on Thursday, the 1st inst. The church is in the Early Pointed style, and the sanctuary and vestry of the former edifice are retained. Doulting stone is used for external walling, Beerstone and Doulting for the windows, and blue limestone and Bath for the internal walling. At the west end will be a tower, 142ft. high, and 32ft. square, and a flèche will mark the intersection of nave and chancel roof, and will contain a bell for daily service, which will be held in the eastern part of south aisle, where special hot-air apparatus is laid down. The organ will be located on the second floor of a double transept. The total length, from east to west, will be 100ft., and the height from floor to centre of barrel roof 60ft. Chairs will seat some 1,200 worshippers, an increase of 500 sittings on the former fabric. The cost, as at present being carried out, will be nearly £12,000, but, to complete the edifice, a further £2,000 will be required. The architect is Mr. G. H. Fellowes-Prynne, son of the vicar, and difficulties having arisen with the builder whose tender was originally accepted, the work is now in the hands of Mr. A. Guy, of London.

Westleigh, N. Devon.—The parish-church, which is of the 14th and 15th century periods, was reopened on Wednesday week, after internal restoration and re-seating. The whole of the old carved seats have been repaired and fixed in the central part of the church, and made good with new English oak. The remainder of the seating is of pitch-pine. The new pulpit is of wainscot-oak and walnut, on a base of Bath stone, and has handrail and balusters of wrought iron. The chancel is fitted with desk and seats of pitch-pine. The altar and credence-table are of oak. The tower-arch has been thrown open, and a new west window inserted, all the mullions and tracery of the old one having disappeared. A screen of oak, with glazed and traceried panels, shuts off the lower part of tower-arch for use as a vestry. The old timbers of roof have been gilded and decorated. The old flagging, and some remarkable old tiles* found in the church, have been re-laid in the nave and north aisle, but the chancel is paved with patterned tiles, made by Maw and Co. The chancel and tower doors are new, and of English oak, with ornamental hinge scrolls, wrought by Mr. Oliver, of Westleigh. Nothing has been done to the exterior, beyond repairing, pointing, and slating. The works have been carried out by Mr. T. N. Hancock, of Barnstaple, from the designs, and under the superintendence of, Mr. J. F. Gould, of the same town. Mr. Cann, of Westleigh, executed the decorations, and Mr. Pulsford, of Barnstaple, did the stone masonry. The cost has exceeded £5,500.

* Some of these tiles, which are noticed in Parker's "Glossary," were illustrated in the Building News for Nov. 24, 1876, as was also the 13th-century font in the same church.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

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Carpenter. (Batsford, 52, High Holborn, will recommend a book. 2. You can do nothing, and if such an undue delay is taking place, had better employ a solicitor.)

Correspondence.

FIREPROOF FLOORS — CONCRETE SUPERSEDED BY BRICK.

To the Editor of the Building News.

Sir,—The letter from Mr. Hyatt in your last number is calculated to create alarm in many quarters when it is asserted so authoritatively that concrete is to be superseded by stock-brick. Even Mr. Hyatt acknowledges that the results of his first experiments were surprising. Without doubting the accuracy of the results recorded by the experimenter, I must confess to a feeling akin to scepticism on the subject. The facts and data in your correspondent's letter are not sufficiently precise to enable any one to enter upon a criticism of this remarkable discovery thus suddenly published. If Mr. Hyatt would kindly favour your readers with a few particulars as to the quality of the bricks, cement, &c., they would then be enabled to judge of the results obtained. They must be *knowing blades*, these principal members of the gridiron, to impart such magical influence and

constructive energy to the hitherto despised "stock."—I am, &c., Henry Reid.
21, Arundel-street, Thames Embankment, London, 5th April.

Sir,—Mr. Hyatt's experiments are interesting for the illustration of the manner in which he can construct a small brick beam to carry about 2 tons, twelve days after it is built; but the comparison between that brick beam and one made of concrete only holds good as a comparison between two structures, each 12 days old. Concrete 12 days old has hardly any strength whatever; but the same concrete 12 months old might have a strength even superior to the bricks composing Mr. Hyatt's experimental beam. The experimental beam mentioned by Mr. Hyatt, 7ft. 6in. in the clear, 17in. wide, and 4½in. thick, if made of properly constructed and matured concrete, would not only carry 2 tons, but could be constructed to carry 4 tons if required, or even a greater load than that, without the use of any iron in the construction.

It is quite an open question as to whether or not a brick floor, say, 400ft. super., and 20ft. in the clear, could be constructed with bricks in the manner described by Mr. Hyatt; whereas there is no practical difficulty in constructing concrete plate floors of this size, and even much larger sizes without the use of iron.—I am, &c.,
A. C. P.
Stretton, Parkstone, Dorset, 3rd April.

CRESSET STONES.

Sir,—In reply to Dr. Fairbank's interesting letter on this subject, I beg to say that the Swedish examples described and illustrated in Prof. Nilsson's "Skandinaviska Nordens urinvänare," p. 134, are distinctly called holy-water vessels ("Vigvattenssten"). One was originally in the church of Nöbbelöfs, in the diocese of Lunds. It has six cups arranged in two rows, and measures 17in. by 13in., being supported on a pillar 3ft. high. It was removed from the church when it was repaired, and is now in the possession of Mr. K. Vitterhets, of Stockholm. The other is the one illustrated in my last letter and is in the Church of Strö, in the diocese of Lunds, also.

In the Museum of the Soc. Ant. Scot. are two stone candlesticks, from the Tailors' Hall, Edinburgh, bearing the date 1634, which appear to be secular cresset stones (see catalogue, p. 146.)—I am, &c.,
J. Romilly Allen.
23, Maitland-street, Edinburgh.

"ARCHITECTURAL SCANDALS."

Sir,—Permit me just one reply to Messrs. Bleakley and Murray's letter of March 31st, when I shall leave you and others to deal with the serious professional points raised in this case.

These gentlemen evidently desire your readers to believe that they at once knew I was the author of the letter signed "Architectus," from what they are pleased to call the "animus" thereof. Whereas the fact is, that they had written to you for information on the point, and I, on hearing of their desire, through you, gave them, of my own free will, the name of the author, in a letter of the 30th, but which they entirely ignored in theirs of the 31st.

As to the "animus," scarcely had they accused me of it before they proceeded to show its folly for themselves, by placing in italics the fact that (notwithstanding the supposed "animus" of my letter of the 23rd), I, on the 24th, actually did Mr. Murray a kindness, by signing his nomination-paper as an A.R.I.B.A.

Why I did so, after writing to you, will be easily seen from the following. Mr. Murray was in my employ until March 9th, whilst the 2 per cent. offer was sent in to the guardians prior to March 1st, or eight days before Mr. Murray could have taken any active part in the affairs of the firm then in embryo. And it is admitted in this letter to you that when this gentleman called upon me, "on the 24th inst," to ask for my signature, that I "at first demurred" to giving it, because of the offer in question; but after the explanation by Mr. Murray of his want of actual connection with the firm at the date on which the offer was made, his statement that he himself had "told Mr. Bleakley that he had gone against the rules of his own Society" in making it, and his giving me to understand that the rules of the Institute would hereafter be their guide, I fulfilled an old promise by signing his nomination paper—still feeling, however, that, although I could exonerate him personally from what had taken place whilst still in my employ, there was no sufficient reason why I should recall the letter sent you on the 23rd, containing extracts from our daily papers, the truthfulness of which he had only verified, and the passing over of which, without comment by the profession, might have led to the 2 per cent. offer being looked upon as a correct thing, and hereafter quoted as a precedent because done by an Associate of the R.I.B.A.

Messrs. Bleakley and Murray having admitted their offer of 2 per cent., it is to be regretted that they should have attempted to prove its correctness by such "reasons" as those given; because, if correct, they only make matters worse by showing that the services required by the guardians were those of a clerk of works only; and, consequently, the position offered for competition amongst architects was such that no Associate of the Institute could accept on any terms whatever.

But the question arises, Do the "reasons" correctly describe the facts? Your readers can judge for themselves by comparison with the following advertisement, in reply to which the unfortunate 2 per cent. offer was made:—

Birkenhead Union.—To Architects.—The Guardians of the Poor of the Birkenhead Union require the services of an ARCHITECT to prepare plans, make working drawings, and to superintend the carrying out of an Extension of the Workhouse, at Tranmere.

Offers as to amount of commission and charges for the entire supervision and superintendence of the work, with all plans (which must first be approved by the Local Government Board), to be forwarded to the undersigned, marked "Architect," and addressed to the Building Committee, on or before Monday, the 30th inst.

The Committee do not bind themselves to accept the lowest or any offer. PETER GREGORY.
Sandycroft House, Birkenhead.
19th February, 1880.

Here we see that not only have drawings, superintendence, and supervision of all kinds to be provided, but "all plans" which the Local Government Board even may require are to be included in the commission asked, and if 2 per cent. is the correct charge for all this work, what are we to think of the other competitors, of whom it is said in the newspaper reports that, "some of the applicants were men of high standing in their profession, who offered the usual terms of 5 per cent."?—and that, it must be borne in mind, for the self-same work, and in reply to the identical advertisement to which the 2 per cent. offer was made by Messrs. Bleakley and Murray.

As to quoting "Hirst's Architectural Handbook," it is worse than useless, and has no bearing whatever on the case. The question is, What says the "Schedule of Rules" issued by the R.I.B.A. itself for the guidance of its members in their "professional practice and charges"? and nowhere therein can I find any warrant whatever for anything less than 5 per cent., except where "several similar but distinct buildings are erected at the same time from a single specification and one set of drawings, and are under one contract," in which case "a modified arrangement" may be made for the duplicates, but only after charging the full 5 per cent. on the cost of the original building; whilst as to alteration or "extension" of premises, instead of a reduced charge, it is particularly set forth that "a special charge may be made on account of the special difficulties and trouble usually involved."

As to the "challenge" for mutual inquiry into "professional dealings," your readers will understand its value from the facts that my experience extends over 25 years, whilst the firm making the "challenge" has, on its own showing, only been in existence at most for a few weeks, Mr. Murray being in my employ until March 9th last.

In conclusion, the fact of my writing anonymously shows that I had no desire to "pose" myself as suggested, and I have no personal feeling or animus in the matter, dealing not with individuals (excepting so far as they are named in the extracts from the local daily press which I forwarded to the professional journals), but on purely professional grounds.—I am, &c.
C. O. Ellison ("Architectus").
62, Dale-street, Liverpool, April 6, 1880.

Sir,—I think that the question of the tenders for the architect's work to certain guardians for the enlargement of their workhouse, should be well and properly ventilated in your valuable journal. Of course, in this free country, where anybody can put the word "architect" after his name without let or hindrance, he can also charge for his services any low price that will, in his opinion, undersell any other man having the word "architect" after his name.

But, Sir, as your experience knows too well, this freedom is dangerous to the morality, dignity, and art of the profession. Therefore, all good men and true have surrounded themselves and the profession with certain safeguards which are designed to be protective to the true interests of the profession, and also of the general public. In the case which has been brought before you the competition is won by one whose terms are named at 3½ per cent. for architect's work, and also for quantities. He beats a firm who offer to do the architect's work for 2 per cent., but say nothing about quantities.

Now, if it is true that one member of the firm is a member of the R.I.B.A., and the other nominated for membership, I submit, there can be no excuse for their conduct on this occasion, and I maintain that those gentlemen architects who sent in 5 per cent. as the professional charge for the proposed work deserve all the sympathy and thanks which we can give them. For the members of the R.I.B.A. who send in prices below the professional scale, it is high time they were in the strong grip of the Council of the
April, 1880. "Institute."

ARCHITECTURAL EXAMINATIONS.

Sir,—As there is an influential movement on foot for remedying the present unsatisfactory method of conducting public competitions, it would seem a suitable time for suggesting another reform, with the idea of raising the status of the profession, of which—more particularly in provincial towns—it is in need. It is that architecture should be made like other professions which require the passing of certain examinations and the receipt of a certificate or degree, before membership is recognised.

I believe architecture is the only profession in which this is not imperative, and I think London men are not aware of how much this, in the country, lowers its standing in many ways.

Friends here have been astonished to learn that I had served four years in an architect's office, and afterwards worked for some years in London offices for improvement; as in this neighbourhood, and presumably in others, a few months' work tracing in an office, or at a school of art, is considered sufficient training for any "Architect" (or "C.E." as the local newspapers *will* put it).

With local connection, work in the shape of small houses, and a good builder, this style of architect will rub on for a while, and no one be much the worse; but in anything of church work, the results, particularly in details, are ghastly, though not to the local newspaper correspondent, or the select vestry. With him everything is "neat." He would say of the dome of St. Paul's that it "presents a neat and handsome appearance," and of course everybody knows that but few have such appreciation of grouping and the delicacies of detail and style as the members of a country select vestry.

When any difficulty arises, should, for instance, a strange and unwary builder attempt to follow the drawings without looking out for the probable traps as to want of headway, &c., the "architect" collapses, the distrustful "proprietor" flies to some well-known metropolitan name to help him, and the incompetence of one man damages his neighbours and the profession generally.

Again, in London and large towns, "pupils" are generally lads of fair social standing. In country offices this is (in my experience) the exception, and therefore all the more reason that the word "architect" should imply and guarantee the possession of a certain amount of general and technical education.

I will be glad to see in your columns any expression of opinion on this suggestion.—I am, &c.,
Londonderry. A Provincial Architect.

Stained glass has just been placed in the south window of the chancel at St. Andrew's Church, Great Yarmouth, in memory of Mrs. F. Brown, of Bracondale, Norwich.

Intercommunication.

QUESTIONS.

[6085.]—**Book on House-Painting and Decoration.**—I want to know the title and price of a complete and reliable work on this subject, using the word "decoration" in the restricted sense understood by house-painters. The kind of book I want is such a one as may be said to contain all that a foreman of house-painters and decorators requires to know of the trade.—H. G.

[6086.]—**To Test White-lead.**—Can any of your readers give a simple method of testing the quality of white-lead? This question has been asked before, but I believe not answered. I have an impression that one method is to dissolve it in diluted sulphuric acid, when the earthy matter, if any, that it has been adulterated with remains undissolved. Is this so? White-lead is so largely adulterated, and when it is is such a loss to the consumer that a simple and ready means of detecting it is very desirable.—H. G.

[6087.]—**Local By-laws.**—I should be glad of an opinion as to the legal interpretation of the model by-laws issued by the Local Government Board in the following cases:—A granary adjoining a public-house is turned into a club-room, floors, doors, and windows added, and roof raised. Is this "a new building," and should plans be presented to Local Board? A workshop and loft over is converted into a dwelling-house. Is this "a new building," and should plans be approved by Board? Is any work published giving the Metropolitan Building Act, with notes, &c., thereon, suitable for reading for district surveyor's examination?—Beta.

[6088.]—**Stone Royalty.**—I am a contractor in the habit of executing a great deal of church building and restoration, and have just built a very large tower to a church. The clergyman of the parish thinks I have not allowed him sufficient for the royalty of the stone, which was given originally for the use of contractor by the lord of the manor. I am willing to allow royalty, as I have paid previously. Will any brother professional give me information what they have paid per cube yard for royalty stone? I have already paid the estate quarryman 3s. per yard for raising, it being compulsory to employ him.—A. B.

[6089.]—**Senate House, Cambridge.**—Can any of your readers inform me where I can get an elevation of this building, with details drawn to a scale?—C. F. M.

[6090.]—**Public Baths and Washhouses.**—Is there any modern standard work upon this subject, and which of the existing metropolitan buildings is considered the best?—Soap.

[6091.]—**Furnace.**—Can any of your correspondents name a work on the construction of kilns or furnaces for the burning of terra-cotta and stoneware? If there is no such work in existence, a few remarks (with sketch, if necessary) from someone acquainted with the subject, would no doubt be of interest to your general readers.—Young Architect.

[6092.]—**Payment for Plans.**—I would feel obliged to some of your numerous readers for any information on the following:—A. wanted a house to be built, plans of which were drawn by C. A. desired them to be altered. The Local Board disapproved of this alteration. The plans were altered again to their satisfaction. A. desired to build a larger house than the one mentioned, so new plans were drawn, with specification, in which a contract was based between A., B., and C. A. ordered extra work to be done, which he declined to pay for, and for other disputes he was sued in the county-court by B. and C. The judge gave his award in favour of B. and C. Does this action prevent C., independently of B., from recovering payment for the plans furnished to the Local Board?—W. W.

[6093.]—**School Accommodation.**—I shall be obliged if any of your correspondents can inform me the manner in which the Council on Education determine the accommodation of a school? Do they calculate the number of scholars by means of the superficial area, or by the cubical contents? For example—how many scholars, boys, girls, and infants, will a school of the following dimensions accommodate—Boys: School-room, 46ft. × 20ft., two class-rooms, each 20ft. × 15ft. Girls: School-room, 46ft. × 20ft., two class-rooms, each 20ft. × 15ft. Infants: School-room, 46ft. × 20ft., one class-room, 20ft. × 16ft. Average height of rooms about 18ft. Possibly some of your correspondents can refer me to some published rules on the subject, so that I can calculate the accommodation for myself.—William Strong.

REPLIES.

[6073.]—**Mathematical Question at the R.I.B.A. Exam.**—The following is, I think, a better way to solve the question which puzzled "Two in a Fix" than those published—

Let x = number of cubic feet of brickwork
y = " " mortar

$$142x + 80y = 44064\text{lb.}$$
$$x + y = 317{\cdot}625\text{ft.}$$

Multiplying the latter equation by 80 and subtracting it from the former, we have—

$$142x + 80y = 44064$$
$$80x + 80y = 25410$$
$$62x = 18654$$
$$x = 300{\cdot}871\text{ft.}$$
$$y = 16{\cdot}744\text{ft.}$$

—H. G. W. D.

[6079.]—**Measurement of Earthwork.**—If "F." has not seen Bidder's tables he should get them, as they are clearly explained and contain all he requires. They may be obtained at Vacher and Sons.—M. W. M.

At the annual meeting of the vestry of St. Faughman's Cathedral, Rosscarbery, Munster, held on Monday week, plans prepared by Mr. W. Atkins for the restoration of the cathedral were approved.

LEGAL INTELLIGENCE.

Injury from Building Operations.—At the Cork City Record Court on Thursday, the 25th ult., the action of William C. Barry *v.* Edward Hornsby and Richard Evans, was tried before Baron Dowse and a special jury. Plaintiff was an hotel keeper at 30, Old St. George's-street, Cork, and defendants were Edward Hornsby, secretary to the Commissioners of Public Works for Ireland, and Richard Evans, the contractor for the building of the new post-office, Cork. Plaintiff claimed £1,000 for damages and injury done to his house and business consequent on the erection of the post-office, and asked for an injunction to restrain defendants from permitting a wall to remain in its present position. His case was that the defendants took down the old theatre so negligently and unskilfully that the floors and ceilings of his house were shaken and cracked, and his windows broken, and that his furniture was injured by the dust. Further, that light was permanently obstructed by the building of a wall against one of his windows, and that the view from three other windows was interfered with by the maintenance of scaffolding opposite for an unnecessary time, and that by the removal of eaves and gutters the house was rendered damp and uninhabitable. Amongst the witnesses for plaintiff were Mr. Forde, builder and surveyor, and Mr. William Mahoney, formerly in the employ of the Board of Works, who spoke to the damage done and the delay in the building of the post-office. For the defence, it was contended that the cracks in plaintiff's house existed previously to the rebuilding, that every care was taken in the work, and that the work was executed within a reasonable period. Mr. Owens, architect to the Board of Works, confirmed these statements, as also did the defendant contractor and his son. The judge, in summing up, said it was an extraordinary thing that the building works were stopped during three or four months while the Board of Works were conducting negotiations with other parties, and he considered these should have been done beforehand. At the same time plaintiff was but a yearly tenant. The jury returned a verdict for plaintiff for £250 damages, 6d. being added as nominal damages for obstruction to light and air; an injunction not to be applied for.

Metropolitan Building Act.—At the Marlborough-street police-court, on Wednesday, before Mr. Newton, the adjourned summons was again called on in which Messrs. R. Dennett and Co., of 5, Whitehall, were summoned by Mr. Robert Walker, district surveyor of St. Martin's-in-the-Fields, for having done certain work at 28, Haymarket, without first giving notice to the said district surveyor, as required by the Metropolitan Building Act, 1855. It will be remembered that Messrs. Kirk and Randall were the builders of the premises in question, but that Dennett and Co. had been employed under a separate contract to put in their patent fire-proof iron floors, &c., and the real question at issue was whether the district surveyor was entitled to a notice for Messrs. Dennett's work in addition to the general notice of the building given by Messrs. Kirk and Randall. Mr. Walker contended that he was, and Mr. Poland (for the defence) that he was not. At the last hearing the magistrate suggested that the matter should be arranged amicably, by Messrs. Kirk and Walker giving one notice, which should specifically include Messrs. Dennett and Co.'s work. When the case was called on to-day Mr. Walker said he was anxious to settle the case if he possibly could; but he wished, in the first place, to repudiate the idea that the question involved in this matter was one of fees, as Mr. Poland suggested last week. It was nothing of the kind. Mr. Poland explained that he had not intended to impute that Mr. Walker was actuated by the desire to obtain extra fees; all he had done was to point out that if the decision should be in favour of Mr. Walker his clients would have to pay the fees; and that, therefore, as they were constructing so many of these fire-proof floors, it was to them a matter of great importance. Mr. Walker said that since last week he had received a notice from Messrs. Kirk and Randall, in regard to the works at 28, Haymarket, and the only doubt in his mind was as to whether that notice did really include the whole of the works. In this new notice they used the words "in continuation of work described in former notices." That might lead to misconception, and he had therefore written to Messrs. Kirk and Randall a letter, stating his interpretation of the notice, and if they accepted that interpretation he would be satisfied. In the letter he said: "I understand that the notice now given includes all works being done to that building (28, Haymarket) to which the regulations of the Building Act apply. Section 38 of the Building Act states that works in the same building in progress at the same time may be included in the same notice, and I understand you have exercised that option, and have, by arrangement with Messrs. Dennett and Co., included in your notice, the works being done by them, and I hereby give you notice that, as district surveyor, I shall hold you answerable for the whole of the works of that structure both as regards the Building Act, the Board of Works' new by-laws and the safety of structure, and that I shall use this letter and notice as evidence against you should summonses become necessary." The only answer he had received to that letter from Kirk and Randall was a simple acknowledgment of its receipt. As Mr. Kirk was now present, he wished to know whether his firm gave the notice according to the terms stated in the letter he had read. Mr. Poland understood that Messrs. Kirk and Randall did accept the interpretation of notice contained in Mr. Walker's letter. Mr. Walker asked if Mr. Poland was instructed by Kirk and Randall, or by Messrs. Dennett. Mr. Poland said he was instructed by Messrs. Dennett's solicitors, who had seen Kirk and Randall, and understood them to acquiesce in the view taken of the matter in Mr. Walker's letter. Mr. Walker said he had now to ask for three summonses against Messrs. Kirk and Randall, arising out of that very notice, which, after all, was merely a preliminary affair to enable him to ascertain whether he should go against Messrs. Dennett and Co. or against Messrs. Kirk and Randall. The three summonses would raise important points under the Building Act, which must be settled by the magistrate. Mr. Newton said he would grant the summonses, but he hoped the matter would be settled without coming into court. Mr. Poland: Then of course the present summons is withdrawn? Mr. Walker: Yes; on the understanding stated in my letter. The summons was withdrawn accordingly.

Our Office Table.

A short operatic sketch on the architectural topics of the day will be produced, under the direction of Mr. Stannus, at the Architectural Association Soirée this (Friday) evening. The author is as well known at Conduit-street for his ability to amuse at the proper time, as for his capability of affording instruction when more legitimate business is before the Association, and, if he is fairly well supported, the members will, doubtless, enjoy a very merry evening.

As will be seen from a report which appears elsewhere, something like a dead stop has been come to in connection with the Municipal Buildings Competition at Glasgow. Competitors who have already set to work had better wait till they are quite sure that the amended instructions—whenever they are issued—emanate from somebody who has authority to give them. At present the Town Council have laid themselves open to the imputation of a most flagrant breach of faith with the competitors who responded to their advertisement. If the beginning is an earnest of the end, we should think this competition bids fair to be the most unfair and shameless of any yet decided. We recommend a very careful study of the Lord Provost's speech to all who may feel inclined to compete. Translated into plain English, it reads very much like an intimation that whatever promises or agreements the Council may make with competitors, when the plans are before them they will do exactly as seems good to them.

Stand No 181 in the International Exhibition of Building Appliances, to be opened next week, at the Agricultural Hall, Islington, has been taken by Messrs. Robert Boyle and Son, of Glasgow and London, who will display a variety of their celebrated Self-acting Air Pump Ventilators, constructed to suit different styles of architecture, from the most ornamental and elaborate to the plainest form. Messrs. Boyle also show modifications of their Air Pump Ventilators, intended for the ventilation of soil-pipes, drains, and sewers. A large plan likewise demonstrates how their complete system of ventilation is applied to a dwelling-house, provision being made for the effective extraction of the vitiated air, the heat and products of combustion arising from the gas, and for the admission of a supply of fresh air, hot or cold, as required, without draughts or currents. The plan seems simple, and we understand that experience has proved it to be very successful in practice. A model and plans will also be shown of Messrs. Boyle's improved system of Ventilating Steam Ships and Public Works by means of the boiler furnaces, which is well deserving of attention. There is also here to be exhibited an effectual cure for smoky chimneys, the action of which is shown by means of a working model.

THE BUILDING NEWS.

LONDON, FRIDAY, APRIL 16, 1880.

BUILDING EXHIBITION AT THE AGRICULTURAL HALL.

THE exhibition of building appliances, opened at the Agricultural Hall, Islington, last Monday, is comprehensive enough to invite the attention of all interested in building and the decorative arts, if not sufficiently representative of the varied branches. Construction, as one of the principal departments, is fairly illustrated by concrete building apparatus, horticultural improvements, glazing and roofing materials, improvements in sashes, flooring, and joinery. Sanitary appliances have a separate class devoted to them; bricks, stone, and artificial building materials constitute another large class, while the decorative branches, including furniture, make a conspicuous show. As we intend to confine our remarks to those exhibits which possess merit in design or workmanship, and specialities of construction, it will not be necessary to follow exactly the order of the catalogue in the eight classes. We may begin, however, with Class II., which includes building materials. This class is chiefly located on the north side of the building, below the gallery. Mr. Samuel Trickett, of Victoria Wharf, Millwall, has an interesting stand of building-stones and granite. Among the varieties, we notice some beautiful red shafts of Corsehill stone, which Mr. Trickett has lately introduced. We cannot speak from personal knowledge as to the durability of this stone, but we notice it has been used in several recent buildings in London. Among others we may mention the "Hand-in-hand" Insurance Association offices, at Blackfriars, and several buildings in the City. It promises to wear well; it has a fine even texture and rich colour, is easy to work, and seems one of the best and cheapest sandstones in the market. For mouldings and carvings Corsehill stone preserves a sharpness of arris that is invaluable, and it is said the acids of the London atmosphere do not affect it. We notice specimens of red Antwerp, Aspatria and red Mansfield, also Spinkwell and Greenmoor, sandstones of warm colour, and Howley Park, a rich, yellowish brown, besides several polished specimens of Aberdeen, Mull, and Peterhead granite. The Hollington Stone Co., Uttoxeter, Staffordshire, exhibit two specimens of their stone, which is known as the "water-stone." It is a fine sandstone for carving. The Patent Victoria Stone Co., of Kingsland-road, send various useful appliances of their patent, to which we have before called attention; Mr. J. M. Tall, son of the original patentee, has at Stand 44 much worth the attention of all interested in concrete building; while Messrs. C. Drake and Co., of Battersea, exhibit a concrete fireproof door, made of Portland cement and bricks, and some cheap chimney-pieces, compounded of burnt ballast, possessing an ornamental granitic or breccia-like appearance, and certainly superior to cast-iron for that purpose. Henley's Patent Building Apparatus is shown by a large model, illustrating its rapid adjustment, for the construction of bay windows, cross walls, chimney-jambs, and flues. Messrs. White and Co., of Gresham-buildings, display their Broseley tiles for roofing and glazed and other tiles; and in the same class of goods we must call attention to the "binding roll roofing tile," exhibited by Mr. J. Matthews, of Weston-Super-Mare. Glazed bricks, stoneware, and architectural terra-cotta are represented in stand 40, where Messrs. Joseph Cliff and Sons, of Wortley, Leeds, and of King's Cross, show a variety of goods, from sanitary traps and appliances to artistic terra-cotta. We particularly draw the visitors attention to some well-modelled panels in low relief, suitable for pilasters, friezes, &c., made in clay and called Della Robbia from its resemblance to the coloured glazed Italian ware. Knight's patent air-shaft chimney terminal, in a variety of forms, is another speciality. Mr. W. H. Lascelles, of Bunhill-row, contributes one of the most interesting collections in this class. A room has been fitted up for the display of specimens of his patent concrete; and the visitor may see his tile-like slabs outside, and the most unique specimens of artistic design within. We notice two admirably-executed examples of square mullioned windows, deeply moulded, made in the concrete to imitate red brick, for Mr. A. W. Blomfield, M.A., and for Mr. Waterhouse, A.R.A.; but the leading speciality we have to notice is the ceiling of the stall itself, which has been constructed of the same material, and forms a combined fireproof floor and ceiling. The ceiling is divided into panels by beams, and these contain rolled girders and joists of iron, which are encased in the concrete and moulded externally to any section. The panels are thick slabs laid on and stamped with ornament in low relief below, these forming the panelled ceiling of room. A wooden floor may be put over, if preferred. The manufacturer claims for this new floor not only fire-resisting qualities, but cheapness. We notice also, a small Queen Anne chimney-piece, designed by Mr. Norman Shaw, R.A., in the same material, a well executed and artistic piece of work, though made to imitate woodwork; and several specimens of art joinery. Messrs. Howard and Sons, of Berners-street, show a few specimens of their parquet flooring with dove-tailed joints, and one or two chimneypieces in Queen Anne taste, and a beautiful panel with inlay in sycamore on oak. By the aid of their improved dovetailer, this firm can supply a very good parquet at 6d. a foot superficial. Among other exhibits in this class we can only name some excellent red and white facing bricks, and other clay manufactures by Messrs. Eastwood and Co., of Lambeth; silicated stone drain-pipes, and various sanitary appliances by Bromfield, Elliott, and Co., of Hove, Sussex, and Gresham House, London, who also send various models and plans; the recently-introduced earthenware wall-boxes for joists, and the new verge-tiles, manufactured by Mr. Richard Beckett, of Hartford, Cheshire, recently described in our pages; a collection of Broseley roofing tiles, glazed, and encaustic tiles, and some excellent pressed bricks of Mr. J. White and Co., of Gresham Buildings. Ransome's patent stone filters, architectural stonework, and indurating solutions call for notice, also Messrs. Callender and Son's damp-resisting solution and damp-course. The visitor anxious to see novelties in building materials will find a wooden building set apart for the explanation and exhibition of Balmain's patent luminous paint, a recently-introduced invention which, as we have previously remarked in these pages, promises to become valuable in a variety of ways. We saw tablets for house-agents, for those who let apartments, mirrors, lanterns, life-buoys, luminous hand-rails, &c., in short, every conceivable object to which the luminous paint could be applied, besides a bottle of the veritable "bottled daylight" itself.

In construction, the visitor to the hall will not find anything very striking or novel. We have mentioned a few improvements in brick and concrete; we may now draw attention to exhibits in joinery, fittings, horticultural glazing, &c. A large show of joinery is to be seen in the central avenue; we name the following exhibitors:—Clarke and Holland, American walnut, and pine and ash joinery; H. Atkinson, and Co., of the City-road, have a collection of Stockholm joinery, including specimens of bead flush, and moulded doors, window-sashes; and Mr. F. Sage, of Grays-inn-road, contributes a large display of counter and shop-front fittings of excellent quality in workmanship; among the articles is a door in walnut framing with mahogany panels relieved by white wood, ebony, &c., in the mouldings and architraves. We must notice a mahogany counter made at £1 1s. a foot run, including front trusses, shelves, &c., and some patent hoarding at 1s. a foot capable of immediate erection and removal with the labour of only two men. Messrs. Hobbs, Hart, and Co., exhibit their sliding-doors for party-walls, and we saw a few admirable patent safe-doors and locks for bankers vaults and plate rooms, which, for ingenuity, constructive contrivance, and workmanship, would appear to baffle the resources of any burglar. Mr. James Hill, of Upper Thames-street, has, also, a stand well worth notice. Messrs. Esdaile, and Co., of City Saw-mills, and Vauxhall Cross, send a few admirable specimens of joinery, Swedish and American doors, mouldings, &c.; Colman and Glendenning, of Norwich, examples of their well-known patent single school-desk; Mr. W. H. Lindsay, of Paddington, some patent reversible treads and landings; Mr. E. Davey a model of improved sash-fittings, which admits of removal of sashes for repairs, and opening for ventilation; and Mr. W. Burley some clever holdfasts, and a hand mortar-mill of efficient construction. In horticultural glazing, we may draw attention to Mr. Lewis's (Stamford-hill) system of lead gutter-bars and clips, which are fixed in the rafters of glazed roofing, admitting of an easy mode of fixing the glass sheets without putty; an invention with the same object is shown by Messrs. Johnson, Brothers, and Co., of Waterloo-place, Pall-mall, who adopt patent compressible tubes of zinc, which hold the glass at the joints; Messrs. Verity Brothers, of Regent-street, show their patent air-propellers and system of ventilation applied in various forms to buildings; and heating arrangements receive attention equally. We note a wrought-welded boiler, by Steven Brothers, adapted for greenhouses for shallow drainage, a large assortment of open and close cooking-stoves and hot-water apparatus; a small gas stove for lighting, heating, and ventilating, by Ritchie and Co., of St. Swithin's-lane, besides a large number of ventilating arrangements. Most of the latter are based on the deflecting plate principle of inducing an up-current. We may specially note a conspicuous stand representing Boyle's patent air-pump ventilator, to the merits of which it would be superfluous here to bear additional testimony. This firm show several models of circular and square ventilators adapted for different styles of architecture, but we prefer one or two of the simpler designs exhibited, which seem to meet the requirements without incurring the charge of imitating architectural features; but for those architects who desire to give the ventilator a central position, Messrs. Boyle show a lofty flèche or open turret design, of exceedingly good detail, in which their arrangements are encased and disguised. Their patent chimney-cowl, for preventing blow-down, is simple and effective. In the same field we notice the "exhaust chimney-top and ventilator" of the Universal Ventilating, Sanitary, and Engineering Company, Lee-green, having an ingenious "inlet-drawer ventilator" which can be fitted into walls like Arnott's and admits of easy regulation. Messrs. Gilmore and Clark's "Autotherm-arkon or heat ruler" is also a clever self-acting ventilator, depending on a balanced valve

actuated by a band of metal which expands as the temperature of room increases, and may be applied in a similar manner to Arnott's. Mr. J. E. Ellison, of Leeds, shows experimentally the value of his conical-shaped apertures for the admission of air, and exhibits a collection of perforated bricks and air-gratings. Mr. P. Hinckes Bird shows a model of his costless ventilation; and C. Kite and Co., of Euston-road, send specimens of ventilation for stabling and ridges. In lifts we notice a good automatic self-sustaining arrangement exhibited by Messrs. Thomas and Sons, of Cardiff, in which an endless rope is used. In the working of iron and wood revolving shutters, our attention was directed to Messrs. Salmon, Barnes and Co's. (Ulverston, Lancashire,) balance weight motion, by which the shutters are kept vertically over the groove. In sanitary apparatus Messrs. Pearson, W. Smeaton and Sons, and Bostal, send specimens of their patented improvements for closets, the merits of which we have before descanted upon. Messrs. Smeaton's specimens of cast-lead rain-water pipes, as now being fixed at the New Examination Schools at Oxford, will be approved by those who wish to give an architectural character to such fittings. In the examples before us, the pipes and heads are made oblong on section, and are stamped with patterns in a style that will accord well with the Oxford buildings. Messrs. W. Richardson and Co. exhibit various horticultural models and an excellent hooded tubular boiler, which we see labelled as sold to Mr. A. Waterhouse, A.R.A. Messrs. Ewart and Son, of Euston road, have a variety of useful and sanitary objects; we note their instantaneous water-heater, and the Empress smoke-curer and ventilator. The excellent stoves known as the "Thermhydric," invented by Mr. Saxon Snell, are exhibited by Messrs. T. Potter and Sons, of South Moulton-street, and Mr. J. Constantine, of Manchester, sends one of his well-known convoluted stoves, which have now stood the test of many years' use.

In the class of gas and hot-water heating, we must recommend a glance at Mr. J. F. Clarke's (Moorgate-street) stall, comprising grill-stoves, double-oven kitchener, gas and other baths, gas-fittings, &c. The model of a steel lining for a strong room is suggestive. The Stott self-acting gas-valve, or governor, shown by Mr. Sinclair, of Leadenhall-street, is a useful economiser of gas, and an examination of the apparatus at the show will clearly prove to any one the simplicity of the apparatus, and how effectively it controls the pressure at the burner by producing a quiet and steady light; and every gas-consumer knows that increase of pressure means a waste of gas.

In the decorative and artistic class, a few exhibits of merit in design and workmanship call for notice. In the main avenue, Messrs. Ashton and Green, of Bury-street, St. Mary Axe, have a large standing of ornamental chimney-pieces, in statuary, Brocatella, Italian Griotte, Sicilian, and other rich marbles, and enamelled slate. One or two of these particularly drew our attention by their rich design. A chimney-piece, with semicircular opening, with grey tiles, enriched by an ivy-leaf border, is very chaste; another, in a rich Griotte and Black, has Ionic shafts in the jambs and consoles; the sides and hearth are tiled with a white star pattern in squares, and there is a dog-grate. This firm also exhibit a variety of plainer description, in enamelled slate; the stoves are register-hob, with tiles and brass repoussé work, and are manufactured in a variety of patterns suitable for Jacobean and other styles of furniture, and the fenders in black marble, brass, and iron, are in keeping with them, and are in the Queen Anne and other styles. We note also an American walnut mantel, with mirror, in the same taste, and a variety of kitchen-ranges; another stand of this firm is filled with roofing-slates, examples of cleavage, among which specimens we note Westmoreland, Bangor, Port Madoc, and other varieties, and Messrs. Ashton and Green's permanent green slate, a very pleasing tint. Staffordshire and Broseley tiles, ridge and Roman tiles, red finials, moulded bricks for cornices, and terra-cotta chimney-pots, paving-tiles, &c., are also to be found here. G. Bartholomew and Co., of Finsbury, display a choice dining-room suite of furniture in the Queen Anne or Chippendale style; the sideboards, with mirrors and shelves, are well designed in detail, and the ebonised cabinets for drawing-room are tasteful in shape and finish. In metalwork Messrs. Jones and Willis, of Euston-road, maintain their old position. Their patent "Hesperus lamp," an arrangement by which three wicks give an illuminating power of 45 candles, is particularly noteworthy, and is an exceedingly economical substitute for gas. We notice also some capital brass chandeliers, lecterns, and ecclesiastical metal-work, and one panel of a wrought-iron gate which deservedly took a silver medal at Paris. Among many poor and mechanical-looking castings the work of Mr. Charles Green, art-worker, Sheffield, stands out in refreshing relief. His large ebony and bronze cabinet, in a massive Cinque-Cento style, though heavy and over-florid in outline and detail, is relieved by some very cleverly-designed and spirited bronze panels. The emblematic figures of Winter and Spring, and the symbolic representations of the vegetable world, are sharp and refined in modelling; we notice also a well-executed chimney-piece designed and modelled with bronze enrichments by the same artist in exceedingly good taste; we especially refer with praise to the series of square medallions with heads representing the "Seven Ages," and the foliage between; to another specimen in ebony and bronze more refined in design, and to several other clever castings. Near these exhibits Messrs. Jeffrey and Co., of Islington, display specimens of their admirable wall-papers and embossed leather fabrics, many of quiet conventional patterns and tints, suitable for rooms in every style of art. In parquetry the floor specimens exhibited by Mr. H. Bassant, of Little Windmill-street, Golden-square, W., compete with those of the best manufacturers' in workmanship, and are manufactured to cover old floors at 8d. per foot. Among decorative applications we must not forget the Silicate Paint Company's (Charlton, Kent) non-poisonous paints, their excellent non-poisonous substitute for white-lead, and their beautiful enamel colours. Designs are shown of rooms decorated with the silicate paints. Mr. S. Samuel, of Dalston, shows a variety of patterns in graining and marbling of wonderful imitative beauty, and we might name several other exhibits of stained glass, imitation woods, and marbles, and decorative processes if our space allowed. Among the useful sundries of building, Messrs. Engert and Rolfe's (Poplar, E.), fibrous asphalte, anti-damp course, and roofing felts, well deserve a place.

We have little space to spare in which to notice the large industry of machinery. There are some useful engines that may be adapted to building and wood-working purposes. Mr. E. S. Hindley, of Bourton, Dorset, exhibits several of his 8 and 4 horse-power horizontal and vertical engines, saw-bench, hand and circular, with rising and falling spindle, and boring apparatus. Messrs. Crossley, Brothers, show their excellent "Otto" silent gas-engine, adapted for many useful purposes. Messrs. Western and Co. their band-saw machines, while Messrs. F. W. Reynolds and Co. devote a large space to a variety of contractors' steam-engines and machinery for converting materials and timber. This firm's mortar-mill, mortising-machine, core-driving and boring-machine, the combination circular and band-sawing machines; their planing and moulding and other appliances appear to possess all the improvements which experience, ingenuity, and economy can suggest. A large class is specially set apart to builders' ironmongery, and sundries, which will be found worthy of attention by the builder and general visitor; but we find the official catalogue has not been very perfectly classified; we come across several exhibits in other classes that ought to have been enumerated here, and objects of decorative art will be found mentioned in the class of building materials.

The exhibition is well worth a visit. The idea to which it owes its existence is a good one; but next year a little more time devoted to the preliminary arrangements would probably be profitably employed. The amount of public support likely to be rendered to such an exhibition has already proved sufficient to warrant the managers in keeping it open till the 24th inst.—a week beyond the time originally intended. This augurs well for a greatly-increased success in future years.

A RECENT VISIT TO RUSSIA.—V.

NARVA.

We left our readers, as it were, travelling north from the city of Riga, and we now propose, as a last stage on our way to the Russian capital, to visit the old Esthonian town of Narva, which, as the crow flies, is some 255 miles N.N.E. from Riga; but, by the circuitous route of the present railway, is exactly double that distance. Narva is situate on the left bank of the Narova river, about eight miles above the point (sea-mouth) where it discharges itself into the Gulf of Finland. For ages this river has been a racial boundary. On the west bank, it was the frontier of the Finnish and Teutonic people, and on the east of the Russian, or Slavonic. Prior to 1710, when the whole district came under the present rule, the mouth of this river was the Baltic or European port of the Russian kingdom, and in this light it may be looked upon as the predecessor of the more modern one of St. Petersburg.

The Narova river, from which the town under notice draws its name, is deep in its bed. On the western bank, at the point we have indicated, stands the old Teutonic town, defended by colossal walls of stone, now mostly in ruins; and on the eastern bank stands the straggling Russian town of Ivangorod, each in its turn guarded by a great stone fort, or castle. These forts, frowning one on the other, are situated on either bank of the river, that of Narva, a great feature in which is the Herman tower, dates from the 14th century; this, with the walls climbing the steep hillside, when viewed from the bridge which spans the river, is a pleasing example of a European fortress. That of Ivangorod, with its lines of battlements, its strange-looking towers and loopholes, in its turn is a good example of an Asiatic stronghold.

Upon the Russians founding St. Petersburg, Narva lost much of its commercial pre-eminence, and upon the forts of Cronstadt and Sveaburg taking first rank in a strategical point of view, it gradually lost its position as the seat of military power. The town, although founded by the Danes in 1223, from whom it passed to the Teutonic knights in 1347, mostly dates from 1558 to 1710, during which period it was a flourishing town of the then important kingdom of Sweden.

The streets of the town are narrow, and their lines are largely influenced by the course of the defensive works. The houses, mostly of brick and stone construction, are large and important, and from their present

use as offices, restaurants, and trading stores, it is plain they have lost considerably on the point or score of dignity. Briefly, we may say, they tell the tale of former wealth and prosperity under Swedish rule, and of poverty and retrogression under that of the Russian. There are some signs of resuscitation, owing to the establish ment of some large flax and cotton-mills in the neighbourhood; but it is an historical fact that, during the first hundred years of its Russian rule, no single house was built or erected in or about the town. It must not be inferred from this that Russian rule is unprogressive; the cause must be traced to the absorbing military character of the forts of Cronstadt and Sveaburg, and the absorbing commercial character of the new capital of St. Petersburg, which, as a rival, it could not hope to withstand.

In the present century, the town has fared little better than in the last. The sand-bar at the mouth of the river, preventing the entrance of all but the smallest ships, and the introduction of railways, which here connect the capital with Reval and Baltic-port, have left it a cipher between two great points of commercial prosperity.

Narva, in old times, was the most northern trading port of the Hanse Town merchants, and the furthest point to which Christianity was carried in the 13th century. The old churches of the town, which are two in number, are interesting from this fact; but we can say but little of them from any other. In plan, they are parallelograms, without towers, spires, or outward divisional signs of nave and chancel. The roofs are steep in pitch, and, with the weathering of the great side and angular buttresses, they are covered with pan-tiles. The walls, the face of which is roughly plastered, are very massive. The windows are deeply splayed on either side, and, except in being pointed, they are void of both character and detail. One of these churches has fallen into the hands of the Russian inhabitants, and has been altered to suit the requirements of the Greek form of worship. The western wall or gable has been ornamented with a circular tower, one half of which is attached to the outer face of the wall, and the other to the inner; above the apex of the roof it rises as a minaret or bell-tower. Marking the division of the nave and chancel is a dome of considerable proportions, the pillars of which stand within the line of the walls. Beyond being plain and massive, it will be seen there is nothing in these Northern churches worthy of special note.

The market-place is small, and the principal trading day is the Sabbath. On the west side stands the Town-hall, erected in 1683. This building, like most in the town, is more strictly Classic than the character of the architecture common to England in the 17th century; but, like all the work of the old Swedish architects, it is flat and ineffective.

As already stated, there are some large flax and cotton-mills in the neighbourhood; these have been drawn here by the falls a few miles above the town offering an abundance of water-power, a motor that is wanting at St. Petersburg, were similar fabrics are worked by steam. These mills at Narva are constructed from the local Silurian marble or limestone, the sections of which are shown in the rocks below the falls. In design and general arrangement they are counterparts of those found in Lancashire, and their machinery is traceable to the same source, as are also the experts in charge as managers. The Government of Russia is extremely favourable to the introduction of manufactories, as they hold them to be directly beneficial to the working class, in the way of furnishing employment.

Indirectly these establishments, which are mainly in the hands of English and German capitalists, are subsidised by the State; foreign manufactures are kept out of the country by high tariffs, and a protected market is thus formed for native productions. On the one hand, the mass of the people are compelled to purchase at a dear market, and, on the other, from the absence of legislation in connection with the hours of labour, the benefits conferred upon the operatives are of a questionable nature. That advantages fall to the lot of someone we are prepared to admit; to the operatives and the consumers they are barely traceable; but to the manufacturers they are very patent, and we may safely say there are few countries which offer so favourable an opening for the introduction of manufactures, and the employment of capital, as does the northern continent of Russia.

Turning to the subject of the Narva river, which, excepting at the falls, is sealed with ice during one-half of the year, we may note that in the summer season it is a great highway of trade, notably for the floatage of timber. On its banks are works for the manufacture of bricks, which are mainly conveyed by water to St. Petersburg, and, in the town itself are joinery fabrics, the produce of which finds its way to the same market.

We are here within the radius of the winter quarters of the operatives engaged in the building trade of St. Petersburg. To the number of some thousands, they leave their rural homes on the return of spring, and wend their way to the metropolis, where employment in their respective callings is readily obtained at wages closely assimulating with those of the English operatives. These men, who mostly leave their wives and families behind to attend to their little plots of land, or to give heed to their growing stock, live in the most frugal manner, their diet mainly consisting of black-bread, salted fish, and milk. They live together in companies, and hire houses in the outskirts, or in the poor quarters of the city, and they draft off one of their company to attend to their domestic wants. In some cases they live in wood huts, or take up their quarters in the rooms of the houses they are building. Furniture they ignore, and they require nothing in the shape of bedding beyond a bundle of straw.

If these men are free from the vice of drink, a vice that is deeply-rooted in the working class of every country, they can, during the summer season, store up a considerable sum of money. On their return home on the approach of winter, their savings cover their payments of rent, and provide them with their family requisites outside the yield of their land. From this it will be seen their annual migrations are analogous to those of the Irish reapers, who aid in collecting the English harvests, and whose savings are devoted to the payment of their rents, &c.

Compared with the every-day life of the English operative, that of the Russian offers a marked contrast. During the summer season he is called upon to raise a fund of money to cover his wants in the winter, and on his family devolves the office of providing a store of produce. The early winter is a busy time with these Russian peasants, for they then kill off their increase of fish, flesh, and fowl; when dressed these are frozen by exposure, and in this state, stored in out-houses, they remain perfectly good through the whole of the winter. The intervention of a thaw, which rarely occurs in these Northern winters, is a national calamity, as the food preserved by this means will not admit of freezing a second time.

(To be continued.)

The Gloucestershire magistrates have adopted plans prepared by Mr. Medland, the county surveyor, for improving the Guildhall at Gloucester, and the work is to be carried out forthwith.

INSTANCES OF ACCESSORY ART.*

THIS is another work on ornament, a department of art which has been rather fully, we might have said, overdone, of late. Mr. Lewis F. Day, the author of the effectively-bound volume now upon our desk, places a series of examples before us executed in photolithography in black, blue, and brown, to illustrate the scope of accessory art, without attempting to classify the designs according to style or in any historical sense. The author observes: "The examples have been chosen because they suggested some train of thought that seemed worth following. They are simply pen and pencil notes on decorative art, quite independent one of the other, and as various as the moods in which they were put on paper." One might say that we have too many of these pen and pencil jottings, and that they have hindered rather than helped the decorative artist by supplying designs ready prepared to his hand. We cannot doubt they have done mischief this way. At the same time we feel that the work of the true artist is welcome in promoting a well-formed taste among ornamentists. Mr. Lewis F. Day begins his address to the reader by referring to the too common misconception of ornament by the public, who admire a work of art for its close imitation of nature, and no one will disagree with the author in thinking the pictorial element is almost inevitably fatal to serviceable decoration. We are of opinion, however, that to convince people of this mistake, they must be taught to learn the reasons for their preference as well as the grounds upon which truthful ornament can be designed. To put examples of ornament before them can only be of service when they have learnt to mistrust their earlier prejudices. Mr. Day in some measure meets these views by accompanying his designs with short essays upon the principles of ornament, in the general gist of which we agree, such, for instance, that in the application of a natural type, as the apple or mistletoe, a variety of circumstances ought to determine the degree of naturalness or conventionality to be employed. The remarks on liberty in "style" are also sensible, to illustrate which the author gives a design for a stained-glass window. The foliage is bold, if we cannot altogether approve the infusion in it of 16th-century detail of woodwork. Mr. Day in several of his sketches has boldly trespassed beyond the restrictions of style, and his essays are attempts more or less successful to show that we might, with advantage, aim at more originality in our designs than is just now considered either fashionable or correct. The example of inlaid cabinet illustrating "consistency in style," is nice in parts, but a little crowded in panels. What Mr. Day calls "style-less ornament," illustrated by three stained-glass window-panes, we should term rather Jacobean; it is certainly more Japanesque than simply Gothic in feeling. The detail of frieze or window-head given is interesting, as showing the decided blending of ornament in Cinque-Cento, rather than as a perfect example to follow. Under the title of "Ecclesiastical Art" we have a cluster of cleverly-drawn lilies, certainly a trifle naturalistic; we are in doubt, however, as to the application of the particular design. We see the author declaims against much of the so-called ecclesiastical art, and points to a conclusion we long ago intimated, that there is a little too much of "the shop" in modern ecclesiastical ware as supplied from stock patterns. The two panels given to show the adaptation of natural forms to ornament err on the side of naturalism, though the author says they have been designed from the study of Gothic and Japanese. Admitting that conventional stiffness and

* Instances of Accessory Art, with Critical Notes. By Lewis F. Day. London: B. T. Batsford, High Holborn.

monotony have been avoided in their composition, they are rather too close a transcript of nature to be admissible for architectural decoration. As panels they are pleasing, and the panel treatment admits of a closer relation to the pictorial. Another panel treatment, in which the rose has been adapted, is pretty. The example of scratched ornament on earthenware is a pleasing border design. Further on, two panels under the title of "Ornamental Growth" are given, which are to our minds better examples of ornament. In the borders given in "Detail and its Distribution," an attempt is made apparently to avoid the severity and arbitrary appearance of the ordinary wave border, and there are one or two successful efforts. Under the heads of "Repetition" and "Quarry Decoration" we have useful suggestions for backgrounds and surface decoration; but we do not admire the diapers. Japanese ornament is not overlooked, and two characteristic plates are devoted to the subject. The remarks on Japanese drawing are written with a thorough knowledge and appreciation of the peculiarities of the style. The plate representing Japanese painting gives an admirable example of the artist's mode of perspective representation of birds on the wing, and we agree in the observation that "half the secret of success in adapting nature to decoration is in the perfect knowledge of nature," though we believe as much of the wonderful decorative faculty of the Japanese artist is due to the fact that he has been left untrammelled by the conventions and rules of other nations, and has been left alone to his own imaginings. Blue and white in china painting, and some Greek or Etruscan forms of borderings and diapers, make up a few of the last plates in the book. The design for the decoration of door-panels is anything but architectural; and pretty as the foliage is in the panels, the result is entirely to ignore the framing of the door, which should be the first object of the decorative artist. We cannot understand the motive in carrying the natural foliage from panel to panel, interrupted only by the rails and stiles, as if the artist endeavoured to make his door a skeleton of framework, and to give the idea of open panels. The example given also is faulty in the proportion of the door, which is much too high for its width. The design for wrought ironwork is also unsatisfactory, for the reason that the structural lines are not considered. With these exceptions, however, the decorative artist will find ample material in Mr. Day's work. He has boldly avoided the restrictions imposed by mere style, and many of the adaptations will be found suggestive.

THE POLYCHROMATIC DECORATION OF VARIOUS BUILDINGS.*

(*Concluded from page* 421.)

THE remains of coloured decoration in our own country are sadly fragmentary, though numerous, as may be seen by the long list of those given in the very admirable work on "The Decorative Painting of the Middle Ages," by Mr. E. L. Blackburne, which is in the Institute Library. The third volume of the "Vetusta Monumenta," published by the Society of Antiquaries, contains a record and illustrations of a most interesting and remarkably perfect example of early polychromatic treatment of a building of the twelfth century. This was a small church belonging to the Hospital of St. Mary Magdalen, on the hill near Winchester, unfortunately destroyed in 1788. The above-named illustrations and descriptions may be studied by the student with advantage. Many of our cathedrals, as Norwich, Rochester, and Durham, retain some interesting remains of their former coloured decorations, and Canterbury possesses a unique chapel in its crypt, the interior of which is entirely covered with its early Norman paintings, in a state of nearly perfect preservation. In default of more complete specimens of coloured interiors extant in our own land, from which to gain a clear notion of their general effect, we are fortunate in being able to turn to the record of several that have been well described, and minutely analysed by the late M. Viollet-le-Duc in his valuable "Dictionnaire de l'Architecture Française." As the illustrations in that work are not coloured, they do not convey to the general reader any clear idea of the effect of the originals. A short résumé of his account of some of the examples mentioned by him, accompanied by enlarged drawings to which colour has been added, in accordance with his descriptions, may therefore be interesting and of use. The series of specimens of chromatically-decorated buildings referred to by that author, as existing in France, commences with those of the simpler harmonies, and is continued with successively more and more elaborate ones; and thus it shows the practical working-out of the system of polychromy, under the ever-changing condition of the several Mediæval styles, of which I have endeavoured to explain the theory. The lower hall of the Keep of the Castle of Coucy is decorated in the simplest possible manner, with merely yellow and red ochre (brownish red), black, white and grey. Although the effect is scarcely more than that of a warm grissaille, even this combination is seen in this example, to be capable of producing very varied effects. These earth-colours, red and yellow, harmonise naturally; and patterns of yellow on the brown and red, or the reverse when outlined with white or black, or with both, produce a result which is delicate, at the same time that it is clear and distinct. There are, it should be noted, elsewhere in this apartment, a few touches of green and vermilion, as in the capitals of the columns; but there is no blue, beyond the quiet blueish grey, previously mentioned as the nearest approach to blue used at the period. The illustration represents parts of the square-edged ribs of the vaulting, which have ornaments on the face radiating with the voussoirs, and running scrolls on their soffits. In No. 1 the ornament is dark yellow (composed of red and yellow ochre mixed). This is outlined by broad lines of chocolate (the red ochre and black mixed), with narrow lines of white within the darker one. The groundwork is of yellow ochre with white spots upon it. No. 2 is outlined with chocolate and white lines; the stalks are of slatey grey, and the ground is yellow ochre. No. 3 has the ornament of deep reddish brown with chocolate and white outlines and the ground yellow ochre. It will be obvious from these few examples that variety and delicacy united with force can be obtained with the simplest means if used upon right principles. The Refectory of the Commandery of the Knights Templars at Metz is a building of early thirteenth-century work. It consists of a hall composed of two divisions with a central row of columns. It is decorated in a simple manner without either blue or gold, and yet with a wonderfully bright and rich effect. The groundwork is white, and the ornamentation is yellow and red ochres, with a few rare touches of grey. Some panels upon which figures were painted have borders representing an architectural canopied framework; but it is noticeable that the treatment of the details is rigidly flat, and without any attempt to give relief to any portion. Such a class of decoration is capable of execution at a very small cost and by ordinary workmen, which is a great desideratum. Being conceived upon right principles and a good system, satisfactory effect is certain to be produced, without fear of the mistakes happening, and the confusion occurring which are the almost invariable result of unsystematic attempts at decoration, even by able artists. These two examples will suffice to explain the general character of the early Mediæval polychromatic decorations; the next to which I shall refer is of later date and more advanced character. The choir of the church of St. Nazaire at Carcassone has a remarkable treatment in colour, which is also elaborately described by M. Viollet-le-Duc. The windows which nearly occupy the whole of the walling space are filled with richly-tinted painted glass. For some reason, probably that of economy, gold was not employed and blue in consequence avoided. The problem had then to be met in a special manner, and the old simple harmony to be in the main adhered to. The vaulting was the principal field, besides the windows, left for decoration; the groundwork of its spandrel spaces was left white and powdered with stencilled red stars, and each spandrel bore upon it the figure of an angel clad in yellow drapery. The vaulting ribs, together with broad borders on each side of them, put to strengthen and emphasise these important features of the construction, were decorated with exceedingly rich, delicate, and sparkling ornament, closely resembling that of Giotto's chapel at Assisi, in red and yellow with touches of dark colour; a bold broad band of red marked the line of the ridge of the vaulting (like the accentuation nature generally accords to the spine of an animal). This carried the eye forward to the easternmost triangular spandrel next the apse, which was made the key-note of the whole, the groundwork being, in striking contrast to the white elsewhere, of deep brown colour, and the angels light upon it. In the centre of this spandrel is a circular panel containing the figure of Our Lord in majesty, seated on a throne, clad in purple robe with green lining. His nimbus is gold, thrown up by a blue auriole behind, and the ground of the panel is bright red. This concentration of rich colouring in one portion of the composition, with the restraint maintained throughout the rest, shows a great degree of knowledge and skill in producing effect, and prove that the system to which the artist conformed was one that was by no means necessarily cramping to individual taste. The principles sufficiently indicated by these simple examples were carefully observed even in the most elaborate, and tended to preserve sobriety in the midst of the utmost splendour. Would that we could recall, in imagination at least, the effect of some of the sumptuous buildings and their contents, which formed a galaxy of artistic glories around the shrine of the Confessor, in the Monastery of St. Peter at Westminster, and the palace adjoining it. The only fear, if we could do so, would be that we should be setting ourselves under the tyranny of precedent that might extinguish originality as completely as those of Athens could do. And we might be in danger of canonising Henry the Third as patron of the noblest art, and of forgetting that he lacked some other very necessary characteristics of royalty. First we should have his graceful Abbey itself as the casket, containing the brightest jewels; not as now reduced by solutions of shellac to one dead dull monotony of mud colour, but gleaming in polished Purbeck marble, as may be seen to have been the case by some portions which have been fortunately preserved in this condition in the north transept. This exquisitely refined material was the best that could be conceived to set off and enhance the beauty of the wondrous royal tombs, not to speak of the gorgeous shrine of the Confessor in their midst. Over and around them shone the pearly light of the painted winpows, of the effect of which we can gain some idea from those still left in the apse clerestory, with figures of proper scale, and subdued and retiring but rich and jewel-like colouring. Their radiance fell upon monuments, such as those of Aymer de Valence, the Earl of Pembroke, of Crouchback, Earl of Lancaster, and of Aveline, his Countess, which I select not as the finest, since doubtless they were excelled by the royal tombs, but as the best known from their prominent position and the best preserved. Their graceful forms, perfect proportions and exquisite architectural decoration are still patent, but as they have suffered from the universal modern mud-wash, I turn to Mr. Blackburne's description of their original decorations to convey some idea of their pristine beauty:—

"The effigy of the knight (Aymer de Valence) lies beneath an elevated canopy, profusely ornamented with painting and gilding. The grounds of the niches are painted blue and red in alternate order, diapered with small gold flowers; those of the trefoils are red, and those of the quatrefoils green, powdered with gold flowers. The whole of the fillets and hollows of the tracery, with the shafts and capitals, crocketting and finials, are gilt."

St. Stephen's Chapel, the Painted Chamber, and many other exquisite works in the same locality have perished, leaving only fragmentary evidences of the extreme delicacy and refinement of their execution. It would be tedious, however, to multiply examples or to enter into a minute description of the details of those already cited, although I strongly advise students to examine closely into them for themselves. Sufficient has been said to show how thoroughly Mediæval polychromy was based upon system, and how that system was one evolved from a common-sense consideration of requirements with the refinement of good taste and

* By John Pollard Seddon, F.R.I.B.A.; a paper read before the Royal Institute of British Architects, on Monday, the 5th inst.

perfect judgment. It would be presumption on my part to attempt to describe or criticise the glorious works in polychromy of the Middle Ages of the South of Europe. Venice, Ravenna, Messina and Monreale are all names which call up to the mind visions of the most gorgeous colouring ever attempted in architecture. Of one of these (Ravenna) Professor Symonds remarks that "there is nothing more beautiful in decorative art than the mosaics of such tiny buildings as the Tomb of Galla Placidia or the chapel of the bishop's palace. They are like jewelled and enamelled cases; not an inch of wall can be seen which is not covered with elaborate painting in the highest colours. Tall date-palms spring from the floor with fruit and birds among their branches, and between them stand the pillars and apostles of the church. In the spandrels and lunettes above the arches, angels fly with extended wings; on every vacant place are scrolls and arabesques of foliage, birds, and beasts, doves drinking from vases, and peacocks spreading their gorgeous plumes; a maze of green and gold and blue. Overhead the vault is powdered with stars gleaming upon the deepest azure, and in the midst is set an aureole embracing the majestic head of Christ, or else the symbol of the sacred fish, or the hand of the Creator pointing from a cloud. In Galla Placidia's Tomb, these storied vaults spring above the sarcophagi of emperors and empresses, each lying in the place where he or she was laid more than twelve centuries ago. The light which struggles through the narrow windows serves to harmonise the brilliant hues, and make a gorgeous gloom." Of the works of this class in the South Professor Lewis concludes, as I have done in regard to the nearly contemporary decorations in the North, that they were wrought instinctively, "unknowing of the rules now binding us, and ignorant of the prism's very being," and yet with invariable success; and that in them the pictures were made to form an integral part of the decoration;" and so long as this last-named principle was adhered to, a good effect was always produced; but as this became lost sight of, the individual pictures were aggrandised at the expense of the general *coup d'œil*. The paintings of the great masters of the Renaissance obliterated, instead of decorating, architecture, and the field so gained for display of their genius and translucent powers was, of course, accepted as a boon. It is now when we find the same sacrifice exacted, without like compensation, that we realise the evil the system has done. It is therefore, necessary, to protest against buildings of importance being treated as an eminent artist suggested that the east end of one of our cathedrals should be, viz., painted black, that it might suit his picture, which he had not succeeded in making to suit its position in the cathedral. Classic architecture has been supposed to be more suitable for the display of decorative painting than Gothic, as affording broader surfaces and possessing simpler details; consequently painters have been too often suffered to run riot in them, and to work their own sweet will therein, totally ignoring all architectural proprieties. The work of genius is always welcome, but at the same time it may be misplaced; and misplaced it is when doubtful saints sprawl among clouds upon arch-spandrels, or expose naked limbs in every vagary of foreshortening upon ceilings, as those of Rubens do, in the old banqueting-hall—now the chapel—at Whitehall. One cannot but wish such paintings in respectable frames upon gallery walls, rather than turned upside down, and destroying all notion of the flatness of the surfaces they are supposed to decorate. It has always seemed to me that Classic architecture was quite as capable of the same common-sense treatment, as to coloured decoration, as Mediæval, and that in fact it positively needs it more. Its walls surfaces being larger, and its constructive members fewer, solidity and flatness seem essential to it. Now, therefore, that it has become one of the vexed questions of the day, how our mighty metropolitan cathedral should be decorated, if decorated at all, this particular point appears to deserve serious consideration. The invariable architectural treatment of Classical interiors and that adopted by Sir Christopher Wren (which it is not my present purpose to dispute or defend) is to superpose upon the walling some architectural order, with columns and entablature, and possibly pedestal and attic, as the principal feature. Surely then, the first object with the colourist should be to emphasise this, and to maintain its unity and importance. Attention, however, it seems to me, is generally given to the manner of variously enriching alike the several members of this order, and of the walling with its arches. The frieze between the cornice and architrave has thus a treatment differing from and contrasting with theirs, the result of which is that the part of the composition (the order) which should be broad and united, and stand out from the groundwork, is cut up and subdivided. In the two drawings exhibited this evening, which I prepared some time since at the request of the Provost and fellows of Queen's College, Oxford, I had two problems to solve. First, the decoration of their chapel in case the present exceedingly dark painted windows were retained; and second, an alternative treatment, supposing those windows removed to the library of the college and lighter ones substituted. As regards the former, I proposed that the walling should be lined with very light-coloured marble, to reflect all the light possible, and to contrast with the glass; and upon this groundwork to make the order in dark marble, that it might stand out distinctly as the principal feature. In the latter case the glass was to be kept as brilliant as it could be, the wall-work in dark marble, as a background to the order; the order itself again being in light material, such as the Mexican onyx. The second one is the one that I should certainly prefer, although I notice that constantly the order is made the darker in modern practice. If colour is to accentuate form, the column and entablature, which are themselves projections from the wall, need to be the lighter according to my judgment. I have in the foregoing part of my paper treated coloured decoration as generally applied to the interior of buildings. I wish, however, to make a few remarks upon it in connection with their exterior, and that in reference to what is possible and desirable at the present day. I will not attempt to fortify my position again by adducing ancient precedents, for as the brilliant hues have all faded from the Greek temples and from cathedral fronts, which we are assured were equally richly painted, we might well hesitate to follow examples which have been so futile in point of durability. Our external polychromy as a rule must be in the materials of the construction. As a grain of practice is said to be worth an ounce of theory, I exhibit a drawing of an attempt of my own in this direction for a terrace at Aberystwith. I had at my command admirable rich red bricks from Cardiff, black ones from Staffordshire, and buff ones from Ruabon, with yellowish and blueish grey freestones. I used the red as groundwork with black for decoration for the ground story; then next above the red with buff as decoration, and lastly buff as groundwork and red as decoration at the top, but emphasising the shadows of the cornice and strings by the use of the black again. By this treatment the strongest colour is at the bottom, and is gradually lightened upwards. Facing westward, as this terrace does, the sun strikes it at the time when the parade before it is most occupied, and produces a brilliant effect, preferable, I fancy, to the prevalent dirty paste colour of most of our seaside resorts. I have noticed with satisfaction that some creditable attempts have recently been made at the west-end of London, in the way of innovation upon the muddy tints which until now have monopolised the outside of houses in the vernacular terraces and squares. Sundry mansions in Belgravia now stand out with, on the whole, pleasing contrast to their neighbours in Pompeian red with black, browns, and subdued yellows. This fashion, which is spreading, indicates that the old Puritanical fear of colour is waning. The selection of hues of the deeper tones mentioned is judicious as being the most likely to last. Other more ambitious attempts at external polychromy in Regent-street, with lighter drabs, blueish greys and gold, seem to me to be far less suitable for exposure in London, whether considered in their freshness or in their inevitable deterioration after a season or two. But the carrying one coat of deep red over the whole building from base to chimneys, broken only by the picking out of the orders (or rather parts of the orders) in black, as has been done in several instances in Belgravia, is, I venture to think, not so satisfactory as if the stronger colouring were confined to the lower portion. The partition of the orders also is undesirable, as in one instance where I noticed the pilasters and cornice were black, whilefrieze and architrave were red like their groundwork, producing at a distance an effect, which upon reflection must be seen to be ridiculous. Again it would appear better as a rule to make the order lighter than the ground, rather than funereal black. Still, after all criticism, these attempts are creditable and the innovation a desirable one. The examples are, however, but making the best of what exists and for temporary duration. Should the desire for external colours, which they indicate, extend as may be hoped, it would be well to consider and seek for materials fit for carefully studied and permanent polychromatic decoration. In conclusion, therefore, I shall make a few remarks upon the materials suitable for the durable execution of the decoration conducted upon the principles I have endeavoured to point out. The regret with which you have doubtless heard me refer to the faded glories of Classical and Mediæval polychromy, is in itself almost condemnation sufficient of the processes employed in them; while the eloquent description I have quoted of the still fresh and lustrous colouring of Ravenna, and others from the same author, of exquisitely rich interiors in Sicily, seem to commend as distinctly for our use the more permanent work in mosaic, to the fact of their being executed in which this greater permanence has been due. But we are often told that mosaic is necessarily costly, and that the effect is peculiar and suited rather to southern climes than to our own. I think that both these ideas are erroneous and based upon the supposition that we must accurately copy the exact method adopted by the ancients in the application of this material: that we must use it only in the minute and regular-shaped cubes we find in old examples. Doubtless we cannot do better than follow these when engaged upon similar elaborate works, but I advocate a far broader treatment for ordinary decoration. To my mind the employment of equal sized rectangular cubes produces a disagreeable spotty effect, and sometimes even a comic one, when they are coursed in regular rows up and down faces and limbs. Whereas by using the material in irregular forms and irregularly, this unpleasant appearance can be avoided. Granting, however, that the plain wall surfaces and even the vaulting spandrils can be appropriately and permanently decorated with mosaic (for curved planes are as easily plated with it as flat ones) there are still the mouldings or other constructive members to deal with, and for which we seem to need a corresponding material. I cannot but fancy that this is to be found in stoneware or other ceramics. At present, if we use a marble shaft we have nothing for the bases and capitals to be used in connection with it, except marble, which does not lend itself well to mouldings and certainly not to carving; whereas, in clay, modelling of any class is easy, and colour is applicable to it before it is burnt. I have constructed a chancel arch with this material at the church in the parish of Ayot St. Peter's, Herts., and was satisfied with the result, and I have also used it in connection with mosaic in the pulpit of the church of St. James, Great Yarmouth; and I submit drawings made for bases and capitals to accompany marble shafts for a mansion near Kenmare, in Ireland. Tiles and painted porcelain are other materials to which attention has been already directed and in which much has been, and more might be, satisfactorily executed. Painted tapestry also has been recently introduced and appears to me to be capable of good artistic tone and to be a medium for the application of good art in a fairly permanent manner. In fact we have but to create a demand for architectural decoration, and to render ourselves competent to design and direct it, and further to do our best to train or induce artists to learn its requirements and conform to its conditions, and I doubt not we shall find modern science and invention able to supply us with ample facilities and materials for the purpose. I would, however, rather conclude, as I began, by advising students in decoration to be content with what is simple and to aim at what is true—to work upon the system which has produced such excellent results in so many ages, and which once mastered will admit of all the variety that their matured imagination and fancy may dictate to them.

At the Easter Quarter Sessions for Norfolk, held on Thursday, the sum of £150 was voted as a gratuity to Mr. Richard Oakes, on his retirement from the post of road surveyor for West Norfolk, an office he had held for thirty-five years.

THE DECORATION AND FURNITURE OF TOWN HOUSES.—II.

In his second Cantor lecture, delivered at the Society of Arts on Monday evening, Mr. R. W. Edis treated generally on floor, wall, and ceiling decoration. On the walls of the room were displayed art paper-hangings, lent by Messrs. Jeffrey, Messrs. Crace, Messrs. Morris and Co., and Messrs. Scott and Cuthbertson; the lecturer also showed many specimens of painted panels, parquetry work, and tiles. A numerous audience, largely consisting of ladies, followed the descriptions with much apparent interest. Since in town houses the light was practically obtained only from one end of a room, and this in the back-rooms was generally obstructed by surrounding buildings, it was desirable that the general tone of colouring and decoration should be bright and cheerful, so as to neutralise as much as possible the prevailing gloom. While in new houses there was little difficulty in arranging any kind of surface decoration, in old houses there were many obstacles to contend with in any endeavour to materially alter the design and character of the surfaces. In ceilings, for instance, any alterations, except by mere plain decorative treatment of the original plaster work, were costly and troublesome. Much might be done by a careful slight tinting in paint or distemper, and general arrangement of stencil decoration, to make the existing ceilings more artistic than the usual run of plaster enrichments, and more in harmony with the wall-treatment. In most town houses the floors of the hall and inner hall were of stone, and any cutting away of this for the purpose of laying down tiles or marble must necessarily be expensive. The stonework itself, if kept clean and white, would form a very good border for simple Persian or Indian rugs, which were generally cheerful in colour and pleasant to the feet, were readily taken up and shaken, and tended to make the usually dismal entrance of a town house look warm and comfortable. An inexpensive way of adding to the artistic effect of existing stone paving was to incise in it one or two lines as a border—the lines being of unequal thickness—and then fill these in with coloured cements or narrow tile slips. The process adopted by Baron Triquetti, in the work executed by him at Windsor, for the Queen, and called "Tarsia de marbre" consisted of cutting numerous lines into the marble slab and filling them in with coloured cements, somewhat after the manner of the well-known pavement in Siena Cathedral, but the lecturer considered the process not one to be commended, and that the result when applied to figure decoration for wall surfaces was anything but satisfactory from an artistic point of view. There was no reason, however, why the inlaying of stone with coloured cements or marble or tile slips should not be more generally adopted for pavements in halls and conservatories. A simple way of treating old stone paving was by forming a large square or diagonal diaper pattern all over it by means of slightly-incised lines, and inserting at the junction of these lines small red or black tiles; this was better than the everlasting monotony of linoleum or oilcloth, which soon lost their brilliancy, and required renewing in a few years. A more expensive mode of treatment for stone paving was by cutting a border, say, 12in. wide, all round, and filling it in with grey, red, and black marble slips, or with a pattern border of marble mosaic or tilework. Marble mosaic and plain or encaustic tile paving had of late years largely come into use, and either mode of decoration was excellent. With tiles, simple designs and masses of plain colours, red, grey, and buff, were to be preferred to any elaborate patterns, which, as a rule, were anything but artistic, and were too often utterly unsatisfactory. In tile pavements, especially in the narrow hall of a London house, it was desirable to have as broad a treatment of the spaces as possible, and to avoid altogether the "all over" patterns, published in most pattern books. Not only were these elaborate geometrical patterns unsatisfactory when laid, by destroying the breadth of surface, and seemingly diminishing the already too-narrow space, but they were infinitely more expensive than plain 4in. or 6in. tiles, laid over the whole space with a simple border of black or buff. In late years there had been a revival in the use of marble mosaics for pavements. Messrs. Burke and Co. and other manufacturers had endeavoured to bring this eminently beautiful and artistic work into more general use by economising as much as possible the cost of its foundation and laying; but this kind of pavement was necessarily costly, in smaller spaces varying from 50s. to 70s. per yard, although, when laid, the result was most satisfactory. Messrs. Minton and Messrs. Maw manufactured tessera of burnt earth, with which a somewhat cheaper pavement could be made. In all this kind of work, a considerable extra thickness was imposed upon the existing stone base. This must be provided for either by cutting away the stonework, or, which was preferable in every way, and less expensive, splaying down the new coating to the door openings. Mosaics must be carefully protected against frost and damp, were necessarily costly, and their effect, at short distances, was generally unsatisfactory, although they had very high value for paving, for mural decorations, and as applied to large monumental structures. Another, and a cheaper way of paving, was by the use of what were called "mosaic tiles," made by pressing a number of marble chips into Portland cement, either without or in pattern, the tiles being polished when dry; the effect was good and pleasing. The cost varied from 10s. per square yard, and if the tiles were used in single colours of red, grey, and black, and effective pavements could be obtained at a low cost. Inlaid cement work for floors ought to be much more encouraged, as cheap and durable. Both linoleum and oil-cloth were objectionable and to be avoided as much as possible; painted oil-cloth soon became shabby, by its pattern being worn through, which pattern was too often only an imitation of tile or parquet work, bad in treatment, colouring, and design. Until quite recently it had been the fashion to cover the whole of the floors of reception and bedrooms with drugget or carpet which was scarcely over removed, except at the annual periods of spring and autumn cleaning. It was hardly necessary to object to the system as utterly opposed to all laws of health and cleanliness, for floors thus covered became the receptacles of dirt and dust, which no amount of brushing could get rid of, and the daily brushing served only to raise a cloud of dust, settling in part upon every object in the rooms, and in part returning to its original resting-place. Not only was this covering of the whole surface both unhealthy and dirty, but the cost of the carpet was infinitely more than the cost of painting or staining the edges of the rooms. The cheapest way to treat a floor surface was to paint, say, a margin of 2ft. or 3ft. wide all round the room in four or five coats of dark colour, care being taken that the groundwork throughout was dark, so that the scratches would not show any light colour under, and that sufficient time was allowed for each succeeding coat to harden and dry. A square carpet or rug could then be pinned down over the entire space, and taken up for shaking once a week, and the borders could be washed and cleaned every day. New floors could either be treated in this way, or stained and varnished, or wax-polished. Abroad, many floors were formed entirely of tiles laid upon concrete filling-in between the wood joists; but, although clean and healthy, this kind of floor was somewhat cold and dismal, and unless extremely well laid, the joints were apt to form receptacles for dirt and dust. Another way of forming borders was by the "parquet." This consisted in the fitting together in narrow strips of various hard woods, carefully grooved and tongued into a pattern. This work was, however, expensive, varying from 2s. 9d. per foot super laid, and involved considerable labour in cutting and altering old floors, unless the whole surface was covered with parquetry. The general effect of this inlaid woodwork was more showy, but not more artistic than plain painting. Messrs. Arrowsmith and other well-known upholsterers had for years laid themselves out for this kind of work in solid parquet, which must not be confounded with the thin veneering glued down to a common deal backing, which although practically cheaper, was inferior in quality. Messrs. Howard, of Berners-street, had patented a "carpet parquet"; it was made by machinery of very thin strips of wood which were first desiccated, then cut to the required form and arranged into a pattern and secured by a canvas backing. The advantage of this was that it could either be laid as a border or entirely over the room without interfering with the old floor, and if laid as a border, any ordinary carpet filled up the thickness. The cost varying from 6s. to 9s. per foot super, was much in its favour. All parquet work was practically impervious to dust, and therefore materially conduced to the healthiness of a room.

Passing on from pavements and floors to consider the decoration of wall surfaces, the author said the dinginess of London climate, the smoke, and other impurities, and the fogs, were all reasons why we should endeavour to make the exterior of our houses brilliant and cheerful. Even the stucco palaces of Belgravia and Tyburnia might be made pleasant objects to look upon, if relieved with colour, after the fashion of the palaces at Verona, and other Italian cities, from their dreary monotony of imitation stone painting, and sickly commonplacedness of Portland cement. Gratitude was almost due to those who first broke away from the ordinary colour, and painted the exterior of their houses red and blue, and to Messrs. Jackson and Graham, for the attempt made to introduce external colour decoration in the new Continental Hotel, in Waterloo-place. Something might be done by the judicious use of colour in the monotonous lines of cornices and wall-faces, instead of the dismal grey and stone tints. The use of marble, even in small panels, marvellously brightened up and relieved the surface of a plain dull wall, and a few plaques of the material inserted into our street fronts would do something to lighten up and break the present drabness at a comparatively small outlay. Although architects were by no means responsible for the vulgar tastelessness of the new streets in the metropolis, there was, undoubtedly, a want of accord between the architect, the painter, and the sculptor, a lacking in that art-brotherhood which in olden days made men think nothing too insignificant to work upon, whether it took the form of the painting of a great decorative picture, the figure-decoration of a noble hall, the painting of arabesques on walls, or the tinting and colouring of outside plaster-work. He saw no reason why this want of sympathy should continue to exist, why the skill and thought of the architect and decorator should not be employed in making street-architecture pleasanter to look upon by means of coloured decoration, lightly, simply, and economically treated, or by the use of terra-cotta in a variety of colours. Could not a lesson be learned from the treatment of some of the external façades in the Street of Nations at the late Paris Exhibition, and majolica ware and faïence be adapted to external decoration? The money spent on a piece of bric-à-brac or an ordinary water-colour drawing would, if judiciously laid out, provide for the decoration in good glazed terra-cotta or tile-work of the entrance-door of a house, and with thought and a moderate outlay, the miserable skeletons of London street houses might be vivified and brought into some semblance of pleasant life and colour. Fresco decoration in distemper was out of the question; but painted pottery, terra-cotta, mosaic, and even iron enamelling might be well fitted to give colour and even beauty, and such would not suffer by smoke or atmospheric influences.

For the decoration of internal wall-spaces many modes of treatment were available, but in this lecture Mr. Edis said he should confine his remarks generally to the materials which might be used. Chief amongst the various ways of covering the walls of rooms in the Elizabethan age was by hangings of tapestry or arras, which, fastened to tenter-hooks, at once hid the rough walls, and gave warmth and comfort, while they could easily be stowed away. Another covering was "painted cloth," or canvas on which was painted various devices; the elaboration of this class of hanging was taken up by the French, and had more recently been reintroduced into this country in the way of straining damask, satin, silk, or other material over the walls, entirely covering them or arranged in panels. All these kinds of work, however, however charming in themselves, were essentially out of place in London rooms. Tapestry was gloomy and held dust, and silk and satin were too delicate to stand the smoke and dirt of town atmospheres. Old tapestries might be hung on the walls of halls or staircases as works of art, provided they could easily be shifted for cleansing. On the principle that everything which collected dust should be avoided in a town house, all flock-papers, as well as those stamped in relief, should

be excluded from choice, although some of the better class of double flock-papers, such as the sun-flower pattern, made by Messrs. Jeffrey were very suitable, and might be well used. The French plan of panelling the room was objectionable, as the mouldings collected dust, and the effect, except in large reception rooms, was unsatisfactory, as it interfered with the hanging of pictures. Embossed leather was largely used in the Elizabethan age for wall hanging, but was nowadays exceedingly costly and difficult to obtain. Where used, it might be formed into a high dado, with a wood rail moulding above, or divided into smaller dado panels where the ornamentation pattern admitted of such treatment. The papers stamped after the manner of leather, by Messrs. Jeffrey, were exceedingly good in design and fairly inexpensive. Mr. Walton, of Sunbury, had invented a new kind of material for wall decoration, which he called Muralis, and of examples were hung on the wall, near the lecturer. This was said to have the merit of being strong and moderately inexpensive. It was practically linoleum fixed with canvas so that it might be fitted up against the wall or ceiling, and was a mixture of linseed oil and fibre rolled on to a fabric, and afterwards stamped by machinery with ornamentation in relief. The specimens which had been submitted to the author were fairly artistic in their design, the stamping being clear and sharp, and the effect being more like very delicate low relief carving or plaster stamping. The especial merits claimed for it were its warm and comfortable appearance, that it did not absorb moisture, and offered an impermeable resistance to wet from within or without. It could either be put up for dadoes, or as a decorative frieze, and painted to any colour to suit the general tone of the room. The cost was moderate, some of the best patterns for dado work, about 2ft. high, being sold for about 3s. per yard run. Good tiles could be used in panels on the walls of halls with painted figures or other decorative subjects but the use of rough unevely-burnt tiles, where the subject painting was utterly ruined by the poor character of the material, was not to be encouraged. To suppose that this irregularity gave an air of age was simply ridiculous, and if it did it would be setting forth a lie, and be as bad in taste as it was in appearance. Had our forefathers been able to make tiles as well as could be done now, they would have done so, and it was gross affectation to copy imperfection of any kind. Messrs. Howard had a cheap way of forming wood dadoes by glueing on to the wall what they called wood tapestry, which might be adopted where there was no chance of damp, but he should prefer to see a simple deal painted dado rather than such a form of veneer. For small drawing-rooms, where expense was an object, India or Manilla matting might be used as a dado, for it was clean and fairly durable, but much depended on the means at the artist's disposal. The majority of people would have to be content with the more recent invention of paper hangings for the decoration of rooms, and, thanks to Messrs. Jeffrey, Messrs. Crace, Messrs. Morris, and other manufacturers, there was no difficulty in obtaining artistic paper hangings of good quality and at moderate cost. The designs of these firms were of the highest excellence as regarded drawing and colouring, and the quality and workmanship was as good as it could be. The examples hung on the walls showed that the cheapest papers might be equally good in artistic design as the more elaborate specimen. In the cheapest form of hangings the paper was printed by machinery, and all the colours were applied at one time, either on self-toned paper or one which received a general coloured ground. The prices of these varied from 1s. to 3s. per piece, according to the thickness of the paper used. Block-printed papers were necessarily more expensive, as they demanded greater skill and knowledge on the part of the workman, each colour being printed separately. In all these papers so-called "gold" could be introduced, the cheaper quality being done in powdered metal on gold size, while in the more expensive papers gold leaf was used, by which a much greater brilliancy was obtained. Even at its best, gold on paperhangings in rooms exposed to the filthy gas of London, and to the humid atmosphere of our climate, was unsatisfactory, and soon lost its brilliancy. Some of the raised flock papers of Messrs. Jeffrey were exceedingly good in artistic treatment and colouring, and were eminently adapted for ceiling decoration, either as entire covering, or in panels having slight wood enframing. Very good effect might be produced by the pattern flock papers on gilding, lacquered over like the old Venetian work; this lacquer gave a richer metallic effect, and the gold was, to some extent, protected from tarnishing. White flock papers on a light ground looked well for ceiling decoration, and could afterwards, when dirty, be painted to any tone. Amongst the examples of flock papers submitted was one in the Adams style, in white on a red or green ground, especially suitable in treatment. The one advantage of flock papers in decoration was, that the flock, being all wool, could be dyed or stained in any colour, and they had much greater softness of tone than other papers. With the great and varied selections of high artistic paperhangings now made, and which could be obtained from any good decorator from 1s. to 70s. a piece, there should be no difficulty in choosing a good design. It was gratifying to find that high-class manufacturers, in association with good artist designers, were seeking to prove to the public that paperhangings of high merits in design and colouring could be obtained without going to France for them, and without slavishly copying ancient examples. He regretted it was necessary, even with such manufacturers as these, to issue new patterns each year. As artists their aim should be to combat the shifty nature of a public who would always demand change if they could get it, and sought for new fashions in paper as they did in dress; and in any case it behoved the manufacturer to take heed that his novelties displayed a progress and not mere change, so as to continuously educate the public by each fresh production. Primary tests of the fitness of wall-hangings were, as the late Owen Jones had pointed out, that there should be an evident flatness in the surface, and that every appearance of relief or perspective should be avoided.

The treatment of ceilings with colour was in most London houses a difficult problem. In houses of the Adams kind, where the ceilings had delicate enrichments, that might be dealt with as Wedgewood ware in light tones of pink, green, grey, or buff; but where a ceiling was quite flat it was desirable to tint it a light tone of grey or cream colour, to get rid of the extreme glare of pure white. Next the cornice, simple distemper patterns of a darker shade of the same colour would be useful, or a few simple lines with stencilled corners. Cornices, if plain, might be tinted in one or two shades, darkening as they went down to the the general ground-tone of the paper. If the cornices contained the usual ill-designed plaster enrichments, care should be taken to pick them out as little as possible. If they presented broad, flat surfaces, a stencilled flower or geometrical pattern could be introduced, care being taken not to make it too prominent. Carton Pierre and canvas plaster were both of French origin, and had been introduced into this country by Messrs. Jackson and Son, of Rathbone-place; both were well adapted for ceiling decoration, as they could be laid on to existing plaster-work. It would be well if we could accept some hints for the adaptation and imitation of the brilliant colouring and graceful ornamentation from the long-buried city of Pompeii. By the use of the word "imitation," he did not mean, however, that we should copy in our houses examples of work which expressed only designs from heathen mythology, or stories of life peculiar to an age of luxury, not always moral, or in accordance with present taste; but in the graceful drawing of ornamental borders, in the careful rendering of bright and delicate colouring, and in the general treatment of decorative design in plaster work, many valuable lessons were to be learned. Although representations of Classic legends were inadmissible, he saw no reason why, in our houses, we should not have art decoration setting forth events in the country's history, stories telling of the nobility and greatness of those who have helped to make our country great. Allegory was out of place nowadays, and truth and beauty of subject should take the place of sickly sentimentalism in design and treatment. Sir Frederick Leighton, Messrs. Marks, Poynter, Armstrong, Albert Moore, and other painters had shown us what could be done in decorative art, and, although much of their work had been on a grandiose, or monumental style, yet in Mr. Marks' works there were quaint and humorous examples of good decorative treatment, adapted for humble requirements and humbler means. It was unfortunate that the greater inducement to paint easel pictures should prevent such men as these from giving more time to decorative work, and he hoped that ere long a school would be founded of young artists devoted to this branch of art. At present there was amongst artists a want of that true sympathy in each other's work, and of just appreciation of, and respect for, each others' talent, which could alone lead to association of labour, and fraternity of toil. No painter of eminence could afford to paint decoration, if the work was to be entirely of his own hand; but there was no reason why the master hand should not, in conjunction with the architect, design and complete artistic decoration at a fairly moderate cost. The master's work should consist, in conjunction with the architect, in designing the general scheme, in adding such touches in drawing as might be necessary to the work when drawn at large on the wall or canvas, and in superintending the filling-in, colouring, and finishing of the work, always remembering that decoration for walls and ceilings should consist in good general arrangement and grouping of figures and foliage, and in broad flat treatment, and not in laboured minuteness of detail, or elaboration of finish. He was sanguine enough to believe that art decoration could be done well, and at a cost within the means of all, and at the same time to the pleasure and profit of everyone concerned. Even in the every-day houses of towns, in which a household rested to-day and were gone to-morrow, such work might be done on panel or canvas, and would remain as portable as the pictures and drawings hung on the walls. One such decorative subject, done under the supervision of a good painter, would be worth all the prettinesses of decorative work in gold and colour, or all the bad ornament of conventional form which money could buy or mere decorators could design; and it would give more pleasure than all the stamped leather or bric-à-brac with which so many delighted to load their walls. Amongst the younger painters he believed there were many who would gladly help in such work, and it should be borne in mind that the fame and honour of many of the great masters of olden days rested more upon the purely decorative work they left behind them than on their easel pictures, and that their frescoes had proved in many cases more permanent than the movable canvases. The Royal Academy, with its great wealth and power, could do more than any private individuals towards providing for a real and national school of decorative painting. From a mere money point of view, the younger painters would find that not only money, but fame and reputation, would be equally attained by decorative work as by easel-painting or book-illustrating. The selling of a picture was as much a matter of business and profit as any other work of human brain and hand. The artist should be as much a man of business as any other good member of society, and it was a misfortune to himself and his clients when he was not. Mr. Edis said he was indebted to his friend, Mr. Marks (by whom some ten years ago his own house had been decorated) for taking up this subject in a business-like and tangible manner, and he had shown his approval of his views by sending what he called "two or three show-cards." These, which were hung behind the lecturer, consisted of three large panels, treated horizontally with studies of herons, storks, spoonbills, and other wading birds; the birds, while varied in attitude and exhibiting Mr. Marks' characteristic handling and ornithological knowledge, were conventionally disposed between aquatic plants, and the compositions were rendered in blues, greys, browns, and like low tones. The lecturer explained that the panels were executed by Mr. Marks in association with a younger man, in order to secure good art combined with moderation of cost. If narrow circumstances prevented the use of figure decoration in a room, it was possible to have in distemper or other media panels of coloured decoration, of birds, or other natural objects, treated simply and inexpensively. In concluding his address the lecturer suggested for consideration, whether it was not desirable, from mere economical motives, to decorate our rooms a little more artistically. If the walls were of the usual bare type of one-pattern paper or paint, it was necessary to hide

their bald and cold appearance by hanging on them engravings or pictures. How much better it would be to spend the same money on art-decoration, which would be a source of continual pleasure and delight. In our dreary London rooms there might be internal light and colour, that should help to make the inmates almost unmindful of the dinginess and smoke without, and add much to the comfort and home-like feeling, which good colour, good design, and good taste could not fail to give.

BUILDINGS FOR SECONDARY EDUCATIONAL PURPOSES.*

By E. C. Robins, F.S.A.

(*Concluded from p.* 441.)

PART SECOND.

I NOW proceed to consider the second formal division of my subject, viz., the particular planning of the parts; but I fear the time at my disposal will necessitate a very limited discussion of the details.

The Lavatory and Cloak-rooms.—Every school is, or ought to be, entered through the hat and cloak-rooms, and the most convenient mode of retirement should also be by the same route, supposing always that the cloak-room does not form a separate adjunct to each class-room, as in the case of the City of London School. In this design I endeavoured to realise the expressed wishes of the head-master, and arranged for the boys' entry into the cloak-room on one side of each class-room and out at the other, the custom at the dismission being for the master to order the boys to file off from their class-seats into the cloak-room, and enter again by another door to their seats with the hats and coats with them; when all are ready, the order is given to leave; in this way the loss of clothes is eliminated. But the better plan is to have separate cloak-rooms, which may be heated and ventilated quite independently of the class-room, and may also be dried by hot-water pipes as they hang, or, if very wet, taken to the drying-room. One of the most complete cloak-rooms, as well as the most extensive, in boys' schools of this kind, is that of Cowper-street School, Finsbury. And, I am sorry to say, about the worst are those provided in Board-schools, where, if anywhere, it surely is most necessary to avoid the transmission of disease and other things, by providing cloak-rooms of sufficient size, and not, as is most common, having two or more rows of pegs over each other, so that the garments hang one upon another; but the outcry against expenditure in Board schools will, doubtless, make it difficult to improve in this respect.

In secondary schools, however, this ought not so to be, and yet it is the commonest sin in the most elaborate and expensive buildings in other respects, and not less in girls' than in boys' schools.

The provision made in the North London and Camden Schools is as economical as it is efficient, and the plan is this:—The cloak-rooms are situated in the basement, and consist of a series of rooms the same size as the class-rooms above them, surrounded on all sides with a single row of pegs, not less than 9in. apart, a shoe-rack, and umbrella hook, with continuous metal water-channels, made movable in short lengths.

A screen down the centre gives space for a similar arrangement on either side; hot-water pipes pass under each screen, above the floor; between the rows, forms are placed for the girls to take off their walking-shoes; every peg is numbered, and every pupil has her number.

The lavatories are situated in the cloak-rooms, and the external conveniences are entered from the cloak-room; so that every arrangement is open to inspection, and under the control of the teachers on duty in each room.

In boarding-schools it is usual to provide closets and doors with looking-glasses in the upper panels, &c.; but, in all cases, plenty of room is essential to the discipline and *morale* of the school.

The Class-rooms. — The arrangement of the class-rooms is one of the most important of the parts. The number of scholars varies with the system of classification adopted.

The Public Day-school Company prefer from 20 to 25 in a class; the North London Collegiate School, for the higher education, apportions 30 to a class; the Camden School has classes of 50; a common number is 40, which is that adopted at the City of London School, but 60 is not an unusual number in great schools.

Continuous forms and desks, four, five, and six rows deep, are usual; but I prefer the dual desk to the continuous, and think the best arrangement is that adopted at the North London and Camden Schools, where each student has a single Swedish desk, set 15in. or 16in. apart, so as to allow of a passage between each from front to back; the rows will then need no space between them from side to side, but a 2ft. passage or more is desirable at the sides next the wall, though not essential, the resulting area being from 12ft. to 15ft. each scholar. In all cases, the light should fall on the left side of the desks, and, if the rooms are not heated by warm water-pipes, the fires should be opposite the desks; and not in the centre of the wall, but between the teacher's desk and the entrance door, so that the teacher's raised desk may stand in the centre, and the draught, if any, from the door may only feed the fire, without annoying the teacher or the student.

On the opposite side to the fire, and behind the students' desks, vitiated air extract-shafts should be built in the walls, with a large grating fitted with a gas jet inside, and the means of closing, if desired, one at each side and close to the ceiling. The stoves should be on the principle of Boyd's School Board stoves, with fresh air passing through them into the room. Further fresh-air shafts, on what is known as Tobin's system, may be added, if desired, or by shafts in the wall, under window-sills, opening through hit-and-miss ventilating grating fixed in the window-boards. The latter is adopted at Sandall-road, but has the disadvantage of admitting the air too low, and the descending cooler air, next the cold window-panes, checks the upward current of the inlets. The wall opposite the windows, in which is the door, should be supplied with a large fanlight over the door, and corresponding dwarf window-openings in the upper part of the wall, so that cross ventilation may be obtained at pleasure, and particularly in the intervals of teaching. The rooms should be 13ft. or 14ft. high, as wisely required in all Board-schools. Class-rooms so designed and arranged on one, two, or three sides of the great hall, form the largest part of the school-buildings, and are adapted to every purpose required. Examples of such class-rooms are given.

Drawing Class-rooms. — In addition to a northern light, a high light is desirable; and not only so, but a skylight also; and this is best attained by a curved roof, similar to that adopted at the Gloucester Fine Art School, and to that which I have built for the North London School. In this case, I have formed the roof with iron ribs and sash-bars on one side, and glazed it like a conservatory, lining with boarding so much of the interior as the circumstances of the case required by actual experiment. The drawing exhibited will best illustrate this.

Science Class-rooms.—I have already referred to the great changes which have recently taken place in school buildings, the single lofty hall which constituted the whole school 50 years ago being now superseded by a variety of separate class-rooms and other conveniences. But this change in the architecture has been accompanied by a yet more marked revolution in the mode of teaching, and in the matter taught. The education of the memory, which was all that was provided for our fathers, is in these latter days giving place to the education of the mind. To develop the reasoning faculty is now considered a nobler task than to manufacture walking encyclopædias, and, since it is now generally accepted that one of the most powerful instruments for the cultivation of the reason is the study of science, it is evident that chemical and physical laboratories—and, possibly, even mechanical laboratories — will henceforth be considered essential parts of a first-rate secondary school.

These laboratories will also be associated with one or more lecture-rooms to accommodate from one to four hundred students, or from a third to half the school, if not exceeding 800; above that number, it is better to have two lecture-rooms.

The particular form of chemical operating stalls, and the service of gas and water, the sand-baths, and the fume-closets, are illustrated in drawings on the walls, and may be further studied by reference to the published illustrations of the admirable laboratories at Owens College, Manchester; but, as I am not aware that similar publicity has been given to physical laboratory fittings, I have exhibited on the walls a few illustrations of the very clever arrangements designed by Professor Ayrton for the college at Yedo in Japan, which his kindness has put at my disposal.

I may, however, remark that the chemical laboratory operating stall should be from three to four feet wide and two feet three inches deep, with two tiers of bottle-shelves at the back, two gas jets with Bunsen's burners, a bason of lead or of stoneware; the latter is less affected by acids, but the former is easily repaired or renewed, and fewer breakages occur in its use. If the laboratory is small, one sink in the corner, or next walls, will be all-sufficient, as at Sandall-road. Different sized drawers are required under the oak table top, and the remaining space may be provided with shelves, with doors to inclose same, set back to allow space for knees when sitting at the stall.

The fume-closets should be formed with lead, lined sink and closet under, inclosed with panelling (if not recessed in the wall), with rising sashes in front; in the bottom rail of the lower sash, hit-and-miss ventilators to be fixed, to admit air from the room to the chamber, at the upper part of which is a ring of gas jets at the foot of an extract flue.

A better plan is adopted at Owens College. All the fume and exhaust closets are connected by channels with a lofty chimney, at the base of which a furnace is constantly burning, the draught created by which sucks up the air from the fume-closets and carries it far above the buildings. A directors' room, best apparatus room, and balance-room, and special operation rooms are desirable additions.

Since writing the above passage, I have received from the Science and Art Department of the Committee of Council on Education at South Kensington, their science form, No. 1013, descriptive of fittings for laboratories; and with it a series of drawings, which I have exhibited on the walls; but as, on the payment of 1s. 6d., any one may obtain a copy of these documents, I will not detain you by a description now, except to say that they are the result of much deliberation, and practical experience has proved their value. The Royal Institute at Hull is fitted up with these fittings, which are suitable for advanced classes. The Gloucester and the Watford Art and Science Schools are illustrated in Col. Donnelly's reports, and may be consulted there. These buildings aptly illustrate what is required to complete secondary school buildings. Their existence as separate institutions proves the want has been felt and provided for in this way; in future buildings the want should be anticipated. The chemical and physical laboratories—designed for the Cowper-street technical school of the London Guilds' Institute—are fully described and illustrated in the report of the Governor of the 10th of March last; and since any one interested in the subject may obtain a copy on application to the secretaries, I abstain from entering upon any description of them, but at once proceed to the consideration of—

The Physical Department of the Imperial College of Engineering at Yedo, Japan.—From the particulars given to me by Professor Ayrton, I have been enabled to prepare a ground-plan of the department of which he was professor, and it is no small satisfaction to me, as a member of the Executive Committee of the City and Guilds Technical Institute, that his able services have been secured to develop the physical classes at Cowper-street, for which costly buildings are in course of realisation, which it is hoped may give full play to his talents, to the great advantage of the youth and working classes of the City of London.

Room No. 1 is the demonstrative room, 50ft. square, and occupying the whole height of this portion of the building, which is shown in the exterior perspective of the same. It was fitted up in the following manner:—On a level with the first floor, a gallery about 3ft. wide ran round the whole room, from which wires and other apparatus were suspended for experiments, and giving access to the shutters by which the upper windows could be closed to darken the room for optical and other experiments. The students' benches occupied the centre of the

* Read before the Society of Arts, April 7.

room, and around three sides of the room, next the walls on the ground-floor level, were instrument and working cases, the under side of the gallery being utilised for cupboards, entered from behind.

Room No. 2 is the general laboratory, fitted up with instrument cases, covered in working cases, the tables being on concrete foundations, and uncovered instrument cases on brick piers.

Room No. 3 is the professor's private room and private laboratories.

Room No. 4 is the instrument room.

Rooms Nos. 5 and 6 are for electrical experiments, No. 5 being fitted up with six brick pillars, each about 2ft. square, and descending 6ft. into the ground. No. 6 has long tables on brick piers.

Room No. 7 is the lavatory attached to the laboratory, for washing bottles, &c.

Room No. 8 is a small, artificially-dried room, in which experiments with frictional electricity could be conveniently performed.

On the first floor, which extended over all but the demonstration-room, were rooms for experiments on light, a small class-room for the teaching of applied physics, rooms for special experiments, store-closets, and the battery-room.

The detail drawings, which I have had prepared from those made by Professor Ayrton, are exceedingly interesting and valuable on account of their originality, and because they have stood the test of use in the college at Yedo.

Fittings in Demonstration-room.—The sloping platform, or students' gallery, is shown on the drawings, and in the side sectional view I have indicated in dotted lines the brick piers which sustain the students' tables distinct from the general flooring, so as to be quite free from vibration. There is also a front, back, and top view of the students' benches, and a section showing sinks and gas-fittings.

By this special arrangement of students' benches (which is believed to be unique of its kind), it was possible for the students, without leaving their places, to repeat the experiments made by the professor during the lecture, with apparatus placed ready for them on these firm benches. Between the lectures, these benches or tables could be utilised as part of the laboratory proper.

Illustrations are also given of the instrument cases, with folding-doors and glass panels, as arranged around a portion of the demonstration-room, also used in the laboratory.

Details are shown of the professor's lecture-table in this room, resting on a platform, the whole of which was sustained on a concrete foundation distinct from the general flooring, and its fittings included a pneumatic trough sink.

Fittings in the Laboratory.—Besides the instrument cases, the drawings also exhibit the working cases, furnished with glazed sash windows, as used in the general laboratory and in the professor's private laboratory.

The tables in the cases rested on a concrete foundation, quite distinct from the flooring, to avoid the transmission of vibrations; so that, except where the sash was closed, after work, to exclude dust or meddling fingers, no part of the case rested on the table, there being no connection between the table carrying the apparatus and the floor, on which rested the sash-frames and glazed inclosure, and on which the experimenter stood. With such working cases a delicate investigation could be carried on from day to day, the apparatus being always ready whenever the experimenter had leisure to work at it. Some of the working cases, so inclosed and fitted with window sashes to exclude dust, &c., not being required for very delicate experiments likely to be spoiled by small vibrations, stood upon the common floor without concrete foundations.

There is the charm of novelty in these arrangements so far as I know, and of the following fittings for the battery-room.

Battery-room.—Illustrations are given of these designs as carried out in the aforesaid Technical College of Yedo, under Professor Ayrton's directions.

Accommodation was provided for about 200 Grove's cells, and 300 Daniell's, used for general electrical work and for the electrical testing of the students of the telegraph engineering. The peculiarity of these special fittings was that all the cells were under glazed covers, and, therefore, dust was excluded; yet all the cells were visible, and all obnoxious gases were led up the flues; the cells were easily got at by opening any portion of the double-hinged cover.

When taking a Grove's battery down, after use, the zincs were put at once into the long, narrow leaden sink, immediately in front of the battery-stand; the porous clay-cells to soak in the long leaden sinks immediately behind the operator. After soaking, the porous cells were put on the racks to dry, and were ready for use within reach of the operator putting up the battery on the next occasion.

Of Professor Ayrton's drawings I have seen ten, and of these I have chosen the most interesting examples.

It is to be observed that the fittings of the physical department at Yedo were contrived to enable the students to learn by advancing the bounds of knowledge, and not merely by assimilating existing information, as is evidenced by numerous published accounts of original research conducted in that laboratory; and it is this method of teaching which has given to Professor Ayrton the *prestige* which he enjoys.

ECCLESIOLOGISTS AT ST. PAUL'S CATHEDRAL.

THE members of St. Paul's Ecclesiological Society visited St. Paul's Cathedral, under the guidance of Mr. F. C. Penrose, M.A., on Saturday afternoon. The attendance of members was so numerous that a perambulation of the building was rendered a slow and difficult task, a compact group of over two hundred young men clustering around Mr. Penrose at each halt, eager to hear his description of the leading points of the building. The members assembled in the S. W. chapel at 2 p.m., and were received by Mr. Penrose, who, after exhibiting a series of plans of the old and new cathedrals, conducted the party outside, showing the discoveries made during the past two years during the formation of a public garden, including the remains of the 14th-century cloisters and the foundations of buttresses for the central chapter-house. Thence the members went to the north side of the churchyard, to examine the spot where a small portion of the cross had been found three feet below the surface. The site was considerably nearer the old and present cathedral than the 17th-century plan in All Soul's College, Oxford, indicated; what had been found were the foundations of a pier and arch with mouldings of about the year 1490; these had supported one side of an octagonal platform on which the wooden external pulpit was raised. The visitors having returned to the cathedral, they passed through the elaborate wrought-iron* gates near the east-end, and walked down the choir, Mr. Penrose directing attention to the delicate carving in low relief of cherubs, foliage, fruit and flowers upon the stalls, the work of Grinling Gibbons and his assistants; it was, he remarked, amongst the finest work of the period. He invited special examination of the cherubs on the south side organ-case, which was that designed by Wren; the visible gilt pipes were those built by Bernard Schmydt at the time, but the internal pipes had been renewed of late years by Willis. The western stalls were rearranged about ten years since, and made to face, like the others, north and south. Proceeding westwards, Mr. Penrose said the most effective view of the dome was obtained from the first bay of nave aisles, where the upper portion was cut off, and the total height left indefinite. The north and south chapels, added as afterthoughts by Wren, were next seen, a passing glance being given to the completed Wellington monument, the other or morning chapel being shown to be in the original state as left by Wren. While in the nave, Mr. Penrose remarked upon the singular purity of the type of Roman style used by Wren in this building, and added that it compared very favourably with contemporary Renaissance works executed in France and Germany, for the Continental examples were overloaded with ornament, and all details were highly elaborated. On the Geometrical Staircase the mathematical problems successfully solved in its construction and the beauty of the effect were descanted upon, and the visitors next looked into the library (a few inspecting the great clock and bells), and ascending the circular wooden staircase, ranged themselves round the whispering gallery, while Mr. Penrose successfully illustrated its properties, by giving, in a low but perfectly audible tone, the principal dimensions of the building and the history of Thornhill's paintings in the dome, retouched by Parris in 1856-7. Rising a stage higher, the party passed on to the external platform between the pillars at the base of the drum. Mr. Penrose gave further explanations at this stage, and referred especially to the excellent proportions and outlines of the western pinnacles here seen to great advantage. One of the architects in the party, however, drew attention to the fact that by looking over the unprotected stone coping, it could be seen that the whole of the upper portion of the external façades of the cathedral were mere blank walls, the roofs being sunk many feet below, and inquired whether this was a legitimate mode of giving mass and effect to a building? Inside the base of dome, Mr. Penrose pointed out the great brick cone which, rising the whole height, supported both the internal and external cupolas, and in reply to questions, described the system of concrete doors and encasements by which he had endeavoured to protect all timber from the risk of fire. At this stage the visit lost its interest, for a complete block occurred. Many members had hurried to the stone gallery above the dome or had ascended into the ball; the general body of visitors were too impatient to listen to instructions and to wait till the first party had descended the narrow circular iron staircase between the domes, and as a consequence, a large number were detained on the upper gallery exposed to a keen north-east wind for three-quarters of an hour, and when a return was effected, afternoon service had commenced. The next "visit" by the society will be to St. Mary Overie's Church, Southwark, on May 1st, and will be conducted by Mr. Francis T. Dollman, who has for many years made a special study of that once magnificent but sadly mutilated Priory Church.

* Illustrated, together with the ironwork on Geometrical Staircase, by a measured drawing, in the BUILDING NEWS for May 18, 1877.

CHIPS.

The completion of extensive additions to the drapery premises of Mr. F. Fish, Tavern-street, Ipswich, was marked on Monday week by the dinner to about 60 workmen in the employ of Mr. R. S. Smith, the builder who has carried out the work. The architect, Mr. T. Miller, C.E., was present.

At the Cardiganshire quarter sessions, on Tuesday week, a pension of £100 a year was awarded to Mr. Vaughan, late the surveyor of county roads.

The 27th anniversary dinner of the London Association of Foremen Engineers and Draughtsmen was held on Saturday evening, at the Cannon-street Hotel. The Lord Mayor presided, and the vice-chair was occupied by Mr. J. Donaldson, M.I.C.E. The report showed that, during the year, 11 honorary and 8 ordinary members were added to the list, making the total of members 329. The superannuation fund had increased by £196. Not a single recipient of the widow and orphan fund had died or been added during the year.

The site of the extension of St. Mary's Cathedral, Truro, is being cleared, a block of fourteen houses occupying it having been unroofed and sold by auction as old materials during the present week.

The Sanitary Institute of Great Britain have accepted the invitation of the town council of Exeter, and will hold their annual congress in that city in the autumn.

The Berks county magistrates have remanded, without bail, Edward James Illsley, builder, of Calcot, on a charge that he, being a bankrupt, did fraudulently conceal a pony and cart and other property to the value of £200 from the trustees under the liquidation.

The new Eastbourne and Tunbridge Wells line having been completed from Hailsham to Heathfield, that section has been opened for traffic.

On Monday week Mr. W. E. Springall, who for 10½ years has been borough surveyor of Folkestone, was presented by the workmen employed by the Corporation with a handsome clock, suitably inscribed.

The town council of Guildford have agreed to an offer made by Lord Onslow proposing to provide a new approach to the station, with a 40ft. bridge and roadway, and opening a road through the Artillery fields, so as to open up new building estates, on condition that the town pays £6,500 towards the cost. The plans have been prepared by Mr. C. H. Sparkes, C.E.

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ILLUSTRATIONS.

PRIZE DESIGN FOR A FINE-ART MUSEUM IN A PROVINCIAL TOWN.—DESIGN FOR A BOAT-HOUSE.—MANTELPIECE AND FIREPLACE EXHIBITED AT THE PARIS EXHIBITION.

OUR LITHOGRAPHIC ILLUSTRATIONS.

SOANE MEDALLION (1880) DESIGN FOR A FINE-ART MUSEUM IN A PROVINCIAL TOWN.

The accompanying drawings illustrate the selected design for the present year, the author being Mr. Edward Harnor, architect, of No. 8, John-street, Adelphi, W.C. According to the particulars of the competition, the site was to be surrounded on all sides by streets, the front of the building to face an open square. The accommodation provided is in accordance with the instructions, the main feature of the plan consisting of an open court for sculpture in the centre (lighted from above), and surrounded by an ambulatory, and carried up three stories in height, forming galleries on the first and second floors. On the ground-floors, symmetrically arranged around the court, and with entrances from the same, are the rooms for coins and medals, local antiquities, sculpture, &c. Two rooms, with w.c. and lavatory, are arranged on this floor, for the use of the curator, also cloak-room, and porter's office, in close proximity to the entrance. To the left of the entrance is placed the staircase for access to the first and second floors, with stairs down leading to basement, in which are located the refreshment and retiring-rooms, the remainder of basement being devoted to storage and rooms for receiving and unpacking works of art, &c., caretaker's rooms, &c. In order to give ample light and ventilation to the basement, the ground-floor ha been raised 5ft. above the level of the street, the building being set back, with areas around. The first floor is devoted mainly to the picture-galleries, which are lighted from above. The rooms are all placed in suite, with through communication, and with entrances from gallery of court around. The fine-art room, library, and room for engravings have been located in the front, overlooking the square, accommodation for the librarian being provided in the tower. Externally, the design shows a symmetrical arrangement, with tower in centre, flanked by gables on either side, a detail of which was given to half-inch scale. The staircase has been emphasised externally in design by carrying it up as a low tower, a similar arrangement being adopted on the other side. The style chosen is Gothic of a heavy character, in preference to one of a more ornate description, it being thought more suitable for the class of building. The drawings submitted were seven in number, of which the perspective, sections, and details are illustrated.

BUILDING NEWS DESIGNING CLUB.—A BOAT-HOUSE.

A BOAT-HOUSE is a picturesque subject for design, and several members of our Club have contributed plans of some merit. The selected design we publish to-day, the author of which is "Edwin."

DESIGN FOR MANTELPIECE, &C.

This fine plan, designed by Mr. Somers Clarke, junr., of 6, Delahay-street, S.W., for Longden and Co., of Sheffield, and 264, Oxford-street, W., is designed in the style of St. Paul's Cathedral, from which some of the details are closely studied. The carved woodwork was done by Mr. J. E. Knox, of Doris-street, Kensington Cross, with much spirit, and the grate, which is constructed to throw out warmed fresh air, was made by Messrs. Longden and Co., of Sheffield, and 264, Oxford-street, W. It is of polished brass and nickel-plated work, except in the parts round the fire, which are of black iron. The fire-irons and fender are of polished brass. This drawing was prepared for exhibition at the Royal Academy, but, owing to a mistake about the days for sending in, it, with some others, was not sent.

ARTISTIC CONSERVATORIES.*

We have received a copy of an illustrated book, published by Mr. Batsford, of Holborn, for Messrs. Messenger and Co., of the Midland Horticultural Works, Loughborough, containing designs for "artistic conservatories and horticultural buildings." The designs have been prepared from rough sketches by Mr. E. W. Godwin, F.S.A, and from designs and drawings by Mr. Maurice B. Adams, A.R.I.B.A., and are intended to show the application of the system of Messrs. Messenger. There are in all 20 well-executed photo-lithographs, ranging in subject from plain lean-to buildings to large winter gardens, and detached conservatories prefaced by an introduction, with descriptions of the different designs. In the preface the authors refer to the neglect of architectural considerations in our gardens and horticultural buildings; but we may venture to suggest that this negligence has been in a great measure that of the horticultural builder himself in adhering so persistently to traditional methods. The gardener himself has, we fancy, hitherto had most to say in the matter. The object of the work before us is rather to suggest than to supply information for those about to erect conservatories, and who of course prepare to adopt their own architect's design instead of the stock pattern of the horticultural builder. The sketches may be taken as representative of what some of the Queen Anne revivalists can do to make conservatories artistic adjuncts to our houses.

Messrs. Messenger's system consists in an economical arrangement of iron to strengthen the woodwork, and to transmit the weight of roof to the foundation; they adopt slight timbers to insure dryness and durability. The supporting uprights are of cast-iron, with bracket heads upon which the plate and rafters rest, while the rafters are trussed with iron tension-rods which enable small scantlings to be used. The designs show this arrangement of trussing rods, which may be made useful in the support of creeping plants. Plate 3 exhibits three different forms of lean-to conservatories, with circular and straight roofs, ventilating openings at the top, while one of them shows a gallery opening into it from the first floor; the greatest difficulty in these forms is to make the end unite agreeably to the house. Fig. 1 of Plate 4 is a somewhat happier arrangement, with a masked roof and balcony railings. Connecting arrangements are shown on Plates 5, 8, 9, and 10, opening from a drawing-room by a corridor, or from a staircase and gallery above. Plate 12 shows a group of winter gardens and palm-houses rather uncomfortably close to the house. The floral porches, shown on Plate 14, are picturesque, and seem to indicate the advantages of floral porches, forming a kind of lobby to the hall or parlour from the garden. The verandah designs are pretty, though, perhaps, hardly in keeping with the houses shown in conjunction with them. Designs for green-houses with aquariums are furnished; we may particularly refer to Plates 17 and 18; also a variety of window conservatories to suit different circumstances. Those who are seeking for information of the kind of conservatory they may attach to their houses, will find Messrs. Messenger's book an aid, and their attempt in a praiseworthy direction is worthy of a firm of their established reputation.

* Artistic Conservatories (from designs by E. W. Godwin and Maurice B. Adams A.R.I.B.A.), manufactured by Messenger and Co., Loughborough.

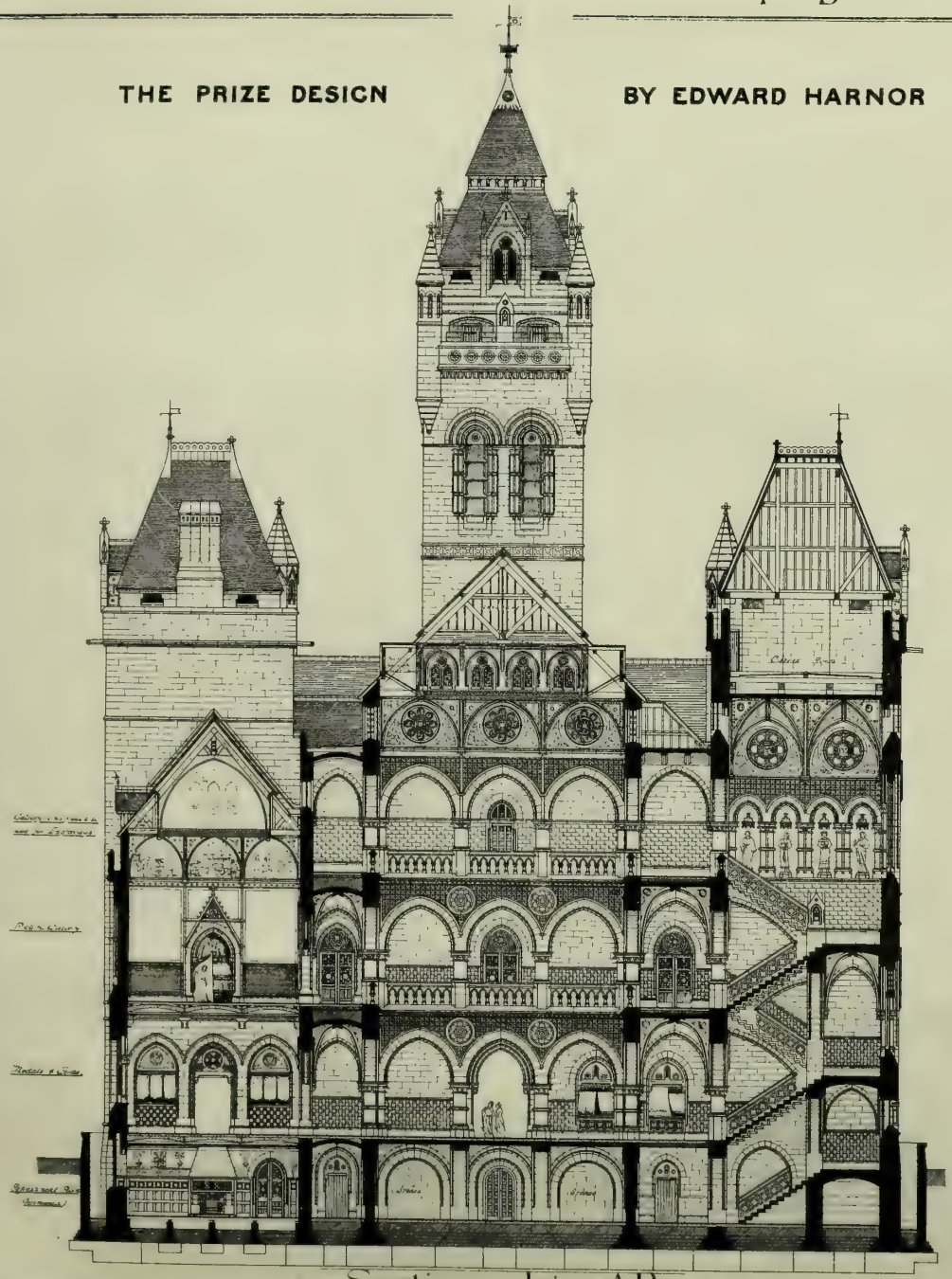
BOOKBINDING.

"The History and Art of Bookbinding" was the title of a paper read before the Society of Arts, on Wednesday evening, by Mr. Henry B. Wheatley, F.S.A. The principal portion of the lecture consisted of an exhaustive history of bookbinding, from the earliest recorded period to the present day; the progress of the art in the principal European countries being traced in detail. The author pointed out that the reason why bookbinding flourished more in France than in England was because there were more French than English collectors who possessed small cabinets of well-bound books, Frenchmen not caring, as a rule, to bind a book unless the work could be done thoroughly and artistically. He feared that the question—Was bookbinding a living fine art? must be answered in the negative, because the greater part of the work now produced was simply imitative. Surely the art could be revived, if the true principles upon which it was founded were mastered. Our great artists should make designs for the bookbinder, as did Holbein, Petit Bernard and many others, and these designs would need to be specially adapted for their purpose, and should be indications to the artist-binder rather than finished drawings. The great fault of the workman was that of adding to and spoiling a work already beautiful. It was, however, hopeless to expect the art to revive until means were taken to raise the standard of appreciation in which binding was held. He suggested that this desirable change in public opinion would be realised if all readers possessed themselves of copies of their favourite authors in the best editions and the handsomest covers, and if ornament were lavished upon the works their owners delighted to honour. But the very necessary caution was added, that good binding being essentially a handicraft, must always and necessarily be expensive, because it had occupied much time of a skilled workman, and the lover of binding must not grudge price, for if he did he could not get good work. While as a fine art bookbinding had fallen into decadence, as a mechanical art it was never in a higher state of perfection than at present, and the second portion of the author's paper dealt in detail with the various processes employed. The aim of the binder at the present day was to unite strength and elegance, and there were morocco bindings which would outlast the books they cover if both were constantly used. Few trades had been less able to avail themselves of machinery than this, so that a picture of the Middle Ages, showing a binder at his work, differed little in detail from what might be seen in any shop in London; the same hammer and the same sewing-press were exhibited in both. Coming finally to the question of the preservation of bound books, it was remarked that the two chief causes of injury to books were damp and excessive dryness from a heated atmosphere. Of these, while the former was directly fatal to the appearance of common cloth bindings, the latter was, generally speaking, the greatest enemy to books. To secure proper ventilation, glass cases should be occasionally opened, or the books would become mouldy. Gas was supposed to be particularly injurious to books; and, doubtless, the upper portion of an unventilated gas-lighted room was specially obnoxious. As to other positions, it was not clear that the heat emitted by gas was more destructive than the same amount of impure air from other systems of lighting; in fact, the library in which the books were in the worst state of powdery decay he had seen was placed in rooms lighted by lamps and candles. Rats and mice, book-worms and cockroaches, did great damage in libraries, and it was often with the greatest difficulty that they were got rid of.

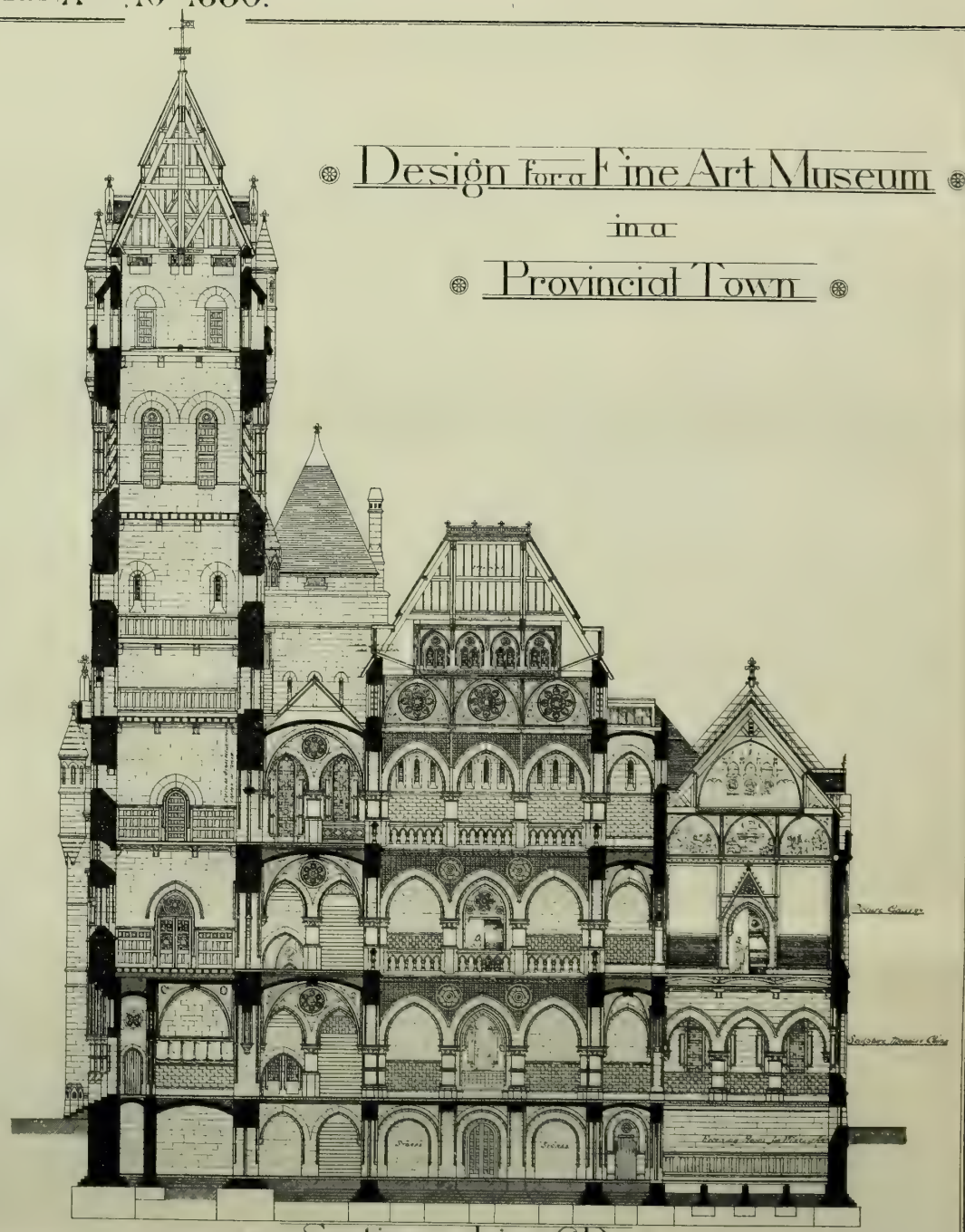
The new bridge over the (Sussex) Ouse Lower Navigation, at Southease, has just been completed. It is a swing-bridge of iron, and has cost the trustees of the navigation £2,450. Mr. Wallis, C.E., was the engineer, and Mr. Shaw was the contractor.

THE PRIZE DESIGN BY EDWARD HARNOR

Design for a Fine Art Museum in a Provincial Town



Section on Line AB

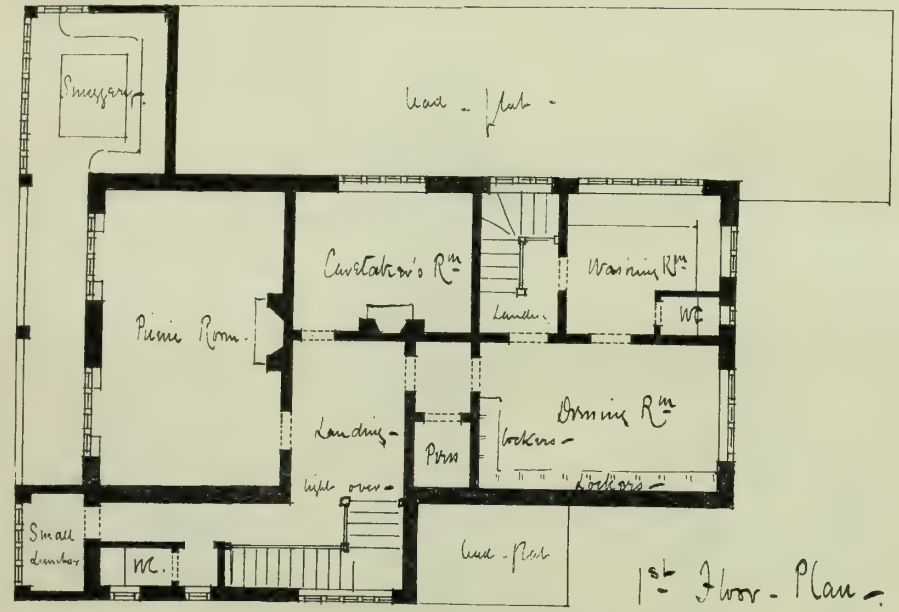


Section on Line CD

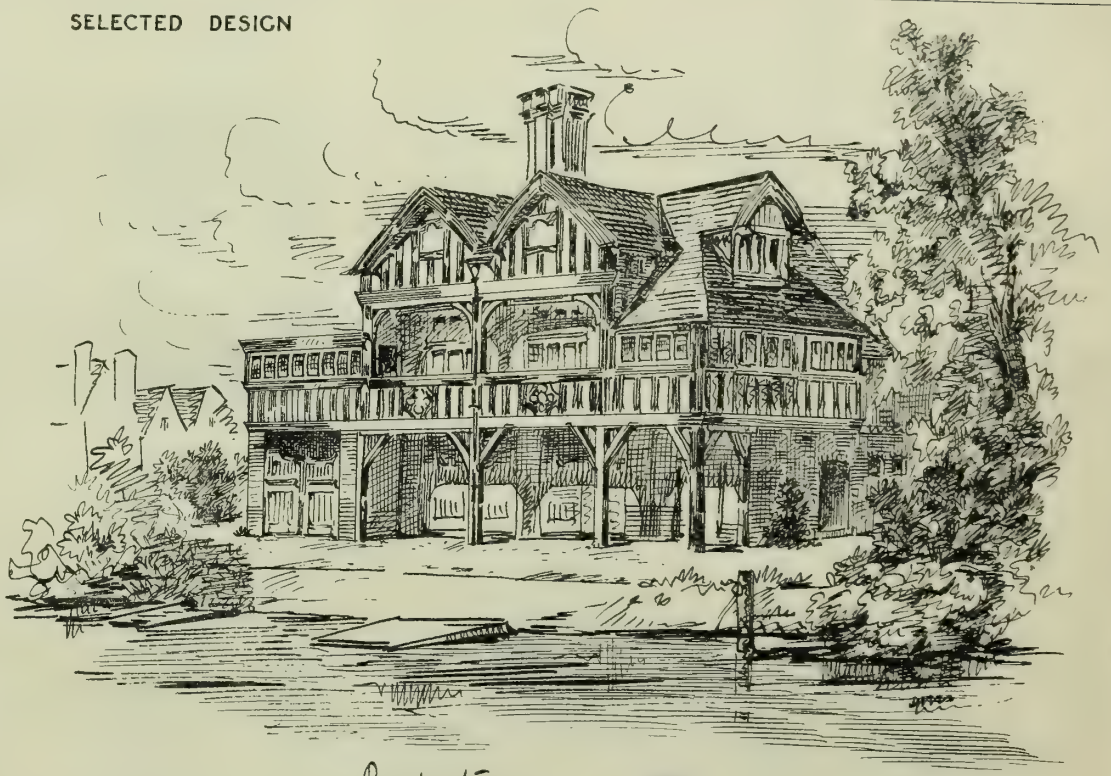
Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

LIBRARY

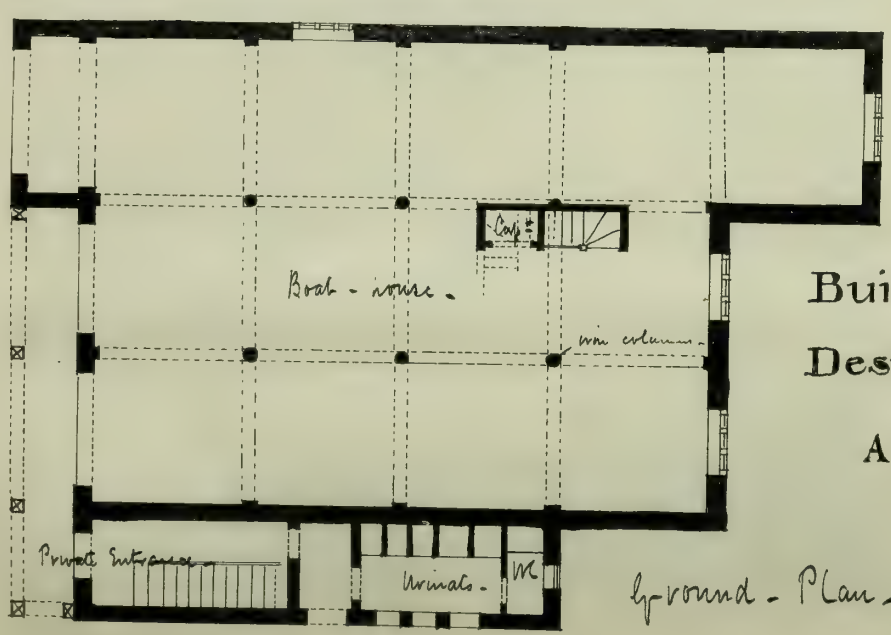
SELECTED DESIGN



1st Floor - Plan



Perspective



Ground - Plan

Building News Designing Club

A Boat-house

Edwin



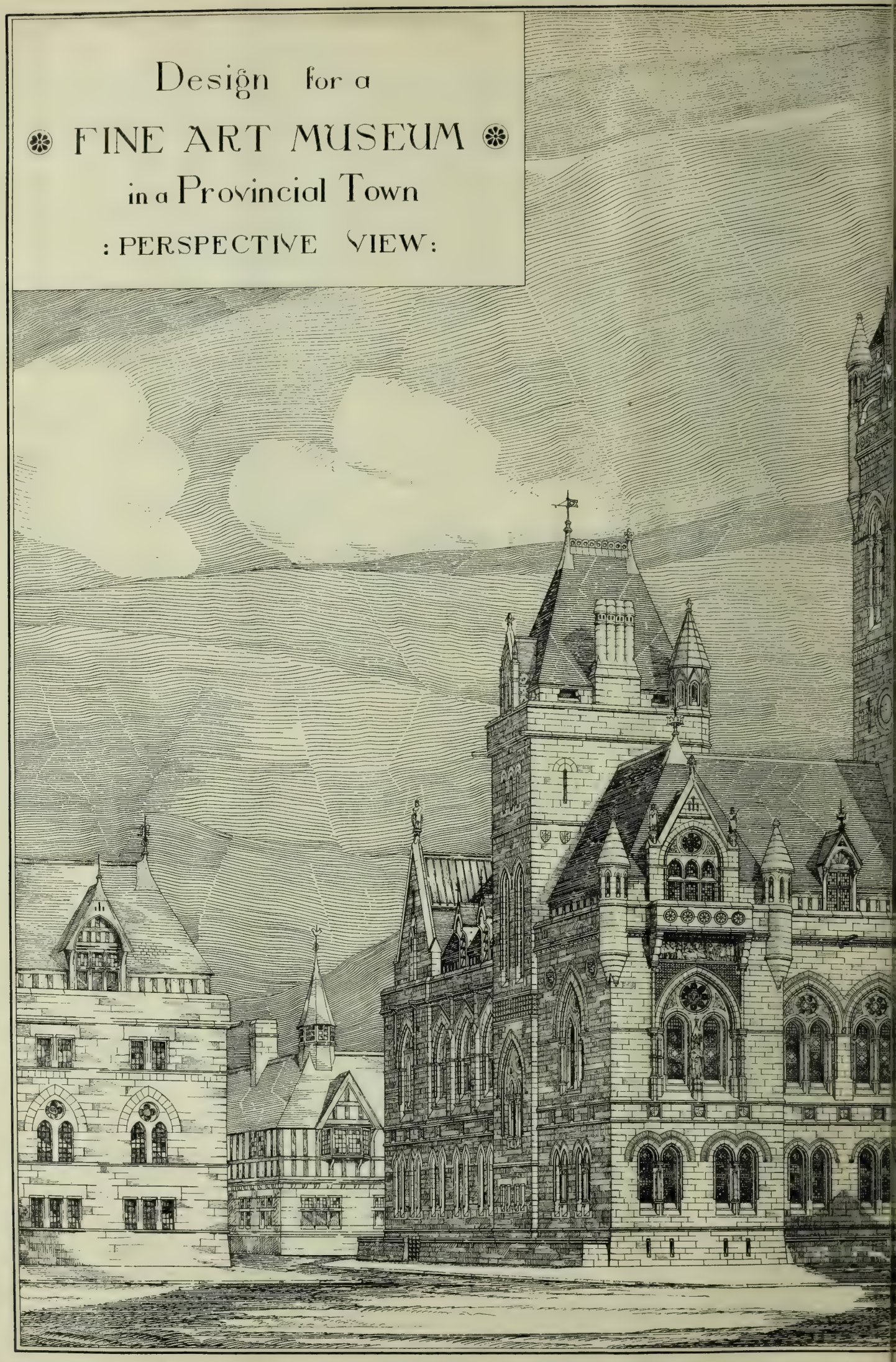
Elevation

Scale of Feet. 10 5 0 10 20 30 40 50 60 70

Photo Lithographed & Printed by James Akerman, 6, Queen Square W C

Design for a FINE ART MUSEUM in a Provincial Town

: PERSPECTIVE VIEW :



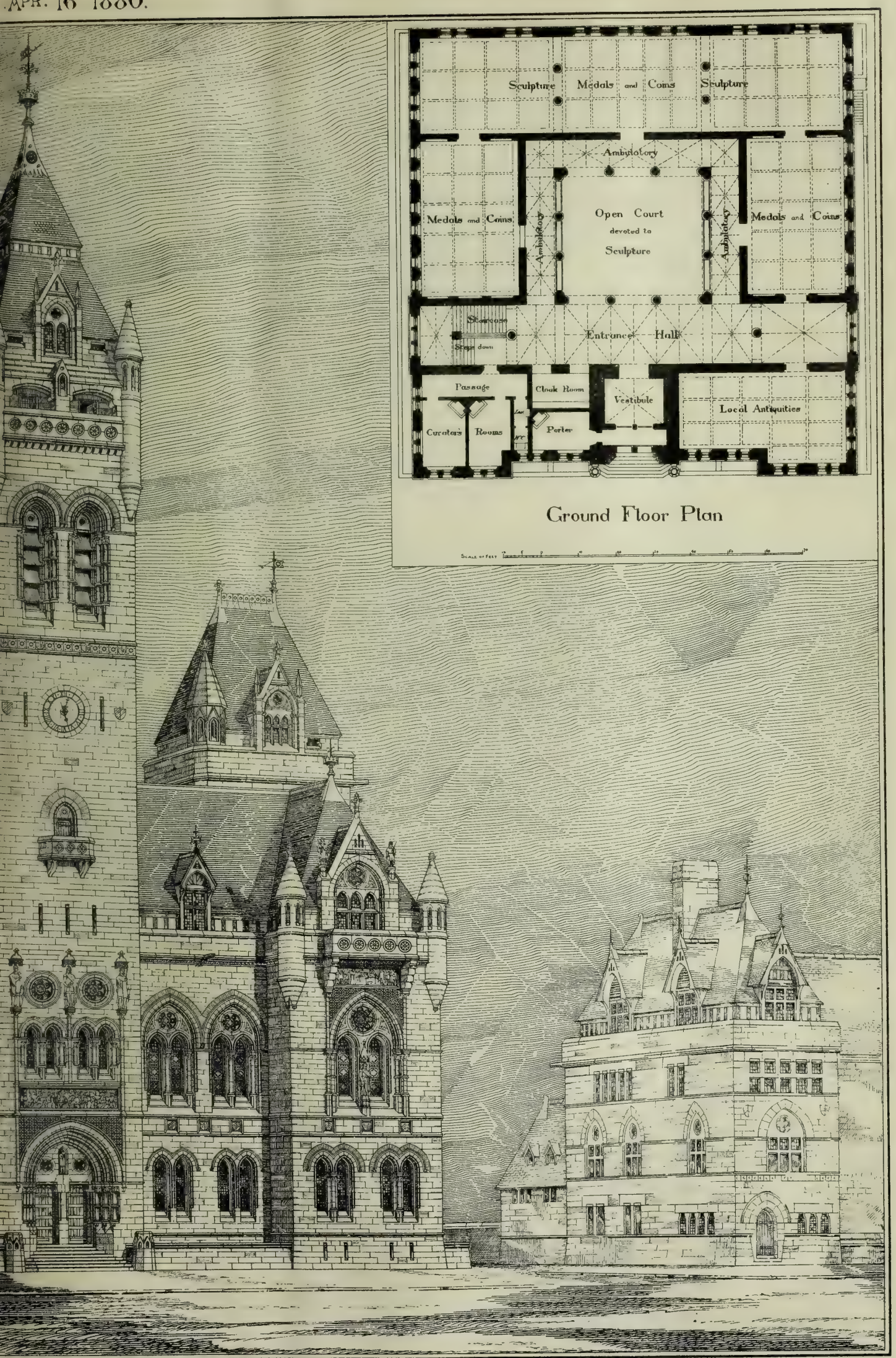


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W C

SIGN BY EDWARD HARNOR

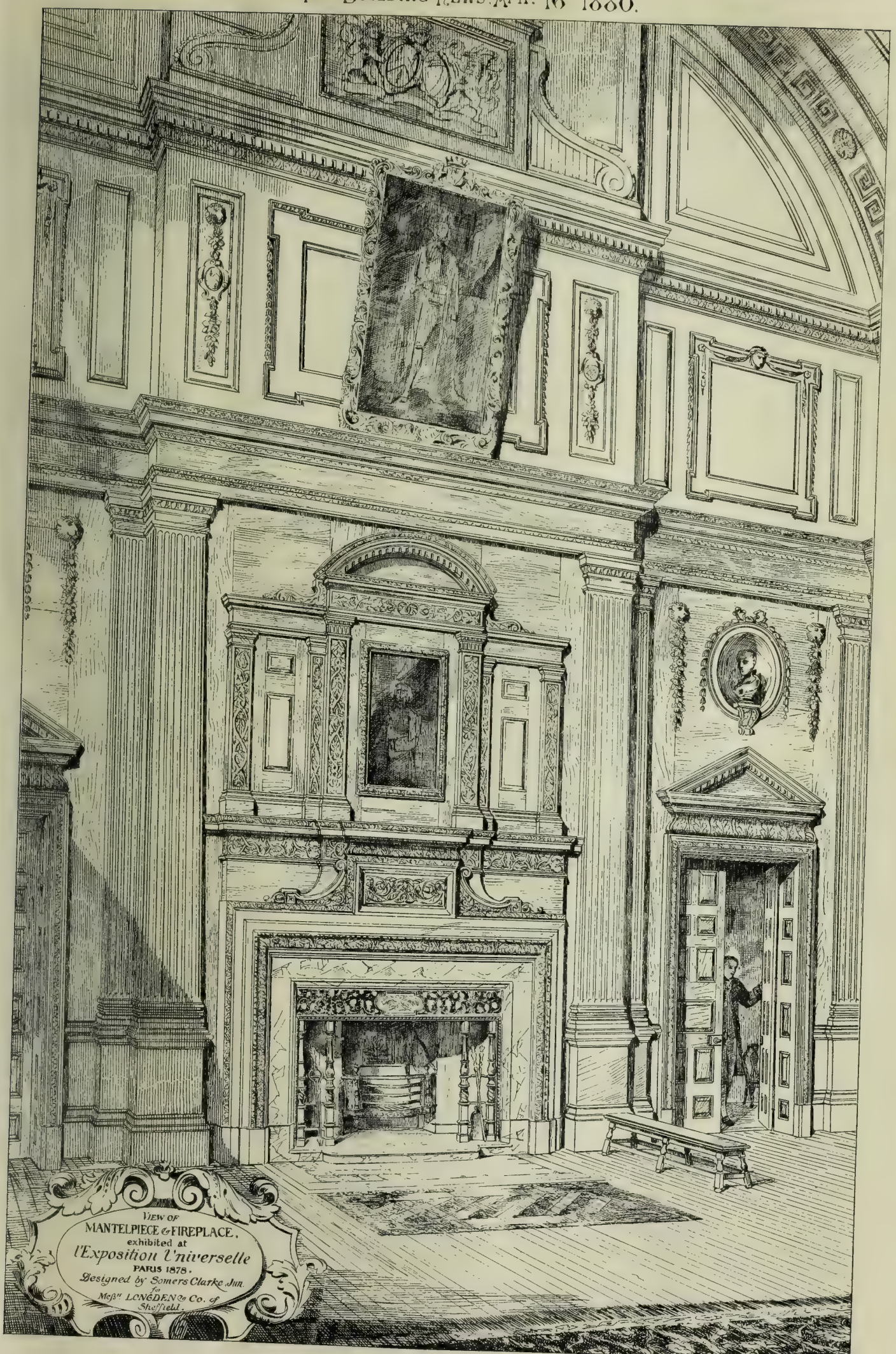


Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

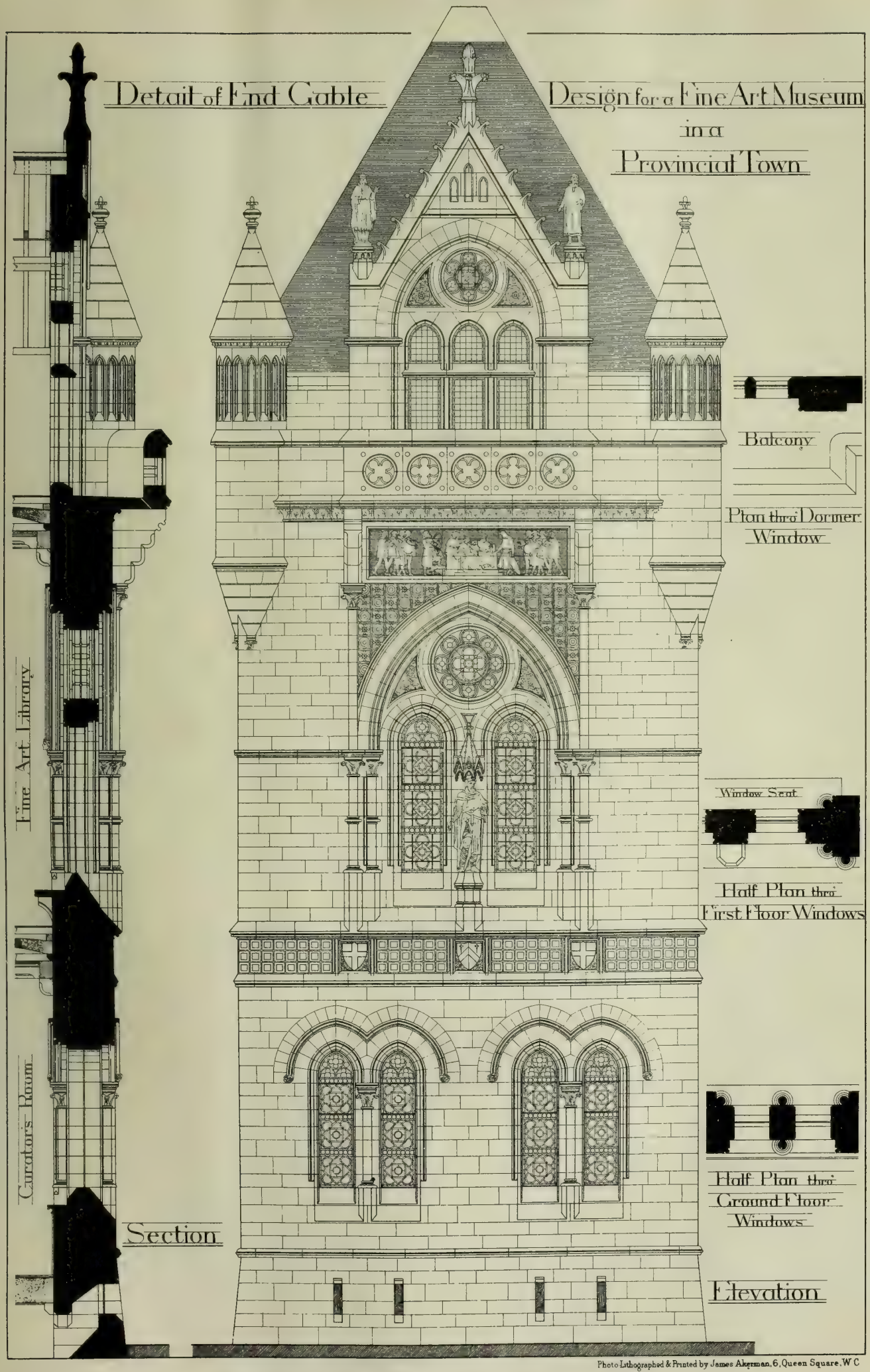


Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

THE PRIZE DESIGN BY EDWARD HARNOR

CLASSIC CASKETS OF GEMS.

MR. J. P. SEDDON delivered, on Tuesday evening, at the Royal Architectural Museum, the third of his series of lectures on the contents of that Institution, before a numerous and appreciative audience. As on previous occasions, Mr. Bedford Lemere, photographer to the Museum, gave a series of illustrations of the buildings and features described, by means of limelight lantern, the architectural details being so clearly thrown upon the sheet, and to such a large size, as to render it easy, as well as pleasant, for those but slightly acquainted with the subject of the lecture to follow every remark and grasp each point.

It was, Mr. Seddon remarked, with considerable difficulty that we in modern times could obtain a just and comprehensive view of what a Classic casket of artistic jewels was in its artistic and finished beauty. Ancient Rome being, as had been wittily said, a place that seemed to need a deal of repair, the shattered fragments of its monuments still extant in it, though astonishing by their scale, were shorn of their pristine pomp and magnificence. It would almost appear that retributive justice had reduced to helpless ruin the whole of the structures reared by that tyrant nation of the ancient world, by means robbed from its subject provinces, and adorned with the corrupted art of the intellectual Greeks it had enslaved, while it had comparatively spared the still older ones they had sought to copy and emulate. Necessity, therefore, as well as inclination, led to the pursuit of investigations among the relics of the more refined and artistic nation of the two. Having referred to the causes which enabled so small a country as Greece to exercise power and influence over the whole world, the author added that even in Greece, when we tried to realise the effect of the art and culture of its inhabitants, we found a portion only of the columns of temples supporting broken entablatures of roofless ruins, melancholy scenes of wreck, surrounded by a litter of fallen stones and a *débris* of rubbish. Time and violence had rendered it scarcely possible to gather a clear impression of what those fabrics were when entire. We could just recognise in their shattered bas-reliefs and multilated carved ornamental details a perfection of design and execution which compelled us to acknowledge that, at least in architecture, the Greeks attained to a point of refinement and excellence almost eluding comprehension. Finding, as we did, the marble of their temples bleached by the exposure of centuries, or toned with stains wrought by rain and sunshine, or clad with Nature's livery of mosses and lichen; while as artists we rejoiced in the hues which thus gilded their decay, we failed altogether to realise the decorative colouring and finish they were originally intended to receive. Further than this, we were so misled by historical and archæological sentiment, and by the charms of their ruined state, that we forbade ourselves even in theory to indulge in a dream of their restoration. But a Classic casket was not the cold and formal object that we had been content to regard it. The frigid purity and prosaic symmetry we fancied to have been its characteristics existed only in our own imaginations, for the Greeks really valued the achievements of their colourists and painters even more highly than those of their carvers and sculptors. They decorated their buildings with colour so as to make them in harmony with all the brilliant hues of their natural entourage in that bright and sunny clime, and they studiously enhanced the general effect of their buildings by the careful and picturesque treatment of the courtyards, terraces, and other accessories of the sites and approaches to their temples and public buildings. At Agrigentum, in Sicily, there is a series of at least six mighty temples, ranged in a magnificent row, but noticeably not placed parallel with each other, along a vast irregular rocky platform, between the sea and the plain on one side and the city and the hills on the other, the whole being visible from the port, and most imposing in effect. The temple of the so-called Juno Lucina, was placed at the south-east angle of the city above a steep declivity to the south. The late Viollet-le-Duc, in one of his lectures, gave an ideal restoration of this temple upon its platform with its approaches, in order to show how admirably and picturesquely all the natural accidents of the site were emphasised and improved with the skill of a landscape-gardener as well as that of an architect, and to this was added, on a nearer approach to the city, that of the sculptor and colourist. It was necessary to repair to Athens, however, to gain a glimpse of the most precious casket of the finest jewels of Greece. The best view of the Acropolis of that city (of which a general view was here shown) was from the monument of Philopappus. Thence this mighty crest reared by nature and moulded by art stood up, bearing aloft its several noble temples, with but a single entrance through its Propylœa, it being everywhere else surrounded by a precipice fortified by steep walls. By this majestic gateway, through which a grand flight of steps gave access, after passing through a portico and an avenue of columns, flanked on either side by a small temple. Five gateways, guarded by massive bronze valves, opened beneath the shelter of another portico upon the area and level of the platform of the Acropolis itself. A series of views of the Propylœa were shown; the walls, the steps, and central inclined plane, and the avenues of columns being shown to be traceable in every part, although partially destroyed. This portal, through which the great Pan-Athenaic procession entered the Acropolis, was the work of the architect Meniscles, 437 B.C., and was completed in the short space of five years. The first thing seen after entering the citadel, was the colossal statue, 40ft. high, of the goddess Minerva Promachus, which was the work of Phidias, and was visible to sailors as they approached the harbour even above the roof of the Parthenon itself. But, as the Acropolis was the centre of Athens, so was the Parthenon the central object of that sacred inclosure, and towards it moved the periodic processions of the Pan-Athenaic jubilees. The building, of which a large water-colour restoration was shown, as well as numerous photographs exhibiting its actual condition, was in fact a framework for the display of works of art of the highest character, both of sculpture and of painting combined. As a framework it was the very embodiment of practical commonsense, and yet instinct with refinement in proportions and details. No attempt was made to awe the spectator by colossal scale or immensity of mass, nor to dazzle him by overwhelming richness and elaborate profusion. It addressed itself to the reason and good taste of humanity in all things. First, in point of scale, it was in character and harmony with that of the human beings who were to be its occupants, and yet for impressiveness it was ample. Then, as to position, it was not set on the Acropolis, as the Romans would have set it, centrally, and with its axis parallel to that of the area, nor was it opposite the Propylœa; but it was placed on the southern side of the inclosure and obliquely, so as to present itself to those entering the citadel, in perspective, exactly in the point of view which would now be selected by an artist or photographer. Next, the design of the structure was entirely consistent with the material, marble, of which it was constructed. The lecturer thought that the prevalent notion that the Greek temples were imitations in stone of wooden constructions was not supported by the facts, nor was it probable that such matter-of-fact men as the ancient Greeks would have carried to such an absurdity a fancy at once puerile and unnecessary. They made the inclosure walls of the cellæ of temples of undisguised masonry, economically arranged with coursed ashlar, of blocks of quite moderate size. Needing, however, for the shafts of the surrounding colonnades, and for the architrave lintels spanning the openings between the columns, larger stones, they roughly prepared the former at the quarry, in that convenient cylindrical form (in which many unfinished blocks might be still found undetached from their original rock), to allow of their being rolled thence to the site of the temple. The columns were afterwards dressed in a tapering form to insure stability, and were left without bases, to avoid impediment to the feet of worshippers. They were then fluted, to soften the play of light and shade upon their surface; and also to emphasise, by their vertical direction, the weight-bearing office of the column. The echinus moulding (of which an enlarged photograph was shown, as well as many of the other details described) of the capital was designed to catch reflected light from the ground, and also to soften the shadow on the abacus, while its upper edge, left intact, formed the bed for the architrave stones to lie upon and to be brought into their places by temporary guiding beams. Then the plain, unbroken breadth of the architrave well expressed the repose of a horizontal feature, and the metal shields charged upon it were seen to be evidently independent of the structure. The delicate guttæ along its upper edge enhanced these qualities. The frieze in its turn of the necessary order of alternation was composed of vertical supports for the horizontal cornice above, the office of the triglyphs being emphasised by the channels on their surfaces. The metopes between, having no constructive duty, were charged with sculpture as decoration, and the composition of the groups of figures (struggling centaurs and Lepithæ) in them were studiously treated with the main lines in a diagonal direction in contrast to those of the triglyphs. The cornice was the double of the architrave, as was the frieze of the colonnade, and was enriched with horizontal lines with mutules and guttæ between. The simple fascia of the cornice by its repose fitly crowned the composition. Such was the main structure of the Doric temple, the ideal of architecture, wrought out so reasonably and consistently, with such perfection of proportion and refinement, and such evident fitness for its purposes, that it had been accepted by the world as the model of architectural excellence. True, the need for the order had passed away, the cella wall had come to the front; and the Doric consequently had become a dead language, but one to be studied by the architects of all time, as its grace and refinement and its perfection of adaption, though for purposes that have been superseded, must live for ever. By a reference to the photographic illustrations, Mr. Seddon indicated the subtlety of the optical refinements introduced into the Parthenon, the almost imperceptible upward curve of the centre of every horizontal line in frieze, pediment, cornice, and pavement, and the entasis given to every column as a proof of the high pitch to which artistic culture was carried by the Greeks. They developed the Doric so fully that they might almost be said to have invented it, although the archæologist might find in Egypt the groundwork of the idea. It was used specially for the most stately temples, and employed as the casket for gems of sculpture fitly placed in the external metopes around the whole internal frieze, and in the tympana at the ends of the building. What these jewels resembled we know from the examples misplaced, because out of place, but happily safe in our British Museum. Upon this Acropolis were other caskets less imposing and majestic than the Parthenon, but hardly less valuable. They served to show the versatile character of the Greek mind and its excellence in another way, and in lighter fashion. The group of three small temples called the Erectheum, was contemporary with the Parthenon and built by the same architect; it bore much the same relation to that temple that St. Margaret's church did to Westminster Abbey, giving additional dignity by force of contrast to the larger and more important structure. This minor monument of the Acropolis was not placed with its axis parallel to that of the Parthenon, but inclined obliquely towards it, so as to allow its flank to be seen together with that of its neighbour, and to bring into prominent view the charming little transept-like portico of the Caryatidæ. Three temples were most artfully combined in this group and adapted to fit an irregular site, both as regarded plan and levels. The temple of Erectheus presented a hexastyle portico at the end of the main building which might represent a nave, and a tetrastyle portico formed a transept, while on the opposite site was the bijou of a portico supported by female figures, all differently disposed in attitude and advancement. One of these figures was now in the British Museum, its place being occupied by a terra-cotta substitute, and the marble, as would be seen by the photograph, had been structurally repaired with ill-fitting blocks of marble from other buildings. In conclusion, the lecturer exemplified the greater richness of the Ionic over the Doric order by means of numerous examples of casts, and referred to the essential differences between Greek and Roman sculpture.

At the conclusion of this address, in acknowledging the applause with which it was greeted, Mr. Seddon said the next lecture would be given six weeks hence, on Tuesday, the 25th of May.

QUANTITY PRACTICE.

MR. CECIL GEO. SAUNDERS read a paper on "Quantities and Quantity Practice," before the members of the Institution of Surveyors, on Monday evening. In his opening remarks the author corrected the popular notion that the employment of building surveyor, and his careful enumeration of minor matters in the quantities, increased the cost of a building. Such was not necessarily the case; on the other hand, the provision of quantities enabled the builders tendering to make a more complete and uniform estimate, by the basis for prices afforded; and, still more important, the quantities gave opportunity for an exact computation of extras and omissions in the final settlement of accounts. Where the builder took out his own quantities, he was practically in command of the situation when the deviations from the original designs and descriptions were reckoned up. Turning to the education and training of the young building surveyor, the author traversed the idea that practical work at the carpenter's bench or the mason's banker was good preliminary practice, maintaining that the time spent in actual work of this kind might have been more profitably employed in observing than in performing mere manual operations. The study of buildings in course of erection was useful to the student, but the best help in giving a good style in taking out quantities was to measure up works. The pupil must, however, begin at the beginning; the drudgery of squaring dimensions accomplished, he might be advanced to the duty of abstracting, and then to writing the bills, always bearing in mind the ultimate object of the operations: that the dimensions formed the details for the abstract, and the abstract the basis of the bill; and that the completed bill had for its main, almost only, object, the saving of labour in pricing. In proportion to the size and apparent simplicity in a building was the necessity for minuteness in every detail of the quantities, as each feature of repetition had to be multiplied many times, and initial error would be serious. Having explained the differences between the modes of taking quantities adopted in different parts of the country, the author remarked that, as a rule, provincial surveyors were believed to make shorter work of their quantities than their metropolitan brethren. In two or three respects, however, it was questionable whether London building surveyors were sufficiently explicit, as, for example, in the scantlings of timbers. From architects, surveyors welcomed either a very full and complete specification without detail drawings, or a very carefully-prepared and elaborate set of drawings, accompanied by a terse specification; for either of these afforded a ready means of arriving at absolute accuracy. The usual cause of the occasional taking of quantities "fully," *i.e.*, with undue liberality to the builder, was the ambiguities existing in the drawings and specifications, conjoined, in some cases, to want of experience in the surveyor; but the author warmly combatted the statement made in a paper recently read before a professional society (the R.I.B.A.), that it was "a common practice for builders to take 5, or even 10, per cent. off the amounts of their bills when moneyed out, before sending in their tenders." As to the liability of the surveyor for inaccurate quantities, the author said that it was beyond contradiction that he was liable to the builder who paid him; but argued that as in law there could be but two parties to a contract, the surveyor could only be held liable to the employer if the latter commission for quantities direct, and in that case there would be no liability towards the builder. This, he held, was the correct legal view of the matter, although the moral obligation on the surveyor to supply correct quantities extended equally to the builder and to the employer. The question of the party responsible to the surveyor for his commission was a nice one where the works estimated for were not carried out, much depending on the special circumstances of the abandonment. The author was not in favour of allowing the architect to take out his own quantities, as there were dangers of his putting a less liberal construction on the drawings and specifications before the contract was signed than afterwards, of his delegating the function to a clerk, or, where this did not happen, the artistic and prosaic qualities necessary in a designer and surveyor were not often equally combined in the same man. The advantages of the system of making the quantities the basis of the contract, a plan which had been highly advocated, were doubtful. It relieved the surveyor from the necessity of actual and careful accuracy, and facilitated the introduction of extras, so that the employer was less certain of the amount of his ultimate outlay than should be the case; beside which the builder might reasonably claim to have the whole of the works measured, treating the quantities simply as a schedule of prices, and thereby increasing the cost of the building by the amount of commission for measuring it. Occasionally, if time were so great an object that quantities could not possibly be got out, it might be useful to prepare approximate quantities, treating them as a schedule of prices, and basing the contract upon them; but the time so gained would probably be paid for in the increased cost of the building.

BLISTERING OF PAINT AND VARNISH.

MANY are the opinions expressed regarding blistering, and although some very sensible theories are advanced, we are inclined to believe that the bottom of the subject has never been reached. We hold an opinion of the cause of this trouble, and it may be that this opinion has been forestalled by others; but as we have never seen the points laid down in print, we present them here. Blistering of a varnished surface, after the varnish has had proper time to harden, is due to the evaporation of moisture which lies confined under the shell of varnish. This evaporation is caused by heat, and it is seldom, if ever, a blister will rise upon a varnished surface without the temperature is raised to an extreme degree, near to that which the varnish received in its manufacture. The accumulation of moisture *under* the varnish may be brought about in several ways; the most particular one being in the closing in of moisture in the rough stuff. During the rubbing of the rough stuff the water used is partly absorbed, and unless due care is taken to give ample time for "drying out" before the application of subsequent coats, a great amount of moisture will be confined within the cells of the rough stuff. Boiled oil contains moisture, as of water, and in cases where steam is used to express the oil from the seed this percentage is increased. Turpentine, an extremely volatile liquid, also forms an evaporating substance which is rendered active by a slight heat, and in its haste to reach the air it disturbs the outer surface, either lifting an elastic coating into bubbles or blisters, or bursting open a hard and inelastic one into cracks. The primary cause, then, of blistering is moisture either in the form of wet moisture or of evaporating liquids, such as turpentine. The wood may be unseasoned, or it may have been wetted in the course of preparation, such as steaming to bend, etc. The rough stuff water may have been applied before the evaporation of liquids had taken place; either of which would bring about disastrous results.

"Dry blistering" is simply the hasty absorption of the liquids from outer coats by putty or paint which is expressly porous, depriving the coating of the requisite amount of binding and adhesiveness. To prevent blistering, close up every lurking place for moisture and be careful to have each coat dry before applying another. —*American Coach Painter.*

COMPETITIONS.

Eastbourne.—With regard to the recently-decided competition for the new public buildings at Eastbourne, we notice the *Eastbourne Standard*, of Saturday last, says, after reviewing the designs:—"Of course, the definite choice of a plan for the purpose of carrying out the construction has not yet been finally settled, and it is not at all improbable, after all, that the Board may think fit to call upon their worthy building surveyor, Mr. Schmidt, A.R.I.B.A., to submit a design, and subsequently carry it out."

Exeter.—The Governors of the High School for Girls last week accepted the plans of Messrs. Hayward and Sons, architects, for the new school buildings which are to be erected in the Barnfield. Fourteen sets of plans were received, and the Governors appointed Mr. Robson, architect of the London School Board, to act as their assessor. Mr. Robson made a selection of five designs for further consideration, and to report upon. Acccording to a local paper he ultimately selected two dissimilar designs, bearing different mottoes, both of which had been sent in by Messrs. Hayward and Son, and recommended them for the first and second prizes offered. From a slightly different account given in our correspondence columns by one of the competitors, it would seem that for some reason the Governors decline to give the names of some of the successful competitors.

Hull Borough Lunatic Asylum.—A meeting of the Asylum Committee of the Hull Corporation was held at the Town Hall on Wednesday week. The Town Clerk reported that he had written to the Lunacy Commissioners, pursuant to the committee's resolution of the 11th ult. The Chairman read the following reply:—"Office of the Commissioners in Lunacy, 22nd March, 1880.—Sir,—I have laid before the Commissioners in Lunacy your letter of the 11th March, and am to request you to inform the Committee of the Town Council that the Commissioners must decline to receive a deputation from the committee having for its object to urge the Commissioners to recommend to the Secretary of State a set of plans other than those submitted by the responsible authority, viz., the Committee of Visitors. The arrangement by which the providing an asylum is thrown upon the Justices of the borough, while it rests with the Corporation to supply the funds, may be an inconvenient one, but it should be borne in mind that this divided jurisdiction exists in consequence of the Town Council never having under the repealed Act of 1845, or under section 129 of the Act 16 and 17 Vict., chapter 97, given notice to the Secretary of State of their intention to take upon themselves the duties of the Justices. At the same time the committee may rest assured that the plans now before the Commissioners, submitted by the Committee of Visitors, will receive a searching examination at the hands of the Commissioners, who, while requiring thorough efficiency and suitability, will by no means lose sight of economy.—I am &c., C. S. Percival, Secretary."—On the motion of Ald. Leak, seconded by Ald. Chapman, it was resolved that the committee express their regret that their exertions had failed in inducing the authorities to consider and examine the plans of "Lucidus Ordo" which, if adopted, would, in their opinion, answer all the requirements of the Lunacy Commissioners and effect a great saving of the ratepayers' money. The committee having exhausted all the means in their power to procure economy, desire it should be placed on the record that an increased expenditure of £8,000 to £10,000 would be caused by the magistrates and the Lunacy Commissioners; and, in the face of the strenuous opposition of this committee of the Council, that the laws relating to asylums, which now enable persons irresponsible to the ratepayers to expend money and charge the same on Corporation funds, should be so altered as to vest the expending power (subject to proper control) in the chosen representatives of the people who have to pay.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

British Archæological Association.—The ninth meeting of the session was held last Wednesday week. Mr. H. Syer Cuming, F.S.A. (Scot.), in the chair. Mr. Irvine reported the discovery of a large number of 14th-cent. tiles during the restoration now in progress at Bangor Cathedral; many of these are of great beauty. Mrs. Moore Hyde exhibited a large number of early newspapers showing in a remarkable manner the rapid progress of journalism. The discovery of a Roman Villa near Brading, Isle of Wight, was announced by Mr. J. Henry, B.A. The site is on Norton's Farm, and already a tesselated pavement and several continuous walls have been excavated. Mr. R. Blair described a small Roman altar which has been found at the Lawes, South Shields, the site of the recently-discovered Roman Station. Mr. Loftus Brock, F.S.A., exhibited a large number of fragments of Roman fictile vessels found in London, and remarkable for indicating various classes of pottery made by that people. One of these had a potter's mark, in cursive characters, which was at first taken for Hebrew. Mr. Chas. Warne exhibited some Etruscan objects of great interest, one being the attenuated figure of a warrior, and intended to represent his departed state. Various other objects were

exhibited by the members, and among these were two pewter measures by the Rev. S. M. Mayhew, one being inscribed "Timothy Buck at ye Fountain in Portugall-street against ye playhouse," and the other with the name of "R. Yeo, at ye Blew Lattice in Ship-yard within Temple Bar." Many interesting records of the old playhouse were noted, and Mr. Lambert called attention to the marks on early pewter work. The first paper was by the chairman, who traced the history of lady's work-bags, and indicated the amount of interest and information that might be obtained from these articles, which were now in less use than formerly. The lecturer illustrated his remarks by the exhibition of several examples of English and foreign work; one of 17th-cent. date was elaborately worked in crewels. The second paper was by the Rev. Prebendary Scarth, on a series of sepulchral inscriptions brought from Italy, and now at Rookwood House, near Llandaff. The importance of making collections of inscriptions in private possession was dwelt upon, as it is to be hoped that the paper would be but one of a series. In conclusion, Mr. Lambert referred to the impending removal of the old buildings opposite Lambeth Church.

Building Intelligence.

Bristol.—The Mount Pleasant Baptist Chapel, which has been erected at the foot of Air Balloon-hill, Hanham-road, St. George's, Bristol, was opened for Divine worship last week. The work was commenced in November last, the drawings having been furnished by Mr. Poole. Mr. E. Gay, of Thomas-street, Bristol, was chosen as builder, the amount of the contract being £450. The style of the chapel is Pointed Gothic. There is a porch at the entrance, and on each side and above are traceried windows, the one over the door being circular in shape. The stone used in the building is Pennant, with Bath-stone dressings. The roof is an open-timbered one, and the seats are of deal with pitch-pine ends. The accommodation is for 300.

Bullinghope.—The new parish-church for Bullinghope, near Hereford, was consecrated on Thursday, the 8th inst. It consists of nave, south porch, chancel, organ-chamber, and vestry, and is in the Early English style. The extreme length from east to west is 61ft., the nave is 19ft. 6in. wide, and the chancel 14ft. 6in. The walls are built of native stone, and the dressings are of Bath-stone. The roofs are covered with Broseley tiles of a warm colour. The seats in the nave are of pitch-pine, the pulpit and chancel fittings being entirely of oak. The floors are laid with tiles supplied by Mr. Godwin, of Lugwardine, those of the chancel being patterned. There is a double bellcote over the western gable. The heating apparatus is Haden's. The architect was Mr. Kempson, of Hereford, the contractors Messrs. Wingates and Sons, of Gloucester. Mr. Robert Clarke, of Hereford, executed the stone carving, and Messrs. Hall, of Bristol, the glazing. The total cost has been about £2,000.

Elmore, Gloucestershire.—The large parish church of Elmore was reopened on Wednesday week, after restoration, from the plans and under the superintendence of Messrs. Waller and Son, diocesan architects, of Gloucester. The church was damp and dilapidated, and, on stripping the heavy Forest of Dean stone tiles from the roof, it was found the timbers were too decayed to be reused. The walls were strengthened, the stucco removed, and new roofs with modern tiles put up; a bed of concrete has been laid over the whole site of the church, the earth lowered from outside, and drainage provided. The passages have been refloored with tiles, and the parts under the seats with wood. The tower and north and south porches have been restored. The floor of chancel has been laid with tiles in patterns, by Godwin, of Lugwardine; the metalwork of altar-rail is by Messrs. Hardmans, of Birmingham; the roof of chancel has been panelled in wood; and a new font, exactly modelled after that in Tickencote Church, Gloucestershire, has been given by Sir Wm. Guise, who has also filled the east window of north aisle with stained glass. The tower arch has been reopened to the church, and a Gurney's stove is provided for warming the building. A new pulpit, prayer-desk, altar-table, rails, and choir-stalls have been provided, all carved by Mr. Henry Frith, of Gloucester. Mr. Gyde, of Painswick, has carried out the work, at a cost of £1,500.

Gloucester. — The church of St. James, Gloucester, was reconsecrated on Friday, after the addition of an aisle and chancel. The church, which was formerly known as the Barton church, was designed by Mr. Sampson Kempthorne, architect to the Poor Law Commission, and was built in 1837-41, at a cost of £2,800, and was a remarkably plain structure. An aisle, 71ft. by 12ft., has been added, separated from the nave by timber pillars and arcades, resting on stone bases; the roof is of timber, stained a dark oak colour. The chancel has aisles on either side, one of these containing the organ, and there is also a new vestry. The floor is paved with encaustic tiles, and there is a low Communion-rail with oaken top. The organ has been repaired and enlarged by Mr. Williams, of Cheltenham. The church is newly seated throughout with varnished pitch-pine seats; the pulpit has been lowered. The older part of the church has been restored, and the bell-turret enlarged. Messrs. Waller and Son, of Gloucester, are the architects; Mr. James Clutterbuck was the builder; Mr. Pimm carried out the decorative painting, and Mr. Henry Frith the carving. The cost has been £2,200.

Huntspill, Somersetshire.—This exceedingly fine church, which some of our readers may remember was destroyed by fire, within 12 months of restoration in 1878, has once again been renovated; and was reopened on the 8th inst. Fierce though the conflagation was, the walls of the structure and the arcades withstood the devouring element fairly well. The roofs and all internal fittings were, of course, totally consumed. The stone used in the building is the well-known local Ham-hill stone. That is a cream-coloured material, but, in the present instance, the fire has burnt it a warm red, like Mansfield stone, and the general effect obtained thereby is exceedingly happy. Following the course of the fire, the exterior of the building has not been interfered with, save, of course, that the new roofs, of somewhat flat pitch, have been covered in with red tiles. The interior of the church is very striking, and the roofs show a wealth of ornate woodwork. They spring from stone corbels having angels, &c., carved on them, and the hammer-beams all terminate with sculptured figures. Those in the chancel represent angels with wings up-lifted bearing musical instruments, and forming a celestial choir, whilst along the nave-roof angels are carved in attitudes of prayer and devotion, and with their wings down in repose. The chancel wall-plates are enriched with pierced tracery and patera, and the various purlins and ribs also carved patera at frequent intervals. In the nave-wall plates pateræ are introduced, and above is a continuous cresting of Tudor ornaments. The aisle-roofs, being lean-to ones, are moulded and panelled, and stopped at the intersections by crow's-footed bosses. The walls are stuccoed, and left the pleasant natural warm tint the local sand gives, and which harmonises well with the surrounding stone-work. The various avenues in the nave and aisles, and the floor under the tower, have been laid with Minton's tiles of ornamental design. The reredos is of red Corsehill stone, and consists in the main of seven continuous and groined arcades. The projecting ogee arches are crocketed, and have their finials running into the projecting cornice above, a pierced cornice surmounts the whole. Immediately over the projecting re-table of polished Devonshire marble, are sculptured representations of the four Evangelists, with Alpha and Omega in circles at either end, whilst forming pendant terminations to the arcades above, are a row of flying cherubim. In the centre and standing upon the re-table, detached from the back, is a cross of pure white marble having foliated ends, and standing upon three steps. The pulpit is an old-fashioned Jacobean one of black oak, saved from the fire, but not originally belonging to this church. Under the tower stands the new font, supposed to be of Norman design. It is circular, and of Portland stone, resting upon an octagonal step of blue lias stone, and is the gift of Sir Edmund Beckett, by whom, also, it has been designed. The stone reredos and the oak stalls are the work of Mr. Harry Hems, of Exeter, who has also carried out the stone and wood carving throughout the church generally. The contractors for the restoration were Messrs. Brock and Bruce, builders, of Bristol. The work has been executed from the design, and under the immediate superintendence of Messrs. Hans Price and Wooler, architects, of Weston-super-Mare. Mr. James Bool, formerly of Bristol Cathedral, was the clerk of works. The present expenditure has been about £5,000.

Northampton.—A new Primitive Methodist chapel, at Northampton, was opened on Tuesday week. The church, schools, and outbuildings cover a superficial area 128ft. 6in. long by 45ft. wide. Stone is used for the finishing off of the buttresses and weatherings. The remainder is of red pressed bricks, with the exception of the side walls, where pilasters of white bricks divide the windows, and are used for the cornices. The chapel and schools were designed by Messrs. Kerridge and Sons, of Wisbech, and the entire work was carried out by Mr. T. Cosford, builder, of Northampton, Mr. Gray superintending the carrying out of all the details. The contract was £4,249.

Stanway, Essex.—St. Allbrights' Church, Stanway, near Colchester, was reopened on Thursday after complete restoration. The plans were originally prepared by the late Sir Gilbert Scott, and since his death the works have been carried on by Mr. J. Oldrid Scott. A new aisle and north porch have been added to nave, the chancel has been rebuilt, the gallery at west end removed, and the pews—which were so high that Bishop Claughton said, some two years since, that when blessing the congregation he never saw one of them—have been removed, benches and chairs being substituted. The most interesting features brought out by the work have been the Norman door on the north side, apparently built of re-used Roman bricks, a piscina in good state of preservation, and a monumental stone of the 13th century, found when making the gutter round the church. Two arches, and their columns, from the old church of St. Runwald, which till recently obstructed the centre of the High-street of Colchester, have been used in the arcade to new aisles, having been presented by Mr. Henry Jones, of Shrublands, Colchester. Ninety sittings have been added to the church. The contractor was Mr. G. Dobson, of Colchester, and the cost has been £2,100.

CHIPS.

The committee for completing Emmanuel Church, Mannahead, have accepted the tender of Mr. Philip Blowey, of North Buckland, near Horrabridge, to add within 16 months a chancel, two transepts, vestry, and organ-chamber for the sum of £3,060. The works are being commenced this week, and by the additions 400 more sittings will be provided. The erection of the tower is postponed for want of funds.

The Kea School-board opened their first new school at Kea, about a mile from Truro, last week. The schools are in the Elizabethan style, and all the designs are of wrought granite. Accommodation is provided for 130 children at a cost of £2,500. Messrs. Odgers and Mitchell, of Scorrier, were the contractors, and the architect was Mr. James Hicks, of Redruth, who has also prepared plans for a school to be erected by the same authority at Balhu to accommodate the children of the western part of the district.

The chancel of the parish-church of Gislingham, near Beccles, was reopened on Sunday week after restoration, the works including removal of plaster from external walls, pointing of stonework, new roof, laying of tesselated paving tiles, the provision of oak benches for choir, and addition of carved figures of the Evangelists to the reredos.

New bank buildings, erected for Messrs. Bain, Field, Hitchins, and Co., at Redruth, were opened for business last week; and a post-office in the same block of buildings is nearly completed. The buildings are erected on the spare ground of the market-house, and are fronted with wrought and moulded granite. Adjoining is a new mining exchange on one side, and a coffee-tavern on the other. Mr. James Hicks, of Redruth, is the architect, and Mr. J. P. Berry, of Plymouth, the builder of the central block.

On p. 426, the name of "Mr. Stock" was given in a "Chip" taken from a local paper, as the architect of Little Easton Church, reopened on Easter Sunday. Mr. J. Clarke writes to us that he is the architect, and his work is still going on there.

More than Fifty Thousand Replies and Letters on subjects of Universal Interest have appeared during the last ten years in the ENGLISH MECHANIC AND WORLD OF SCIENCE, most of them from the pens of the leading Scientific and Technical Authorities of the day. Thousands of original articles and scientific papers, and countless receipts and wrinkles embracing almost every subject on which it is possible to desire information have also appeared during the same period The earliest and most accurate information respecting all new scientific discoveries and mechanical inventions is to be found in its pages, and its large circulation render its the best medium for all advertisers who wish their announcements to be brought under the notice of manufacturers, mechanics, scientific workers, and amateurs. Price Twopence, of all booksellers and newsvendors. Post free 2½d. Office: 31, Tavistock street, Covent-garden W.C.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. Passmore Edwards.

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Front Page Advertisements and Paragraph Advertisements 1s. per line. No front page or paragraph Advertisement inserted for less than 5s.

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To American Subscribers.—Mr. W. L. Macauley, of 23, Dey-st., New York City, is authorised to receive subscriptions for the Building News. Annual rates, 6 dols. 40c., gold.

Cases for binding the half-yearly volumes, 2s. each.

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N.B.—Cases and vols. must be ordered through a bookseller or newsagent, as the regulations of the Post-office prevent them from being sent by post.

Received.—J. L. A.—B. L. Co.—B. U.—C. P.—J. C.—J. J. C. and Son.—E. S. H.—B. of O. D.—H. S.—G. A. B.—T. B. I. Co.—A. L.—G. H.—N. E. Ry. Co.—J. A. Y. and Co.—W. F. W.—R. B.—F. W. and Co.—E. D. C.

"BUILDING NEWS" DESIGNING CLUB.

Alpha. (There is no examination required to compete for prizes. You are eligible as a member.)

Drawings Received.—B. in square, Fleur-de-lis, Bos in circle, Sagitta, Steffano.

Correspondence.

FIREPROOF FLOORS — CONCRETE SUPERSEDED BY BRICK.

To the Editor of the Building News.

Sir,—Your correspondent, Mr. Reid, in your last issue observes:—"If Mr. Hyatt would kindly favour your readers with a few particulars as to the quality of the bricks, cement, &c., they would then be enabled to judge of the results obtained." Messrs. Edwards and Symes have just replied to me with reference to these points as follows: "With regard to the stock bricks and cement, they were (as you know), *ordinary stock, nothing special;* and the cement the best we could get, made by Messrs. Pass, and Co., Isle of Dogs."

With reference to the American experiments alluded to in my former communication, the sections were made at New York, in the fall of 1878, and the final tests of breaking were made when the samples were about eight months old. The cementing materials used were best English Portland cement, in some of the sections, and American "plaster of Paris" in others. The bricks were cheap American red bricks, worth five dollars (one pound) a thousand; size of bricks, 4in. by 8in. by 2½in. Of these materials, *cement* and bricks, a brick beam 2ft. by 11ft. 11in. by 13in. depth at centre, and 11½in. at the ends, was made with a gridiron tie composed of nine blades or bars, each 1½in. by ¼in. The beam had a clear span of 11ft. 1½in.; the load was applied at the centre, upon a bearing-block 1ft. square; the deflection, regular, and constant, from ¼in. at 5 tons, to 1⅜in. at 16 tons, when the beam gave way by the crushing of the bricks. Perhaps your correspondent "A. C. P." will be able on this data to solve his "open question."

Seven small floor sections, each 5ft. 11in. by 2ft. 2in., were made of bricks laid on their edges, the thickness of flooring being consequently 4in., except an increase of 1in. at the centre, made by a layer of the cement in the case of four out of the seven samples. The clear span of these sections was 5ft. 2in. in each case. The gridiron of tie-metals was composed of ten "knowing blades" each 2in. by ⅛in., very tiny fellows, but very "magical." One of the sections, 4in. thick, bricks joined by Portland cement, at 2 tons deflected ⅛in., at 4 tons ¼in., at 7 tons 7-16in., and gave way. The other two sections of 4in. thickness, bricks cemented with *plaster of Paris* gave results as follows:—One of the two at 3 tons deflected ¼in., at 5 tons ½in., at 8 tons 9-16in., and gave way. The other at 1 ton deflected 1-16in., at 5 tons deflected ½in., and gave way. Two sections, bricks cemented with *plaster of Paris* 5in. thick at centre, 4½in. at the ends, each with 1 ton deflected ⅛in., 3 tons ¼in., 5 tons 5-16in., 6 tons 7-16in., and one gave way; the other at 8 tons deflected ⅝in., and gave way. The remaining sections, two in number, bricks united with *Portland cement*, each one 5in. at centre, 4½in. at ends, behaved as follows: one of the two at 2 tons deflected ⅛in., 4 tons ¼in., 6 tons ½in., and showed signs of distress at joints on the underside; at 7 tons deflected ⅝in., at 8 tons ¾in., at 9 tons 1in., and gave way. The other one, with 2 tons, deflected 1-16in., 3 tons 3-32in., 4 tons ⅛in., 5 tons 3-16in., 6 tons ¼in., the weight being now removed, the floor returned to its original level; at 7 tons 5-16in., 8 tons ⅜in. (the section now showed signs of distress on the underside at the joints, but no indication of cracking at the top), at 9 tons deflected 7-16in., at 10 tons ½in., and gave way. In each of the seven sections a fair 6in. of flooring remained uninjured on each side of the destroyed centre portion of the floor, the part actually broken down being a width of 14in. only, out of the 26in. composing the width of the section. Possibly these *facts* may "surprise" Mr. Reid now, as much at they did me at the time.—I am, &c., Thaddeus Hyatt.

21, Addison-gardens North, Kensington, W.
April 13th.

ARCHITECTURAL SCANDALS.

Sir,—We wish, as briefly as possible, to reply to the several points raised by Mr. Ellison, in his answer to our former letter.

He begins by referring, with easy contempt, to our desire to intimate to your readers that we at once knew him to be the author of the letter signed "Architectus," the fact being that he, of his own free will, furnished us with the information. The following extract from our letter to you, requesting the name of the writer, will, we trust, satisfy his doubts on the point. "We have reason to believe that we know the name of the writer of the letter referred to, and as this is the climax of a series of attempts to do us injury (through mere jealousy), we are bound to put an end to such conduct. No one in this neighbourhood but the person we have in view would have called attention to the case, because the facts were sufficiently well-known here and in Liverpool, to justify our action in the matter." In reply to this letter, we immediately received from you the manuscript of the letter signed "Architectus," with the author's name attached, and we trust that the application will have been sufficiently clear for Mr. Ellison's liking.

We will next refer to Mr. Ellison's account of the explanation given by our Mr. Murray, on the occasion of his signing the examination paper. Mr. Murray begs, shortly, to say that it is simply and absolutely untrue. Indeed Mr. Ellison was so satisfied that our action was not contrary to the rules of the Institute, that he signed the nomination-paper, and then requested Mr. Murray to assist him in a professional difficulty. Mr. Ellison knew perfectly well that the application to the Guardians was made with the consent of, and by, both members of the firm, or why did he not, in his letter of the 23rd ult., confine his attack to Mr. Bleakley? How Mr. Ellison contrived, in the first place, under an assumed name, to charge our firm with conduct which he insinuated was discreditable to our profession; to remonstrate with Mr. Murray; listen to and accept his explanation of what he and his partner had done; and then, in the fulness of his heart, acquit Mr. Murray, by declaring him to be a fit and proper person to become a member of the R.I.B.A., we must leave your readers to judge.

We can only reiterate our explanation, and say that we consider "Hirst" an authority, and the division of the full professional fees, as given by him, proves, beyond a doubt, that our action was justifiable.

Respecting our challenge for a mutual investigation before the Council of the R.I.B.A., Mr. Ellison affects to misunderstand our meaning. It was he who attacked our conduct, and as the aggressor, with "25 years' experience" to back him up, he ought readily to accept it. But what are we to think of a professional man who, in the first place, under an assumed name, attacks two gentlemen who served him faithfully for several years, instead of asking frankly and freely for an explanation; and then when he knows that they have demanded, and obtained, his name, declares that he has resigned his Fellowship of the R.I.B.A.—suddenly discovering, in the midst of a controversy opened by himself, that "the advantages conferred on a country member" are not "a sufficient return for a four-guinea annual subscription," vide a letter from Mr. Ellison to our Mr. Murray, dated March 31st.

How far the remark as to his being "a country member" is correct, will be seen from the fact that the day before we received a letter from him, headed 7, Queen Victoria-street, Mansion House. E.C., his London office.

We now leave the matter with your readers.—We are, &c. Bleakley and Murray.

[This discussion must end here. With regard to the first paragraph of the foregoing letter, we have only to say that on receiving Messrs. Bleakley and Murray's letter, we wrote to Mr. Ellison, informing him we considered ourselves bound to give his name as the author, and suggesting that he himself should admit it to Messrs. Bleakley and Murray. Mr. Ellison at once consented to do this, and we believe did so. The subject which "Architectus" called attention to certainly seemed a legitimate one for comment. The course pursued by Messrs. Bleakley and Murray may have been justifiable by the circumstances they have referred to in their subsequent letters, and it is to be regretted that personal feeling has been imported into the discussion. We have received several letters this week, some upholding Mr. Ellison's action in the matter, and others taking the part of Messrs. Bleakley and Murray, for which we cannot find space. One correspondent sends a communication which is, in our opinion, an unfair attack on one of the parties implicated, and would, if printed, certainly expose the writer and us to an action for libel.—Ed. B.N.]

EXETER HIGH SCHOOL COMPETITION.

Sir,—Will you allow the inclosed to appear in your paper?

I think it needs no comment. No thanks are given to the unsuccessful competitors, and they are asked to "send" for their drawings.—I am, &c., Never no More.

Exeter, April 9, 1880.

[Copy].

HIGH SCHOOL FOR GIRLS.

Clerk's Office, 13, Bedford-Circus, Exeter.
8th April, 1880.

Dear Sir,—We beg to inform you that the result of the competition is as follows:—

1. Place aux Demoiselles.
2. Finire querentem labores.

We shall be much obliged if you will allow one of your clerks to call for your set of plans, and to give a receipt for them. We send you report herewith.

The Governers have been informed of the names of the successful candidates; those of the unsuccessful ones are known to ourselves only, and will not be communicated.—Yours truly, John Daw and Son.

GLASGOW MUNICIPAL BUILDINGS COMPETITION.

Sir,—I have not had time to reply sooner to the letter of "M.," and can only do so very briefly now. There is fine unconscious irony in

his remarks that the city architect "has time to quietly study the best arrangement possible," and that, after he has, in the seclusion of the Office of Public Works, produced a plan "superior to the happy-go-lucky result of a competition," the designer of the elevation is to step in, without an invitation, and to "rectify any radical defect in the plan." The defects that are not radical, I suppose, are to take care of themselves.

I would not call any one an architect who could suppose it possible for a satisfactory plan to be produced, in such a case as the present, without elevations and sections, or for satisfactory elevations to be produced to tack on to such a plan. It is not plans and elevations that have to be designed. It is a building, and we cannot separate the outside from the inside without destroying both.

The Lord Provost, as reported in your last, stated that the council "were free to choose the elevations of one architect, and the internal arrangements of another, or, in fact, to come to any conclusion they chose in the matter." Such a notion as this is perhaps excusable in a gentleman who does not know, or profess to know, anything about architecture; but it is not creditable to us that an architect and an "intended competitor" should seriously (I think that he is serious) support the theory that the plans and the elevations of municipal offices can be produced independently of one another.

I do not think the subject is one for argument, but I hope that your correspondent will discover his error before he goes much further with his competition drawings.—I am, &c.,

A Glasgow Architect.

GLASGOW MUNICIPAL BUILDINGS COMPETITION.

Sir,—I hold it would be a great misfortune if any interference now takes place in the terms of the competition. I trust the magistrates will support the Lord Provost and "hold fast faith." The obstruction policy of the local architects seems to me to be grounded on selfish feeling. If Mr. Honeyman is so deeply affected by the faults in the plans, and so anxious for the public welfare, why does he not make and publish a design of his own?

That would be the best proof of his being entitled to credit. The plans are only put forth as sketches, for it would manifestly be unwise to complete them when it is so uncertain how far they may have to be accommodated to the elevations.

I see the faults pointed out by Mr. Honeyman and there are others, but they are all remediable without altering the general arrangement, which, after careful study, I consider to be very good. Of course, amateurs think they know much more than professional men; but I have no patience with people like the Mr. Smith whose utterances are quoted in your last. He says there are too many closets shown. I, as an architect, say there are not enough; and he seems think it witty and utterly condemnatory to stigmatise the design as a "hollow square altogether." If he knew anything of architecture, he would be aware that all large buildings are necessarily "hollow squares."—I am, &c.,

M.

WEAR BAY VILLAS COMPETITION.

Sir,—Can any of your numerous readers give me any information respecting the competition for semi-detached villas on the Wear Bay estate, Folkestone?

I prepared designs according to the instructions issued to architects, and sent them in over two months since, and have not heard anything about them up to the present time.—I am, &c.,

An Old Subscriber.

At the Guildhall, Walsall, on Friday last, H. G Pilshaw, builder and contractor, Bridgeman-street, Walsall, liquidating debtor, was charged at the instance of the Treasury with concealing his goods, with intent to defraud his creditors. Seven separate discoveries of goods between the middle of February and the middle of March were proved, the whole being of the value of upward of £140. Prisoner was committed for trial.

A joint Committee of Essex and Suffolk magistrates last week accepted a tender for £1,883 for the erection of an iron bridge of single span over the river Stour, at Bures, under the superintendence of Messrs. H. Stock and H. M. Ergton, the respective county surveyors.

Intercommunication.

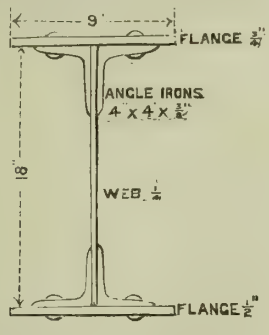
QUESTIONS.

[6094.]—**Late Gothic and Queen Anne Work.**—There are numerous works on Gothic architecture, and as many on Classic architecture, but I am in want of information of one or two works, not highly expensive, which treat of the Elizabethan, Jacobean, and Queen Anne styles, or from the period from A.D. 1500 to 1700. Perhaps some of your readers can kindly inform me if there are such, and the titles or authors' names. Most of the works I have hitherto met with stop short about the time of Henry VII. or VIII. I mean secular rather than Ecclesiastical architecture.—Bayswater.

[6095.]—**Redress Wanted.**—Will any one inform me, from their personal experience, whether legal redress is obtainable in this case? A contract is advertised, and I am, in addition, privately invited to tender by having a copy of the advertisement sent me by post. The usual clause, "lowest tender not necessarily accepted," is inserted. My tender is the lowest, but although it complies in every respect with the printed form of tender, is rejected for the next highest. Will replies kindly quote cases if possible?—Invenis.

[6096.]—**Surveyors' Examinations.**—Can any of your readers inform me where I can get particulars regarding the examinations held by the Sanitary Institute of Great Britain, and also where I can obtain information regarding the conditions of membership, &c., of the Society of Municipal and Sanitary Engineers and Surveyors?—Surveyor.

[6097.]—**Weight of Wrought-Iron Girder.**—In reading over a series of articles which appeared in the Building News in 1873, headed "Quantities," and signed "B. F.," I have met with a difficulty in the chapter specially devoted to "Smith and Founder," on page 610 (May 30th, 1873), which perhaps some of your readers, or possibly the author of the article in question, can explain. The method of calculating the weight of wrought-iron girders is specially dealt with at the commencement of the chapter, and an example is given to assist the explanation—viz., a girder of the following



section, and 20ft. long. The quantities for this girder are also given as under—

	20′·0″	
	1 ·6	½″ web.
(Should be 20′·0″)	22·0	
	9	½″ bottom flange.
	20·0	
	9″	¾″ top flange.
4.	20·0	
	8″	⅜″ angle irons.
6.	60·2½″ × ¾	rivets.

The author, after giving 40lb. as the weight per supl. foot of 1″ wrought iron, leaves the working out to the ingenuity of the reader, but gives the total weight as 12cwt. 1qr 25lb. Is there not an error here? My own impression is that one angle iron only is included, which would explain the deficiency. Including no end plates and no stiffening brackets, I work out the weight as follows—

		Reduced to 1″ metal.
	20·0	
	1·6	
Web.	30·0 × ¼″ =	7·6
	20·0	
	9	
Bottom flange	15·0 × ½ =	7·6
Top flange	20·0	
	9	
	15·0 × ¾ =	11·3
4/	20·0	
	8	
Angle irons	53·4 × ⅜ =	20·0
		46·3
		lb. lb.
		at 40 = 1850

Rivets 6/ 60 = 360
2½ long
720
180
12 900
75·0 × ¾ diam. @ 1½lb. per foot lin. = 112½
112) 1962½
17cwt. 2qr. 2½lb.

No allowance at all is made in the above calculation for rivet holes.—An Old Tory.

REPLIES.

[6085.]—**Book on House-Painting and Decoration.**—Ellis Davidson's "Manual of House-Painting, Graining, Marbling, and Sign-Writing," price 5s., Weale's Series, published by Crosby Lockwood and Co., will be found a reliable book on that part of the subject, and Van der Burg's "School of Painting," price £2 12s. 6d., published in Rotterdam, for which Messrs. Crosby Lockwood and Co. are the London agents, noticed in your paper of April 25, 1879, is, as was there described, a work to be usefully studied by all those who imitate wood and marble, as a comprehensive guide to the art.—A. G. B.

[6087.]—**Local By-laws.**—In answer to "Beta," with regard to the above, the first question in regard to the term "new building" includes, besides dwelling-houses, any building not intended for habitation, which also applies to such building, whether within or without the boundary of premises belonging to the builder. 2nd, "What to be deemed a new building," paragraph 159 of Stratton's "Public Health Act, 1875," gives the following:—"For the purposes of this Act, the re-erection of any building pulled down to or below the ground-floor, or of any frame building of which only the framework shall be left down to the ground floor, or the conversion into a dwelling house, of any building not originally constructed for human habitation, or the conversion into more than one dwelling-house of a building originally constructed as one dwelling house only, shall be considered the erection of a new building." For all new buildings and alterations plans must be submitted to the local authority.—O. M. H. F.

[6091.]—**Furnace.**—The *Journal of the Society of Arts*, published on Feb. 20th of this year (price 6d.), contains a very able and interesting paper by Herbert Guthrie, on "Gas Furnaces and Kilns for Burning Pottery." There is also a very practical chapter on the subject of the burning of bricks, terra-cotta, and stoneware in Part III., on "Materials" in "Notes on Building Construction," published by the South Kensington Committee.—J. Rainey, Nottingham.

[6091.]—**Furnace.**—If "Young Architect" will get "Rudimentary Treatise on Bricks and Tiles," by E. Dobson, published by Virtue and Co., he will get a good deal of information, and if he wants practical trials with clays we will be glad to show him our works, and to assist him in any way in our power.—B. B. T.

STAINED GLASS.

Plymouth Guildhall.—The last of a series of 14 stained glass windows has just been completed in the Guildhall, Plymouth, by Messrs. Fouracres and Watson, of Stonehouse, Devon, who have executed nine of that number. It will be known as the "William" window, and represents the Reading of the Declaration in the Guildhall, proclaiming the Prince of Orange, King William the Third of England. It represents the interior of the Jacobean Guildhall, so wantonly destroyed to make room for Eveleigh's abortion, but of which descriptive particulars are very complete, and William Symons, the Mayor, is reading the proclamation from a carved and canopied oaken bench; the next most prominent figure is the Earl of Bath. The quatrefoils contain the arms of William and Mary, and in the head of the light are the portraits of the Royal pair. An inscription records the fact that the window is "the gift of J. Pethwick, contractor for this building."

LEGAL INTELLIGENCE.

Architects and Contractors.—Hainsworth v. Wright.—On Friday last, before the Judge of the Bradford County Court, an action was brought by Sarah Hainsworth, widow, of Shipley, as the administratrix of her late husband, David Hainsworth, deceased, against Sam Wright, described as an architect, and residing at Church Bank, Windhill. The plaintiff claimed the sum of £2 3s. 6d. for joiners' work done for and goods supplied to the defendant by her late husband. The defendant set up a counter-claim for £2 16s. which he alleged was due to him for certain quantities which he had prepared for the deceased, who had, in his lifetime, contracted to do the joiners' work at a new residence which Mr. William Rhodes required to be built at Harlow Grange, near Harrogate, and in respect of which house the defendant acted as architect.—Mr. T. A. Watson appeared for the plaintiff, and the defendant was represented by Mr. Morgan, of Shipley.—The defendant, in giving evidence in support of his counter-claim, said that the deceased, who was a joiner, had contracted to do the requisite joiners' work at the new residence at Harlow Grange, and had requested him to supply him with certain quantities, which he did. The contract price of the joiners' work was £420, and for the preparation of the quantities defendant was to receive £7 16s. The deceased paid him £5 on account, and said he would pay the balance when he had the money.—His Honour remarked that the defendant had placed himself in a false position by taking money from two parties. His duty as architect was to protect the interests of his employer, but he had also received a commission from the contractor.—Mr. Morgan respectfully dissented from that view. The work which the defendant had done for Hainsworth was not done to the prejudice of his employer in any way, but for the assistance of the contractor for the joiners' work.

—His Honour said the defendant's duty was to see that the contractor's work was properly done. The knowledge which he got of what work had to be done was a knowledge which he should use for the benefit of his employer to check and control the contractor.—The Defendant: It is done by all the architects in Bradford.—His Honour: I have not the least doubt about it. A practice is growing up, and I suppose its existence must be recognised, but it is a mode of taking payment from both parties.—Mr. Morgan: Your Honour has it upon the oath of my client that he is not paid by both parties.—His Honour: He is; he is paid 5 per cent. by the principal.—Mr. Morgan: Not for doing this work. —His Honour: It is his work to protect his principal, but he has been supplying information to the contractor which he ought to have kept for the benefit of his employer.—Defendant: It is supplied for the benefit of the contractor.—His Honour: I know it is.—The defendant further stated that there was an agreement that the deceased should pay him, but he said that he had no money at the time.—His Honour: You acted upon the usual course of proceeding?—Defendant: When the contract was signed he ought to have paid the money.—His Honour: Why?—Defendant: It is the custom of the trade.—His Honour: A custom of a trade cannot be good unless it be reasonable, and a good many things are called customs that are not reasonable, because they are not just.—Mr. Watson remarked that he remembered that some time ago an architect wrote several letters to the *Bradford Observer*, in which he said that, as long as he lived, he would never take that payment.—Mr. Morgan said some might object, but others might not.—His Honour: No man now objects to receive money.—Mr. Morgan: There can be no imputation upon my client.—His Honour: I am sorry, Mr. Morgan, that you do not see my meaning. To my mind the matter is as clear as possible. It was this man's duty to his employer to ascertain what the quantities were, and to check the contractor. Having done that, he says, "I will sell this knowledge for a consideration."—Mr. Morgan: My client was still able to perform his duty to his employer, who knew that these quantities were supplied. I must rest my case upon the agreement between the parties, whatever your Honour's opinion might be.—His Honour: What do you call an agreement? This is a living man speaking against a dead man, and it is evidence which cannot be relied on.—In reply to Mr. Watson, defendant said that when he prepared the quantities he knew that Hainsworth was to be the contractor. Hainsworth was the successful tenderer. Witness prepared a contract, and Hainsworth went to sign it, and asked him to make out a bill of quantities. Witness did so, and Hainsworth said that he could not pay him then, but would do so afterwards.—His Honour remarked that he did not think the question of architects charging for particulars had ever been raised in a superior Court.—Defendant, in further cross-examination by Mr. Watson, said the deceased afterwards paid £5 on account. He gave Hainsworth a certificate for £100, at a time when only from £40 to £50 worth of work had been done.—His Honour commented on the relations between architects and contractors, and said that unless actual fraud could be proved on the part of the architect, a contractor could not recover sixpence except through the architect, whom the contractor bought over by paying him 1¼ per cent. for the particulars.—Mr. Morgan said that, whatever his Honour's opinion might be upon that point, he must rely upon his case as presented to the Court.—His Honour, after referring to the agreement between the defendant, as architect, and Hainsworth, as joiner, pointed out that the provisions of that agreement made the architect the judge as to all moneys the contractor was to receive. The architect was to be the sole arbitrator. The agreement was inherently fradulent. There was a man who was the sole arbitrator in respect of extras, omissions, variation, questions of delay, withholding certificate, &c.—a judge who admittedly took from a suitor a sum of money in payment for that which it was not his duty to supply to the suitor.—Mr. Morgan submitted that that would still leave him free to perform his duty to his employer.—His Honour: No; indeed, no. A man cannot serve two masters. In our present case of degraded morality he may fancy that he can; but he cannot. The defendant must be content with the £5. Those contracts were bad; they were vicious. They placed contractors entirely at the mercy of architects, and a contractor could not recover one farthing unless he could prove that the architect was corrupt, but there was, of course, an immense difference between corruption and refusing to act. —A verdict was entered for the plaintiff, with costs, the defendant's counter-claim being disallowed.

Trade Quarrels.—A labourer, named Joseph Haines, was charged on Monday, at the Highgate Police-court, with pushing down a brick wall, the property of James Tubb, a carpenter, of Hornsey. The complainant stated that having a piece of ground in Myddleton-road, Hornsey, he commenced on Good Friday to build a wall on it, but on the following morning he found his work had been destroyed. As often as he rebuilt the wall he found it pushed down, and ultimately caught the defendant in the act of committing the damage. The motive assigned for the conduct of Haines was that the complainant had done bricklayers' work although he was only a carpenter. The defendant was ordered to be imprisoned, in default of paying 20s. fine and the value of the work destroyed.

Our Office Table.

Amongst the new members returned to Parliament is Mr. John Dick Peddie, who was placed at the top of the poll for the Kilmarnock group of burghs; he is a member of the firm of Peddie and Kinnear, architects, of Edinburgh. Mr. Peddie is not a member of the Royal Institute of British Architects which, since the death of Sir William Tite, has not had a representative in the House, except in the shadowy and ambiguous form of "honorary associates." Mr. Alderman William Lawrence, who represents the City of London, and his younger brother, Sir J. C. Lawrence, re-elected for Lambeth, recently retired from the extensive London building firm of W. Lawrence and Sons. Mr. T. Bevan (elected by Gravesend) is a cement manufacturer at Northfleet; Mr. Sidney Woolf (Pontefract) is an earthenware manufacturer; Mr. R. Arthur Arnold (Salford) was formerly a land surveyor and civil engineer in London, and acted as one of the Commissioners for Public Works in Lancashire during the cotton famine of 1863; Mr. M. Nevil Storey-Maskelyne (Cricklade) was, till recently, keeper of the Mineralogical Department of the British Museum. Mr. William Agnew (S.E. Lancashire) is one of the owners of the fine art galleries at Manchester and in Bond-street, W. Mr. Henry Broadhurst, of Mervan-road, Brixton (Stoke-on-Trent), is the son of a journeyman stonemason, and till 1873 was engaged in the same occupation as his father; he is now secretary to the Parliamentary committee of the Trades' Union Congress; Mr. Stuart Rendel (Montgomeryshire) is the son of the late engineer, J. R. Rendel, F.R.S., and is himself a member of the engineering firm of Armstrong and Co., and its managing partner in London. We have frequently referred to the excavations into hut dwellings, cists, barrows, and other pre-historic monuments in the Lands' End district, and other archæological discoveries of Mr. Wm. Copland Borlase, F.S.A. (East Cornwall), who is worthily maintaining the name of his grandfather Dr. Borlase, the Cornish historian and antiquarian. The sons of the late Mr. Thomas Brassey, the railway contractor, have been re-elected as members respectively for Hastings and Sandwich. Amongst the unsuccessful candidates were Mr. J. Ebenezer Saunders, F.S.A., who has been a Fellow of the R.I.B.A. since 1866, and who was third on the poll at Greenwich, and Mr. Benjamin Lucraft, formerly a cabinet-maker, who was one of three Liberal candidates in the Tower Hamlets.

Mr. W. S. Oldrieve, of Sciennes Hill-place, Edinburgh, has sent us a specimen of a sketch-block he has recently invented, which appears to possess many qualities desirable to facilitate making out-of-door sketches. Mr. Oldrieve's roller sketch-block is a square of about 8in., light and handy, made of a thin piece of pine board, stiffened at opposite sides by two flanges of mahogany, and having two small rollers at the other sides. By this arrangement, a sheet of paper of any required length can be strained across the block and wound on the rollers so as to present a surface for drawing on. When the sketch is completed, and another survey or sketch is required, the paper can be rolled up at one end; the rolled portion on either side being protected by metal shields or clips, prevents the drawing getting injured by the hands, and these shields are secured by small drawing pins. To fasten the sheet of paper without the aid of pins or of an adhesive, a tongue of chamois leather is attached to each roller which grips the paper when rolled once round. The rollers are turned by knobs fixed at opposite corners, so that when the sketch-block is held in the left hand the paper can be drawn either way. As the inventor observes, there is much inconvenience in using a doubled-up sheet of drawing-paper for sketching the plan of a building; it gets creased and soiled, and the figured dimensions soon become obliterated. A dimension book of the common size is generally too small to be of service. We can safely say that many architects will find the "roller sketch-block" an acquisition in making sketch plans of old buildings; and for land surveys and general sketching the value of a sufficient surface of paper that can be easily rolled up out of harm's way will be esteemed.

The first exhibition of the Canadian Academy of Arts was opened on the night of the 6th March, at Toronto, by the Governor-General. The contributions of loan pictures are large and valuable. Five productions from the easel of the Marchioness of Lorne are found among the water-colours. Her Royal Highness contributes a painting of the bedroom of Mary Queen of Scots, at Holyrood, by Miss Imlach. The chamber retains its old furniture and fittings, for the desecrating hand of modern innovation has not yet touched the historic place. Her Royal Highness also exhibits a striking picture of Scotch scenery—Dhu Loch, Balmoral, painted by A. Becker.

Last Friday evening the annual conversazione was held at the galleries of the Society of British Artists, in Suffolk-street. We lately noticed the exhibition of pictures which formed, of course, the main attraction to the visitors, but additional charms were present in the brilliantly-illuminated galleries, in the floral decoration of the entrance staircase and chimney-pieces, and especially in the assemblage of ladies in the picturesque costumes of the Stuart and Georgian periods. The æsthetic charms of the evening were augmented by the vocal and instrumental concert which followed. We may just mention the sculptures in the galleries. In the large room, Mr. G. C. Maguire exhibits enamel portraits, and Mr. Geo. Halse a marble statuette, representing "The Village Maid," No. 814, "Puss," a terra-cotta portrait by Hannah B. Barlow, is clever; but we particularly remark a spirited and very characteristic statuette in terra-cotta, of the late Samuel Bough, R.S.A., by Mr. W. G. Stevenson, No. 815, "Where is your Tail?" by W. H. Trood, is a pleasing study. One of the best busts is Mr. Geo. A. Lawson's terra-cotta model of "A Corsair," 818, remarkable in the expression and force of countenance, and the sharp features, "Ianthe," by R. Physick is classical and feeling but a little tame. A marble group, by Hortense Hazard, in the south west room, is skilfully executed and represents a mother and two children clinging to her, under the title of "I am Left Alone." The composition strikes us as lacking rather in expression, but there is some careful modelling, and there is decided evidence of feeling, and the figures are well-balanced. Two other subjects, one a bust by F. Junch, and the other a terra-cotta figure, are in the other rooms.

The members' *soirée* at the Architectural Association took place last Friday evening, when a numerous company of members and friends were highly amused by the performance of a successful operatic sketch, composed expressly for the occasion by Mr. Hugh Stannus, in which were personated many well-known professional characters. The opera was entitled "The Mixture as before, only more so," and was chiefly a skit on the prevailing principles of art. One page of the programme of this "new and original opera," was devoted to a leaf supposed to be taken out of one of the professional journals, in which a little fun was indulged in at the expense of ourselves and others. Was the error in the numeration of the "Intercommunication questions" a mistake, or a joke? Quite possibly, the latter; some of the other jokes are quite as hard to see at first.

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THE BUILDING NEWS.

LONDON, FRIDAY, APRIL 23, 1880.

ARTISTIC DECORATION.

DECORATION has been made the theme of a few recent lectures and addresses. Mr. Robert W. Edis, F.S.A., in the capital series of Cantor lectures he is delivering at the Society of Arts, dwells principally upon the decoration and furniture of our houses; and Mr. J. P. Seddon, F.R.I.B.A., in his paper at the Institute, upon Polychromatic Decoration; while a third paper, read before the Society of Arts by Mr. C. Pfoundes (see p. 424 *ante*, and this week), has for its subject the Art of Japan. We might, with some prospect of coming to an agreement on fundamental principles for practical purposes, listen attentively to the dicta of these several apostles of the art, if they had been carried out with any degree of completeness in our private and public buildings; but, unfortunately, the efforts of architects have been frustrated or set aside by the interference of those who have made art a kind of plaything, in which cost and caprice are the main factors. We hear much just now of Cinque-Cento, Queen-Anne, Chippendale, Louis XVI., and Japanese furniture; and "sweet things" in drabs, dull greens, and peacock-blues; hob-stoves, and dog-grates, over-mantels and blue china; but it does not appear that those who prate about such things have any definite notion of consistency as regards style, and certainly none whatever of the harmony that should prevail between the furniture and the house. The obvious incongruity of putting a large cumbrous Elizabethan sideboard in a modern dining-room, or a cabinet of Jacobean taste in a drawing-room of ordinary modern finish in its joinery and wall decoration, is matched only by the vulgar and common-place in these matters. Mr. Edis was careful not to enter into the battle-ground of style, but chiefly to confine his remarks to the enunciation of safe principles, into which truthfulness and beauty enter irrespective of eccentricities of taste. Unfortunately, every householder imagines his own taste is faultless, and that there can be no appeal from what he considers his freedom of choice in furniture or decoration; and the ordinary builder of residences would no more think of asking his architect's opinion of the wall-paper and kind of furniture he means to get, than he would of consulting him on the purchase of a picture, or about the next waistcoat he means to order, or the next meal he means to eat. It is a perfectly hopeless task to make some people believe costly elaboration and gorgeous patterns are not artistic, and that pictures or china look better on grounds of neutral or sober tints, and quiet patterns; it is even more difficult to get them to understand the value of constructional fitness and propriety of form and pattern in furniture. As long as style is uppermost in the minds of designers, and the public are led away by fashion, it is impossible to look for any rectification of taste in these matters, and we doubt if any amount of mere preaching will produce the desired reform. We have more faith in the growing sense of art-workmen and decorative artists, but we must place before them the best models. Where are those models to be studied, except in our art-museums, such as Kensington, Bethnal Green, and elsewhere, places out of the reach of the workman, and not adapted for quiet, persistent study? The only way of supplying the need, so far as we can see at present, is by opening art studentships in every district of manufacture—a work that might profitably be arranged by the Science and Art Department. Our technical schools in connection with the City Guilds form a step towards the right direction. The Architectural Societies should take an active and leading part in establishing schools for art workmen, and the decorative artists would find it to their advantage to render their aid to them, as their hands would be largely recruited from them. No agency has been more powerful of late years in educating the public than the establishment of local art museums, though these are somewhat misleading in their object, as the ordinary Englishman has a notion that objects in museums are all curiosities, to be looked at with interest, but not regarded as models for instruction. The only way, we think, to remove this impression is to organise technical lectures by men who know their subject and are known of the public. With regard to the modes of wall-decoration in some houses, the public have such a plethora of ideas that it is rather puzzling to advise which is the best under certain circumstances. Paint, painted cloth, paper, tiles, mosaic, tapestry, embossed leather, veneers, Persian or Indian matting, linoleum, parquetry, are some of the kinds of decorations for walls, floors, and ceilings placed before the bewildered occupant who desires to bring his rooms a little into sympathy with the prevailing taste. What is he to do? Whom is he to employ? These are the questions that distract the mind of many who believe the right thing is to decorate at all costs. In his despair, he hastens to a decorative artist or upholsterer, and hastily accepts the crude and ill-digested notions of his adviser. An Italian house undergoes a thorough change; everything that is Italian is obliterated, the ornaments in friezes, and cornices, and dadoes are disguised or painted out; and the whole key of colour and tone altered from light tints to the dull sombre hues of Jacobean taste. A costly scheme of decoration is substituted that turns out to be an ill-considered plan and subversive of all the conditions of light and architectural style that ought to have been first fulfilled. The furniture follows suit; the light-framed and not inelegant furniture of the drawing-room, and the mahogany sideboards and gilt-framed mirrors, chairs, and tables of the dining-room, are sold off to make way for a mixture of Japanese and Jacobean. Delft ware, or the china of Chelsea and Bow, are substituted for pictures of the Italian and English masters, and the transformation is rendered complete. The house is fashionable, certainly, and as vulgar withal as can well be imagined.

We are glad to see that Mr. Edis does not disapprove altogether of bright and cheerful tones of colouring for our gloomy town-houses; and that he does not despise, as many decorative artists are doing, plain decorative treatment, such as stencilling and light tinting, for our ceilings. For stone pavements, the incising of lines in the borders and filling them with coloured cements, as in the "Tarsia de Marbre" process, might be made highly decorative, and for old paving there is something to be said for the plan. We should prefer, however, to inlay tiles of one or two colours in the borders, without the everlasting geometrical pattern. In speaking of narrow halls, the lecturer well deprecated the love for what he termed the "all over" pattern, which entirely destroys the breadth of effect that is needed. The mosaic tiles now made seem to be admirably adapted for floor and wall surfaces; they are manufactured in a variety of plain and ornamental patterns, the marble chips being embedded in cement and polished. Of course, for inner rooms the excellent parquet floors, such as those of Messrs. Howard, of Berners-street, specimens of which we lately referred to at the Building Exhibition, are, perhaps, the most durable, the cleanest, and most decorative form of flooring we possess. The excellent leather embossed papers of Messrs. Jeffrey, and the wood tapestry, of which specimens may be seen at Islington, besides the more sanitary tiles for halls, appear to give us all we require for the dadoes of our walls, the upper surfaces being painted on the plaster or covered with wall-papers. We have before insisted upon a plain and delicate handling of ceilings, and if colour be used, it should be applied in light flat tints to bring out the enrichments. Light tints of grey, pink, green, or buff, are all good tints, as we see them in the old ceilings of many of the houses built by the Brothers Adam. The chaste ornamentation known by their names is quite in accord with the idea of broad flat surface treatment; and we believe all decorative artists of taste accept the principle, in spite of the constant production of elaborate and heavy relief ornament in plaster and carton pierre, and the desire to imitate the heavy foliage and semi-Classic allegories of Elizabethan and later examples, interesting though many of the ceilings of these periods are.

It has been observed, with some truth, that the poverty of England in coloured stones or marbles is some justification for resorting to polychromy or coloured decoration. We have not the beautiful natural marbles which Giotto found to his hand in designing the Arena chapel at Padua, or Cimabue the fine church at Assisi, and which enabled them to present to future generations architectural illuminations that have become objects of pilgrimage for artists of every age. It is needless to instance that casket of jewels, as Ruskin terms it, St. Mark's, at Venice, whose walls and vaults are lined with marble and mosaic, and dazzle by the magnificence of colour and gold; we have neither materials nor artists such as those. Again, where coloured materials failed, the Mediæval artists applied colour to their walls, as nearly every old monastery and cathedral proves. But the churches of Northamptonshire, Norfolk, and Suffolk show the employment of coloured materials in bands of warm-coloured stones, or carefully-faced flints introduced in the stone as a sort of inlay. In Suffolk and Kent the flint system of decoration prevails to a large extent; we find chequer and herringbone patterns cut out in the light stone or brick, and flints inserted, or two courses of flint separated by bands of light stone. Dark red and light or grey stones, introduced in bands, are found at Irchester and Strixton, and various other churches. We all know that our brick buildings were relieved by diapers of stone and black brick, as many of the Suffolk and Essex churches attest. In our larger churches we see the effect of dark warm sandstones introduced with the lighter stone, or red and grey marble shafts highly polished, among the lighter features of stonework. Relief in two tints thus produced by the introduction of Purbeck marble, with Chilmark stone, strikes us in the grand interior of Salisbury, while a similar contrast is observed at Westminster, and we might instance the coloured decoration of the screens and roofs in the Norfolk churches as painted decoration.

Mr. Seddon, in his recent paper (see pages 424, 451), introduced many examples to show how the Mediæval architects applied colour; and his remarks will be read with interest by all who are endeavouring to revive the true principles of polychromy. Mr. Seddon has more than a theoretic interest in the subject: he has devoted much study and labour to the art, and his works and designs evince a keen appreciation of the effects of colour in different architectural circumstances. We more particularly wish to draw attention to the question of the value of colour as a groundwork to architec-

tural features, or as a means of accentuating them, and Mr. Seddon introduced two designs prepared by him for the chapel of Queen's College, Oxford, which, to a certain extent, illustrated the treatments; but they were more especially designed to show the effect of decoration with the painted windows of the chapel. In one case the design showed the walls covered with a light-coloured marble, to reflect the light and to contrast with the glass, the order being made to stand out in darker marble; in the second case the glass was to be kept as brilliant as possible, and the wall surface to be dark, as a background for the order, which was of a light material. The two opposite modes involve serious considerations, and, probably, there are few who would be found to agree upon the subject. As regards the windows, we certainly should prefer them, as they seem logically to require, to be kept as transparent and brilliant pictures in the wall, and this would, in its turn, lead to the adoption of light marble or colouring for the order. Mr. Seddon says, "if colour is to accentuate form, the column and entablature, which are themselves projections from the wall, need to be the lighter according to my judgment." We single out this particular point in Mr. Seddon's paper as a rather crucial one in practical decoration, and one which is not always thoroughly considered at the onset. In the employment of colour in interiors, the orders are frequently, in some members, darker, and in others, lighter than the walls. Thus, the column may be made to imitate Sicilian marble, or granite; the capitals are painted white and gilded, and the entablature may be of three different tints, which Mr. Seddon rightly says has the effect of destroying the unity of the order. The question, at least, is worth the attention of architectural colourists, whether the walls or the features against them require the emphasis of colour, though, in many instance, it must be solved by the circumstances of each case. There are several points besides this one that require to be settled in the counsels of the artist before polychromy can be safely left to the hands of the architect; the faculty of discriminating the harmony and contrast of colour is one which is more of a gift than an acquirement; and, therefore, coloured decoration must always remain in the hands of a few. We quite agree in the dictum that external polychromy must be, as regards our London architecture, confined to the materials and the construction. We cannot, seeing what has been done, recommend more, and we would much rather see colourless buildings than badly-chromatised ones.

BUILDING EXHIBITION AT THE AGRICULTURAL HALL.—II.

LAST week we examined the bulk of the exhibits at the Agricultural Hall. We now resume our notes, and may enter a little more into detail with regard to a few of the subjects. Among the appliances and improved house-fittings, we noticed, in our last issue, a revolving shutter, with a balance-weight motion, which has the desirable object of keeping the shutter in one position vertically over the groove. This improvement has been introduced by Messrs. Salmon, Barnes, and Co., of Ulverston. In stand 29, Mr. S. Haskins, of Old-street, contributes a variety of shutters and blinds, of good manufacture, and in another stand, we find Messrs. Avery and Co., of Great Portland-street, have on view some specimens of a patent cloth blind, the merit of which appears to be that it is capable of diffusing a toned light of any tint, or being used as a groundwork for artistic ornamentation. The "Empire" blind, as it is called, is made of a strong cambric, saturated with the required colour by a patent process. For houses and shops where semi-transparency is an object, it seems to be a good substitute for ordinary holland blinds, and is said to be more durable. Among window specialities we may mention a contrivance for facilitating the cleaning of ordinary sliding sash windows by Mr. U. Knell, of Wood-street, Cheapside. It combines a sloping casement and sliding sash. Messrs. R. Evered and Co. display a large collection of chandeliers, hall-lamps, and gas-fittings. Their standard, with stained glass shades, are ornamental and useful modifications of the ordinary lamp. At stall 120, Mr. Jas. Hill, of Upper Thames-street, exhibits specimens of locks and door furniture, to which we could only give a cursory glance last week. His "Elizabethan locks" are ornamental in form, of good quality, and moderate in price. Close to it we notice models of Zimdar's pneumatic bells, adapted for hotel and domestic purposes. They are exceedingly simple, the bells being acted upon by the compression of air in elastic tubing, and all cranks and wires are superseded. Stall 118 is worth notice for some tastefully-designed wall-papers, exhibited by G. C. Haite, in a variety of quiet, low-toned sage-greens, grey, and other colours. Some of these were designed for Messrs. W. Woollams and Co., and a few for Messrs. Scott, Cuthbertson, and Co., of Chelsea. A lofty stand in the centre avenue is set apart for the exhibition of an apparatus for improving sound, by Mr. A. C. Engert, of the City-road, which may have some interest for the architect and builder. The principle of Mr. Engert's apparatus consists in its increasing resonance or the volume of sound by the employment of steel plates in the neighbourhood of a pulpit, platform, or piano. Mr. Engert applies the acoustic properties of the telephone to his purpose, and our experimental investigation of the increased sounds the steel plates produced behind a piano at the Exhibition, would be conclusive of the value of the principle, but for the difficulty we see of its architectural adaptation to rooms. Without doubt the steel plates magnify the tones of the piano and voice. We drew the attention of our readers last week to a collection of specimens of graining and marbling, in stand 119A, and we may take this opportunity of correcting a misprint. Mr. Samuel Smith, of Dalston, late of 117, Fenchurch-street (not Mr. S. Samuels, as stated), is the exhibitor. Mr. Smith's process of teaching the art is novel, useful, and, we should think, effective. It is certainly worth the attention of intelligent workmen. We may also state that the Tile Floorcloth Company's invention, noticed by us, consists of inlaying the pattern so as to form a geometrical design, by which means the figures are of the same material and durability as the groundwork itself, which looks like linoleum. Its durability is guaranteed, and the price, including laying, is 3s. 6d. per square yard. Few things of everyday use are so liable to get out of order as door-springs. Messrs. Smith and Turner, of Bartholomew Close, show an improved form of door-spring, for double action, by which any readjustment of the spring can be made after the door is fixed—a convenience of no small value. One great merit of the spring is, that it increases in stiffness as the door assumes its closed position, a feature the ordinary spring-door does not possess. The ball-stop is also an ingenious and simple arrangement, and one not likely to get out of order. We also notice an improved form of hinge for heavy doors, which consists of a top and bottom centre, the cost of which is 10s. fitted to door. The adjustable door-spring has been largely used in banks and public buildings. We did not notice in our last article several specialities of Messrs. Smeaton and Sons. Architects and sanitarians will be pleased to see that such things as lavatories and urinals may be fitted up in offices and other rooms where space is an object, or where it is desirable to conceal such necessaries. We may refer to the "folding-up lavatory" and "folding urinal," consisting of a flap arrangement which can be lifted up and shut in a grooved frame. One of the best forms of closets we have seen is this firm's "Eddystone closet"; the trapped overflow arrangement is very simple and efficient. It is shown made in one piece of earthenware, and we have no hesitation in recommending it as an economical apparatus. A model of their improved seat and riser has this advantage, namely, that they are hinged together, and the whole can be raised like a double flap when the apparatus requires repair or cleaning. Among other exhibits are dust-shoots and baths of various forms, heated by gas or otherwise. Messrs. Smeaton's "Eclipse" cast-lead trap is a model of its kind, and combines the advantages of the siphon in its action, but without the risk of siphonage. It has an inch water-seal, and the construction is exceedingly simple. Roofing-felt and other modes of covering buildings are largely represented in the Exhibition. We have already called attention to one or two; we may refer here to M'Tear and Co.'s (Belfast) asphalte roofing-felt, which can be applied to a variety of uses, such as foundations, as anti-damp courses, or as an outer lining for wooden houses, stables. Its manufacturers show models also of circular and other roofs for wide spans. The circular felt roof is trussed on the bow and string principle. The principals are double-bow girders of pine, covered with light boards on purlins, and overlaid with waterproof felt. For ordinary houses the rafters may be placed 3ft. apart, and covered with ¾in. boarding. A pitch of 2 or 3in. to the foot is considered sufficient. The felt is overlapped about an inch at the edges and closely nailed through the overlap with twopenny galvanised clout-nails about 1½in. apart. A coating of felt varnish or well-boiled coal-tar is then given to the felt. The gutters are made of two layers of felt cemented with the tar. In addition to our notes on ventilating appliances, we must draw the attention of our readers to Mr. G. W. Banner's system in Stand 39, where the Banner cowl's suctional power is shown by smoke being drawn down an inch tube 60ft. long placed vertically as a soil-pipe.

The patent tramway models shown by Mr. Grainger have the merit of at least meeting the objections we have always entertained to the ordinary fixing of the rails. To overcome the wear of the pitching at the straight joint of the rails, Mr. Grainger introduces blocks of iron alternately with the granite cubes or paving. These "anti-lapsus and non-skidding blocks," as they are termed, are of cast iron, and the rails are simply keyed, pinned, or bolted through them. At the ends of the rails chairs are fixed, with felted seats, and these rest on beds of concrete; by these combined means the rails do not sink, or become loose, or springy, and no cross-ties are necessary, as the rails are laterally secured to the chairs. Various sections of rail, and models of machine-made sash-weights also claim notice. Improved wood-working machinery is a class of invention that must largely concern the contractor who is endeavouring to compete successfully in his business, and we cannot recommend to the notice of builders anything more perfect, as economical instruments of labour-saving, than Messrs. F. W. Reynolds and Co.'s "Universal Worker," and Pocock's "Patent Lock-Mortising Machine." The latter is exceedingly simple; the machine is fastened to the door or framing by thumb-screws, and adjusted to the rail. By turning a handle the mortise is cut

in a marvellously short time, so true and clean, that no chisel work could match it. The double-mitreing machine (Bowman's patent) is another admirable labour-saver. An improved portable contractor's engine, with patent feed-water heater, and other improvements, by which fuel and wear-and-tear is saved, we recommend to the notice of contractors also an improved "Mortar Mill." We noticed other machinery of this firm last week. Perhaps one of the neatest and most ingenious machines of this class is the "Tighe Hamilton Dovetailer," exhibited in connection with Messrs. Howard's parquet flooring we noticed in our last article. The Hamilton dovetailer can work every form of dovetail joint, and for cabinet work no machine can possess greater value. The construction is simple, the wood is brought up to an ordinary circular saw, which has an oscillating motion given it at one side, by which motion the dovetail is formed. Having seen the operation of the machine, we can say that no hand-work can groove or dovetail with such speed, accuracy, or cleanliness. Messrs. Powis, Bale and Co., of Budge-row, are the agents. Messrs. Oscar, Eklund and Co., of Leadenhall-street, at stand No. 8, show their excellent machine-made laths, with brand J. S. and Co. They are cut with the grain from red wood, leaving the heart, and are made in Sweden, and we should think the plasterer will find their use more economical than hand-made. In mechanical appliances, Mr. Richard Jones's (Liverpool) barrow and hod-hoists command notice as a far more speedy and safe mode of lifting materials than by labour. A clever liquid meter is to be seen, made by Messrs. Hancock and Heath, Euston-road, which registers at any pressure, as there are no bearings of the machine exposed to the liquid, and the index is fitted in an air-tight chamber. One of the best invalid water and air beds we have seen is that exhibited by Pocock Brothers, 235, Southwark-bridge-road. The bed consists of a series of separate cylinders filled with water, air, or both, and placed in a row along the bed. One of the chief merits of the invention is that the bed can be regulated by filling some cylinders, and not quite others, to relieve pressure upon any part of the body; the cases can be filled at the ends by taps with either air, or hot or cold water; and any of the tubes can be taken away as required for the bed pan. A portable gas-making machine (Muller's "Alpha") is shown by the inventor, of Birmingham, and Queen Victoria-street, London, consisting of a drum or gas-meter, which can be wound up and applied to buildings in the country. It is made in sizes of from 8 to 500 lights. A self-acting deodorising water-closet, with a chamber for camphor and lime in connection with the pan and trap, is shown by Messrs. Brazier and Son, of Blackfriars-road, who exhibit also a model of a fat interceptor, a simple and useful invention, and Mr. R. W. Crosthwaite, of Upper Thames-street, show a few very perfect kitcheners. In addition to other systems of glazing, we may mention Mr. T. M. Helliwell's model of his patent glazing. We hear it has been adopted at the Army and Navy Provision Store in Regent-street. At Stand 31A the Hollington Stone Company, near Uttoxeter, North Staffordshire, show samples of a free working sandstone, known geologically as the Keüper or water stone. It is durable, and of a pleasing warm colour, of uniform appearance, and, we should say, admirably adapted both for architectural carving and sanitary purposes, not the least recommendation being its resistance to the acids of the atmosphere. Messrs. Booth and Wheeler, Bankside, Southwark, have a stall fitted up with specimens of stone, amongst which we must mention the Abbey red stone, a good weather stone of even texture. The sample shafts exhibited, despite their inartistic shape, show a delicate graining like wood. This sandstone was used at Furness and Calder Abbeys. Near this stall the Patent Victoria Stone Company show specimens of their stone composed of granite and Portland cement, and silicated by a patent process. We may just mention in passing Maignen's "Filtre Rapide" for rain-water, the main object of which appears to be the large area of filtering surface afforded, and the aëration of the water; Thos. Waller and Co.'s (Fish-street-hill, E.C.) patent cooking stoves; also an ingenious mode of forming stove and rain-water pipes, by which the pipe can be made to fit any angle, or be bent to any obliquity, even to a right angle. The joint or coupling is smoke proof, and the pipes, or rather bends, have an ornamental appearance. Mr. W. Hardt, of Barnsbury-road, N., is the agent of the inventors, Messrs. Hammer and Fauché. Of chimney-pieces and stoves, Messrs. Yates, Haywood, and Co. send several specimens; for economical heating arrangements, the "radiating heat generator" of Mr. Gillingham, Euston-road, is worth a glance, among the numerous other exhibits, it would be impossible for us to notice. In conclusion we trust that both the promoters and exhibitors will profit by any shortcomings apparent in the present show, the most important of which we pointed out last week—namely, as regards the preliminary arrangements and classification. We hope another year to see the experiment repeated, feeling sure that the architectural profession, the building trades, and the public at large will benefit very materially by its successful consummation. What has already been done is, in our opinion, very creditable to the manager, Mr. John Black.

A RECENT VISIT TO RUSSIA.—VI.

ST. PETERSBURG.

As the seat of empire, St. Petersburg, seated on the swamps and deltæ at the mouth of the river Neva, does not present itself to the traveller as an ancient city. In this respect it bears out the statement of history, that Peter the Great founded it in 1703, as a seat of trade, and a place of shelter for—the dream of his ambition—a Russian Fleet, or, as a witty writer observes, as a window by which he could look out upon Europe. The site chosen was an island or delta, which is intersected or cut across by a branch of the river. On the eastern or sheltered division, called the island of St. Petersburg, he founded, by the aid of annual drafts of 40,000 men from distant parts of the empire, this royal city. The core of St. Petersburg is the great fortress, an important feature, in which is the mausoleum church of St. Peter and St. Paul, the former saint lending as it were his name to the city. The surroundings of this fortress were primarily wooden huts, one of which, from being inhabited by the Emperor, is preserved as a national monument. On the other division, the Vasili Ostrof (Vasil's Island), he ordered his nobles to erect their mansions, and so put an end to their plottings in Moscow, a diversity they freely indulged in during his absence from the old capital; and here he lodged his foreign workmen, the particular locality being long known as "the French Colony."

On the southern bank of the river he built his palaces and his offices of state, and he here laid out the lines of a noble city, which, as the Nevski district, has grown to be the heart of the city, and the seat of one half of the population. This spread of the city has long since reached the northern bank of the river, where it is known as the Wyburg suburb; this, like the higher reaches of the river, is mainly devoted to trade and manufacture.

In the last century it was considered more or less a duty with the successors of Peter the Great to foster and develop the new or rival capital, a duty that was strictly observed by Catherine II. (1763-1776), who has left imperishable marks of her imperial will in the palaces, quays, squares, and monuments of the city.

The early erections, as above stated, were of wood; but bricks were used as early as 1710, and for many years every cart on land, and every sloop on the water, was forbidden to enter the bounds of the city, unless a certain weight of stones was brought as a tribute towards paving the streets. The raising of the low, or swampy portions of the land, was the work of a century, and the embanking of the river with a granite wall, a colossal work, is barely finished at the present time.

The low situation of the city renders it subject to floods, that of 1823, when the waters rose 13ft. 4in. above their ordinary level, being the most serious on record. These floods are caused by long-continued westerly winds acting on the tideless waters of the Baltic. Upon the approach of the waters, the cannon in the fortress are fired to warn the people. The dwellers in the cellars or basements are removed, and boats are prepared with the object of collecting the sentinels.

The nature of the ground, when large buildings are about to be erected, offers many obstacles; these have to be overcome in great part by a free use of piles. In the case of the cathedral church of St. Isaac, a veritable forest of 21ft. logs was used; the cost of which, before measuring came on the scene, was £200,000. The provision in this instance was found to be ineffectual, for extensive repairs are now being made to the cathedral, owing to the treacherous character of the foundations.

In connection with the various properties there are few instances of inclosures, the majority of the houses being built to the line of the streets. The lower stories are mostly sunk below the level of the causeways, and dangerous pitfalls occur in the steps descending thereto, a system that is reversed in the steps ascending to the first-floors. The causeways, to admit of such an arrangement, are necessarily broad, a provision that is traceable to the fact that, when first laid out, the streets were planted down their centres with double rows of trees.

The upper floors are reached by public stairs, and from the hall-doors to the roadways are porches, or covered ways, tastefully constructed in wood and iron.

These upper floors, like the lower ones in the principal streets, are devoted to purposes of trade, from which it will be seen that, although they do not indulge in the great show-shops common to the ground-floors of English buildings, they do a large amount of trade on a given area of ground.

The markets throughout the city are very numerous; but they here take the form of bazaars, and, as in the "Gostumoi Dvor," they are of enormous size. These bazaars consist of small shops ranged side by side, in the front of which are covered walks or piazzas. In some cases these marts are two stories in height; but it is noteworthy that business on the upper floors is of a quiet order. These blocks of marts are intersected by avenues lined with inferior shops. As the true Russian bazaars do not exist in St. Petersburg, we must reserve our detailed notice of them until we reach the city of Moscow.

THE PUBLIC BUILDINGS

of St. Petersburg, such as the palaces, Government offices, and churches, are rarely associated with inclosures other than those formed by the return of their wings. The material of construction is coursed or rubble granite to the base line, which varies from three to six feet above the ground level; this part is mostly built with a receding face, the

object of which is to obtain a broad footing on the treacherous ground. Above this level, with the faintest exception, the walls are of brick; the size of the bricks are 10½in. by 5¼in. by 2½in; these are laid with thick joints, as a groundwork for the facings of stucco. In the case of a votive chapel near the great bazaar, the joints are drawn, and the brickwork is left as a finished face; this, to give it finish, and to protect it from the frost, is painted, the colour adopted being lavender. In the case of the iron-works at the west end of the city, the brick-work is washed over with a composition of wood-tar and red ochre. We noticed but one instance of the brickwork being left in its natural state, and that was in the Government stores, near the south end of the Neva-bridge. These have been evidently constructed with the view of stuccoing, and in the interior they are suffering severely from the effects of frost. We see nothing here of the imported bricks we noted at Riga; the common red type is, consequently, universal. Of stonework in the sense common to us in England, we see but little. The only example we noticed was a porch, or entrance, to an adjunct of the Winter Palace, which was wrought in a ferruginous class of sandstone. On this point we may note there is a large church nearing completion at Moscow, wholly faced with Finland sandstone, the quality of which, judged from beyond the barricade, is very creditable.

Of marble, various kinds are used for external purposes. In St. Isaac's Church the walling is of buff marble. This we take to be the Silurian limestone noticed at Narva. In other other buildings, such as the Marble Palace on the Palace Quay, the walling is a brown marble with reddish veins; opposed to which, in the form of strings, pilasters, and cornices, are red and grey granites. This building was erected at great cost by Catherine II. (1770-1783) for Prince Gregory Orloff, who annexed the Crimea to the Russian Crown. As the nature of the material implies, it is a sombre construction, one which gives the visitor more the impression of a prison than of a palace. We are safely within the line of truth when we assert that 90 per cent. of the buildings of St. Petersburg are faced with stucco.

The order in which the property is kept by the owners is highly commendable. Paint is rarely used on the outer walls, a wash of a very durable character being most general. The State, being desirous that St. Petersburg should be known as a model city, instructs the police to report all cases of neglect in cleanliness: the defaulters are thereupon admonished, and if this fails in effect the needed work is done by the authorities, and the cost is charged to the owner.

The colour applied to these buildings is broad in its range, and in most cases highly pleasing in its effect. In this detail we may note that the inhabitants are far more refined than are the people of Moscow; but this refinement does not extend far beyond the capital, for we learn that one of the palaces at Tzarskoé, 15 miles distant, the front of which was formerly gilt in its facings or architectural details, is now stained green, white, and yellow. The prevailing colour of the walls in St. Petersburg is pale red; on the one hand this graduates to the colour of ordinary bricks, and on the other to pink or lilac. Buildings of these colours alternate with those of sage-green, blue-black, lavender, buff, yellow, mauve, and white. In some cases two colours are used, the one for the wall face and the other for the dressings; in these cases we find examples of brown and Indian red, black and white, as in the Exchange, brown and grey, the latter veined as marble. In the case of churches the colour is more pronounced, and to this gold is freely added: we there find examples of brown walls and the facings two shades of green, the details being picked out in gold. The roofs are invariably green, and the domes are blue and powdered with gold or silver stars, or wholly gilt; the spires, wherever they occur, are nedular in form and a blaze of gold. So out of place is any other colour than green for roofs, that we noticed the red tiles covering the towers on the Kremlin walls at Moscow had been painted this vernal hue.

THE ARCHITECTURE

of St. Petersburg is of various styles, or orders. The State buildings are Italian, or Grecian; those of modern date are excellent examples of art; but those of the last century, with which ranks the Winter Palace of the Emperor, from being drawn through French sources, largely partake of the conventional ornaments peculiar to the reign of Louis the Fourteenth. The ecclesiastical buildings of this century are Classic or Byzantine, of which they are good examples. On the other hand, those of the last century are poor examples of Byzantine or native Russian, otherwise known as Slavonic, a style that, so far as we can judge, is a crude and savage mixture of European and Asiatic examples, with which that common to India forms a strong infusion.

The street architecture does not run on the lines of Byzantian or ecclesiastical art: it ranges from the Classic to the native or old Russian. The latter, judging from the large buildings recently erected and in progress, is growing in favour. This at least is an innovation on the settled architecture of the metropolis; but as a revival of the native style it is very popular, and hereon we may note that it is a movement parallel to that of the English revival of the Queen Anne style. We noticed the same movement in Moscow, where, as in their use of colour, it is more pronounced, and less artistic.

The most pleasing examples of this native architecture are found in the surburban railway stations, which have evidently been constructed as models of the style, being outside the bounds of the city; they acquire additional charms from being wrought in wood, and highly decorated. We noticed the same revival in burnished brasswork, such as gas-fittings, lamps, church ornaments, mirror-frames, enamelled vessels, &c. The designs in every instance are very chaste, a refinement being lent to them by the Parisians publishing art works, the designs of which are founded on the Russian or national style of ornamentation. In the principal print-sellers' windows specimen sheets of these French works are on sale, executed in the highest style of chromatic art.

The effect aimed at in the architecture of St. Petersburg is grandeur; but this has not been satisfactorily attained, owing to the dead level of the land, the preponderance of horizontal lines in the buildings, and the open or naked character of the surroundings.

The monotony of the street scenery is occasionally broken by great watch-towers, constructed to enable the firemen to overlook the city, and to signal, in case of danger, to other stations, and one of the pictures that wins for itself a setting in our memory is that of sledging the fire-engines through the snow on a winter's night. The streets are then cleared by a courier riding, lantern in hand, and blowing a sonorous horn, behind him follows a dozen foaming horses, the path of which is illuminated by the firemen brandishing their blazing torches.

THE STREETS,

in their pavements, are fairly good; the principal thoroughfares are paved with wood, consisting of round or octagonal blocks placed on end. In other cases they are square cubes of granite; but round boulders prevail. These pavings, it need scarcely be stated, are only exposed in the summer time, during the winter being hidden by a covering of brown sand-like snow. The principal streets are high in the centre, with gutters on either side, the secondary are low in the centre, where open gutters exist; at the intersection of these streets enormous sewer-grates are placed, from which, it is clear, they have an underground system of drainage; but this does not appear to be directly connected with the wall-pipes of the houses, or with the water-closets. In working the latter the water is pumped into the cisterns, and the soil is discharged into pits which are periodically cleansed. The enormous size of the stack or wall-pipes suggests that the city is subject to heavy storms of rain, or, it may be, they are provisions against the molten snow; be this as it may, their size is truly remarkable; the smallest we noticed were 5in. diameter, but the majority are 6in. These pipes are constructed of sheet-iron, and the bends or swan-necks are rudely formed in cants or sections. The heads are huge hoppers, and there is no attempt to hide or modify any details of their hideous features. The lighting of the city is admirable, and hereon we may state that the thousands of lamps lining the embankments of the river, when viewed from the Neva bridge, form a sight, the like of which is not to be seen in Europe. It strikes us as somewhat strange that every ounce of coal used for this illumination is shipped from England; but as this is a fact, we may take it as one of the many factors which go towards making life in St. Petersburg more costly than in any other capital.

The population of St. Petersburg is close upon three-quarters of a million; but, from the enormous space covered by the city, you are apt, in forming an estimate, to double this number. Taking the fortress as a centre, you need to describe a circle seven miles in diameter to embrace the whole area of the city. It may be observed that a great portion of this space is taken up by the river, and its various branches; by the canals with their broad sloping banks, and their great highways on either side, which, line after line, traverse the length of the Nevski district, and by the state buildings, the parks, gardens, squares, quays, and streets.

The distances to be traversed in connection with ordinary business is very great, and hence vehicular traffic is much in demand; this is met in the summer time by a plentiful supply of carriages, and in winter by sledges; of late years great relief has been experienced by the introduction of tram-cars; to-day, their numbers are very large, and their routes form a great network in the city.

(*To be continued.*)

ART IN JAPAN.

By C. Pfoundes.*

(*Continued from p. 425.*)

THE objects most prized in Old Japan were not the articles so commonly seen amongst us here, so profusely displayed in the windows of tea-dealers and mercers—not even the lacquer-ware we so prize as old, and have to pay such high prices for. It was, first of all, old swords, sword-mountings, tobacco-pipe and pouch-mountings, pocketbook-mountings, beads, the buttons called "Nedzakies"—those quaint and curious bits of carving, many of which are gems; fans, with autographs and seals, sketches by personages of note, ancient and modern; old scrolls, albums of beautiful sketches, Chinese or Japanese poetry, written in any one of the many curious styles, fantastical, large and small, from characters each several inches square, to entire poems within the area of a superficial inch. Such were some of the art-objects that were the delight of the cultured people of feudal times in Old Japan. Some gathered shells, pebbles, or geological specimens; some affected botany; nearly all loved floriculture; while a few defied the Buddhist prohibition against the destruction

* Part of a Paper read before the Society of Arts on April 6.

of life, and collected insects. A few practised some genteel pursuit, which they learned through the Dutch. Amateur photography was one of the most recent of these hobbies. Every gentleman in Japan had a hobby, while the maiden and the matron boasted of their skill in some especial ladylike accomplishment, musical, poetical, or more practical and domestic.

The artist and man of letters of Old Japan, like his impecunious brother in other countries, was usually a living evidence of the truth of the old Japanese adage, that "when the rich are stingy, the scholars are destitute." But the really clever artist was, as I have already said, welcome everywhere, especially when guests were to be entertained. Skilled artisans were readily accorded personal interviews with the highest personages, and clever mechanics, foremen, and master tradesmen were most independent fellows in Old Japan. The "Daiku-San" (Master the great Mechanic), as the carpenter and house-builder is called,* especially considers himself entitled to "have airs," and carries his head high. He is architect and contractor, likewise sub-letting the contract to the various branches of the trade.

There does not appear to have been any officially recognised system of art education in Japan; the ancient bureau, that was subsequently (to A.D. 808) incorporated with the department of architecture and repairs of the palace, merely supplied sinecure positions for artists of eminence. Artists served a kind of apprenticeship to distinguished teachers. Wealthy amateurs took lessons privately. Standard works of art were studied, while poetry and classical—as well as popular—literature were subjects with which it was necessary to have an intimate acquaintance. Many handbooks to art exist, some very ancient works have been reprinted, and several independent works teach by series of progressive lessons, founded on some ancient system of classification. The various branches or art are divided. First, there are progressive lessons, from straight lines to curves, then broken lines, the combinations of lines and curves, and so on, gradually, until trees, branches, and foliage are correctly drawn. Leaves are dissected and shown in outline, and then filled in, both upper and under sides, curved, and in various positions. Birds, also, are dissected; details of claw, beak, head, and plumage, all minutely taught, first separately, and then combined; the various positions—in flight, and at rest, and foreshortening—are all illustrated. The so-called natural elements, water at rest, the torrent and the stormy wave, wind and rain, each in its varying mood, are all accurately depicted. This very important point appears to have escaped the notice of my predecessors, who do not seem to have known of the native system of art teaching, and I have already pointed out this matter to several writers on Japanese art and other subjects.

Thus it is the Japanese artist is taught to graphically represent sunshine and haze, winter's snow and summer's flowers, the vagueness of dark night, moonlight and its shadows, fleecy clouds and thunderstorms. Further on, combinations are dealt with; lessons as to seasonable plants, the insects, birds, and other objects of animated and inanimate nature. Rules and instructions as to the proper groupings for the various seasons, and also the conventional and arbitrary couplets and triplets so commonly seen in Japanese design in lacquer, ceramic, and bronze work, are also provided.

The following combinations are most frequently met with in Japanese design:—

"Phœnix and Paullownia imperialis." This design is frequently embroidered on the imperial robes, and on them only, but is frequently seen on fans, screens, and hanging scrolls ("kakemono").

"Pinetree and Stork." Both emblems of longevity, a common design, and most frequently used in the embroidery of robes presented to new-born babes, and other articles, lacquer ware, &c., for festive occasions.

"Peony and Chinese Lion." The peony is a design usually sketched on large articles, such as screens at the entrance of temples ("tsui-tate") or on panels, ceilings, &c.

"Bamboo and Sparrow," both being of a mild and gentle nature, a design to be seen in embroidery, fans, screens, and household furniture.

"Equisetum (scouring rush) and Rabbit." It is supposed that there is an "usagi" (hare or rabbit) in the moon which scours it with the dried "Tokusa," a design found on a variety of articles.

"Willow and Marten (or Swallow)." The willow waves in the breeze, the swallow flits to and fro, a favourite design for fans.

"Stag and Maple." Maple leaves turn red in autumn and the stag in autumn calls the doe. There is a play in the idea of the colour ("iro") of the leaf changing, and the love ("iro") of the deer; generally sketched in screens, &c.

"Lespedeza and Sleeping Wild Boar." The wild boar generally makes its bed in clusters of "hagi."

"Cherry and Pheasant." The *prunus pseudocerasus*, cultivated solely for its bloom, is jointly named with the gorgeously-plumed pheasant, generally used in embroidery and coloured designs.

"Plum and Nightingale." The plum-tree, called "the poets' favourite tree," in allusion to the verse composed in honour of Naniwa no Oji (afterwards Nin toku Ten O) by Oni (or Wa ni). The nightingale is fond of song and verse; one of the most frequent designs.

"Moon and Cuckoo." In allusion to Yorimasa and his verse when he slew Nuye, the design is usually a bird flying across the crescent moon.

"Rushes and Geese." Geese flying long journeys carry rushes in their beaks, and, before resting on the water, drop the rush, and then alight upon it; an allusion to the care to be taken in choosing a resting-place.

"Chrysanthemum and Fox." Hansoku Taishi, prince royal, was bewitched by the nine-tailed fox, in the form of a lovely damsel. He made her his mistress. One day she fell asleep in a bed of chrysanthemums, resuming the normal shape of a fox. He shot at it with a bow and hit it in the forehead. Noticing his mistress afterwards to have a wound on her temple led to the discovery of her being a fox.

"Bamboo and Tiger." Tigers feared the elephants, and, therefore, hid in the bamboo jungle. This design is often seen on screens.

"Peach Trees and Oxen." There is an old Chinese saying, "Turn the horse loose on the flower-covered mountain, and the ox into the peach orchard."

"A Dragon Crossing the Summit of Fuji-yama on the Clouds." Small snakes become the dragons, and an abject mortal often becomes an exalted person, rising to a great height, and easily surmounting the greatest obstacles; an emblem of success in life.

"Long-armed Ape and the Moon." It sees the reflection of the moon in the water, and endeavours in vain to grasp it.

"The Mulberry and the Goat." These animals are fond of this plant, and its product paper.

No mistakes are permitted as to seasons and the appropriate objects. Conventionalised ideas appear in the accepted form in many common designs and groupings, but the artists of Old Japan are above being led by any canon that does not permit of an appeal to nature's handbook of art, with the glory and charms of which they are ever surrounded. Theoretical to a fault, and systematic even in their love of variety, colour, and form, the Japanese artists, nevertheless, are no mere servile copyists of nature, like their neighbours the Chinese. They clothed nature with the full wealth of their ideal conceptions, and so conferred upon it their own mental individuality.

Various schools of art have arisen, and for a time flourished, during the past ten or twelve centuries, of which even a mere enumeration cannot be attempted here. Foreign influence, supported by some leading patron of art, may for a time have kept up some peculiar or alien style. The popular desire was for broad and vigorous treatment, with the most marked disapproval of any re-touching, and other cloaks for the numerous sins of omission and commission of the artist tyro, which were held to be reprehensibly inartistic. We must learn what not to look for, and what not to expect, in such an art as this. I may destroy more than one fool's paradise, when I say that observers will seek in vain for many attributes that we hold in the highest esteem. But, in doing this, I give more than I destroy, if I succeed in pointing out that there is much to be learned that is worthy attention, although as yet a sealed book to even those few artists who have already devoted their atttention to Japanese design.

As a fitting supplement to our higher and more æsthetic realisation of classic art, Japanese art, colour, and design may be made to teach a useful lesson. It is really wonderful that the art of this people is what it is, considering the many great obstacles they have had to contend with. Ever liable to sudden destruction by shocks of earthquake and the continued alarm of fire, that next most terribly and mischievous enemy to household art, deeming that if they were not burnt out of house and home more frequently than "once in seven years," as the old adage says, "they were fortunate, indeed"; subject to frequently being roused up in the middle of the night, and obliged to flee to a distance, alarmed by the fire-bell, taking away hastily all the most valuable movables; can it be wondered at that their art has been limited to the decoration of certain articles, of which the more valuable are portable, or, at any rate, movable? If we remember that they are obliged to keep their household treasures carefully packed away in fireproof storerooms, never having in common use any but the simplest necessities, must we not be surprised with the singularly powerful æsthetic and artistic constitution of the people who have preserved and perfected an art that has of late completely overwhelmed us here?

It is not necessary here to discuss the broad question, nor to deal with the technical defects or points of excellence in the arts of Japan, nor is it my desire to preach the universal copying of an alien art. I regret much to see the Japanese efforts to copy our art, and I rejoice at the failures in England to copy Japanese art. They fail, as we do, in this copying without understanding the art motive, or having a knowledge of the originals, or of the fitness of things copied. I would not teach any royal road to mere reproduction, but I do think there is a wide field open for an enthusiastic admirer to point out the real value of Japanese art, to indicate the intention of the native artist, and to explain the poem or legend that has formed the inspiration of the sketch. A high authority said that it would be a noble mission for anyone who would devote time and energy to the task of enlightening us, and thus materially advance the divine work of art. When the hitherto hidden movements of art-thought of the Japanese are understood, their work will assuredly be better appreciated than it has yet been. Any object of Japanese ware, even the commonest, would most probably be found to be decorated with a sketch, however rough, that constitutes a scene in an idyll or a legend, or that illustrates some poetic or historic allusion. As we are now ignorant of all this hidden meaning, we lose the pleasure that a cultivated native would derive from the work. Our mere visual sense only is exercised, and we are often interested merely by the novelty, or blindly follow in the track of a passing fancy or fashion, though but rarely are truly pleased with the drawing.

* Further information on these points will be found in the *Builder* for May, 1879, articles on "Theatres," "Artisan of Japan and His Work," "Constructive Art in Japan," &c.

THE DECORATION AND FURNITURE OF TOWN HOUSES.—III.

FURNITURE was the subject of the third Cantor lecture, by Mr. R. W. Edis, F.S.A., and was delivered at the Society of Arts, on Monday; the topic was treated upon in a general manner, details being reserved for the fourth and fifth lectures. Under the title of furniture the author included all the general fittings of a house, which would nowadays be called "fixtures," such as mantels and stoves, hanging-closets in bedrooms, shelving, built-up buffets, and much special joiners' work. All closets or shelf clusters could be made separate and distinct, screwed into blocks or hanging-pieces fixed into walls, so that in case of removal, if not bought up by incoming tenants, they could be readapted for the new habitation. He strongly advocated the greater use of such fittings for recesses, as they could be made much more inexpensively than the usual movable furniture, could be adapted to the general planning of the rooms, and, if rightly made, would save much labour in dusting and cleaning, and unlike the tops of wardrobes, would not afford inaccessible resting-places for dirt and

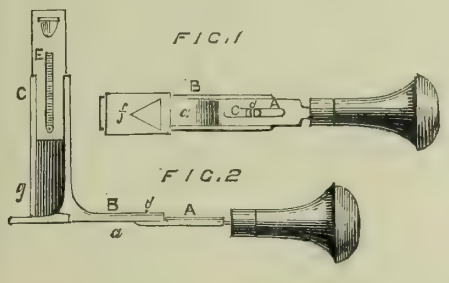
filth. In the furniture now made by our best manufacturers there was evinced a careful regard for grace and harmony of design, combined with use and suitability, and this must be attributed to the fact that the originators were not mere designers of chairs, tables, and curtain hangings, but men who, like the Mediæval artists, believed that every creation should be as honestly and thoroughly thought out, whether it were the smallest fitting of a house, the commonest covering of a wall, or the decoration of the smallest panel in a buffet or cabinet, as the most gorgeous edifice, the most exquisite painting, or the most noble piece of sculpture. Quite certain was it that no good work could be produced by the cramped efforts of designers who saw nothing beyond the mere buffet, chair, or table they were working upon, and who could not realise or conceive the proportion and general arrangements of the room it was designed for. It would be well for English art when architects, sculptors, and painters would not consider it derogatory to their rank to think out and design the lowliest piece of furniture, or the pattern and colouring of a wall-hanging or floor-covering. The taste, as well of the art workman as of the general public, in furniture and decoration had been raised by the exhibitions and loan collections of the past thirty years, and he thought good service had been rendered in this form of education by the vast number of good examples brought together at South Kensington. Furniture had in every age followed the fashion of the architecture of the period. After the 16th century, in furniture as in architecture, there was a manifest decline in artistic design, proportion, and beauty, and exaggeration and eccentricity were usual; but in the 18th century there was, for a brief period, a return to greater simplicity and soberness of design and form. The reaction from the voluptuousness and exuberance of the past century brought back for a while quieter and better taste in all design, and a seeming desire to return to Classic character and feeling. Still later the designs of furniture as of decoration were principally copied from the wall paintings of Pompeii; but the fashion soon degenerated into feeble prettinesses, false construction and taste, and of extravagance in cost, and so into absolute copyism of many styles. The social conditions of the present day had completely changed our requirements in furniture. Our cabinets now had to contain specimens of porcelain and pottery, of gold, silver, and other metal-work, of tissues and other art-objects, which we desired to be seen by our friends, and not to be hidden behind sculptured and panelled doors or elaborate inlaid fronts. Having further traced the history of furniture, Mr. Edis said the work of the period of Louis XVI. was largely influencing the present revival of art-furniture in England, combined with the works of the English designers of a century since. In the work of Chippendale they saw great carefulness of construction, comfort, and suitability of form and arrangement, although in many of his designs there was a manifest and unsatisfactory imitation of French or Chinese ornament and form. As a type of old work suitable to houses of our own day, there was much in the modern copies of Chippendale work appropriate to the present style of house-building. Unfortunately, the craze for this kind of work not only afforded dealers the chance of charging exorbitant prices for old examples, but also encouraged a somewhat extravagant idea of the worth of modern imitations. Hepplewhite, another manufacturer of that period, endeavoured to combine elegance of design with comfort and suitability of form, and his work was now much valued by connoisseurs. In the work of both these makers solidity, comfort, and sound construction were noticeable, while there was an absence of expensive ornamentation and unnecessary turning and cutting. Sheraton at the beginning of this century raised the art of furniture-making into high repute; his work was based on that of Hepplewhite and Chippendale, with the addition of painted decoration inserted in friezes and pilasters. The lecturer thought good modern upholsterers might supply furniture of the manner and fashion of these makers at a less extravagant price than that usually charged; a good deal of unnecessary carving in the chair-backs might be omitted, and, while comfort and excellent form should be adhered to, the designs might usefully be simplified in character. A good dining-room chair, artistic in design, comfortable in shape, and of mahogany or oak, covered with leather or other good wearing stuff, ought to be made for 60s. or 70s. The lecturer here exhibited some good examples of modern Chippendale and Sheraton work, lent by Messrs. Jackson and Graham and by Messrs. Gillow, and said he saw no reason why such firms should not give us this kind of work at a more moderate price. While we were necessarily dependent on skilful handicraft for many articles of furniture, there was nothing to prevent the application of machinery for producing artistic work for the million at moderate cost. The manufacturer was not altogether to blame for extravagance and high prices, for the public imagined that they could, without help, furnish and decorate their homes; and, in matters of taste, believed they had as much a right to have an opinion as the skilled professional artist. Hence people often handed themselves over to some inferior decorator, whom they thought they could lead, and who began by bowing down to their own expressed fancies, flattered their vanity, and ended by perpetrating gross anachronisms, and supplying vulgar designs in furniture and decoration, oftentimes at an excessive outlay of money. Only a few days ago he heard of a lady selecting a carpet, who, when told that the particular pattern chosen was ugly in design, quietly remarked, "Ah! well, you know, all the ugly patterns are the fashion now." Nonsense such as this showed the gross ignorance and conceit of a large proportion of the public, and the influence of the so-called schools of decorators. Why could not people understand that good taste and simplicity went hand in hand with common-sense, while eccentricities and extravagances were not only vulgar, but senseless? In everyday furniture we wanted everything to be fitted to its purpose; that it should not be extravagant in design; that it should be absolutely useful; and, if a chair or couch, perfectly comfortable. Why should cabinets, made to hold collections of china and other artistic objects, be elaborately carved and gilt, and furnished with rows of tiny turned balusters, utterly useless, but terribly costly. Unpretentious, simple framework was all that was required, with glass-inclosing doors, to protect the objects from dust. Tables should be strong, and made of good, well-seasoned wood, the legs plainly and inexpensively turned and not contorted in form; all carving and moulding was utterly thrown away on the legs of a chair or table, which were, as a rule, hidden from view. The legs should be set well back out of the way. The present telescopic tables were much more useful and convenient than the old style of long-framed table, which some were mistakenly trying to reintroduce. Chairs should be made to the shape of the back, strong and sound in construction, with neither projecting carving nor bossy ornament to torture the back, nor lines of brass-headed pins to catch and tear ladies' dresses. Both chairs and couches should be comfortably stuffed and luxurious in breadth of surface for rest and ease. All these couches, including easy-chairs (which ought to correspond to their name) might be made at moderate cost, if elaborate—and inconvenient—turned wood framing were not asked for. The dining-rooms of many London houses were arranged with recesses in one end, in which it was obviously suggested that the sideboard should be placed. Until quite recently these "buffets" consisted of two flanking cupboards with an open central space, a heavy dresser-top with two or three drawers often made with bulbous and flowing fronts, and the whole was surmounted by an enormous glass inclosed within a heavy twisted and carved frame. The art was bad, the construction worse, the expense enormous, and the fitting-up anything but satisfactory, the drawer-space being utterly wasted. Nor had any great improvement been made in late years in this necessary piece of furniture for a dining-room; true, there had been greater elaboration in design, carving, turning, and balustrading had been amplified, panels gorgeously inlaid, and cost increased in proportion. As a buffet or "dressoir" was for practical use and not for show, except for that of plate, china, and glass, the design might be very much simplified, and a useful piece of furniture—with carefully-arranged cupboards, cellarets, and drawers, with a moderate-sized Venetian glass at back, flanked by shelves and glass-inclosed cupboards—might be made of mahogany wainscot or deal painted, free from mouldings, turning, and carving, but good in form and design, for a considerably less sum than that charged for an ordinary sideboard by any good manufacturer. Buffets containing drawers for engravings or photographs, cellars for wine, and the usual cupboards, fittings, and dresser accommodation, might be made quite as artistic and more inexpensively than the elaborate productions to be seen in most dining-rooms. With the buffet might be incorporated serving-hatches from the small back-rooms, or light lifts from the basement. Window recesses were not sufficiently utilised in sitting-rooms, whereas in them well-stuffed divans, with plain deal-framed seats and risers, fitted up for newspapers or magazines, might easily be provided. In bedroom recesses might be arranged hanging-closets for dresses, with shelves for linen and boxes for boots and bonnets. The door might be of deal panelling, from 7ft. to 8ft. high, with a looking-glass in centre from top to ground, and shelves should be carried to the top so as to leave no undusted space. Much constructive furniture of this character could be arranged in a house, artistic in character, easily removed, eminently useful, and withal inexpensive. The labour involved to servants in carrying water from floor to floor, and occasional breakage of crockery, might be avoided by a more general use of fitted lavatories in bed and sitting-rooms; but this must not be entertained unless the waste-pipes could be emptied free into the open air and quite disconnected from drains. These basins could be fitted with a plain marble-top sink for brushes and other toilet necessaries, and fitted under with a small inclosing cupboard, provided with racks and shelves for boots and shoes. Most modern mantelpieces were commonplace in character and abominable in design and construction, and, as they would destroy all decorative effect in a room, he would urge their immediate removal, together with the grates, and their stowing away in a cellar till the lease shall expire. In their place could be so fitted up some more light and suitable construction that it could be removed and replaced by the former boxed marble finishings when necessary. In the dining-room the mantelpiece might be of unpolished wainscot mahogany, American walnut, or polished deal, with a lining of black Siena marble; the lower panels might be filled in with painted subject tiles or delicate carving of fruit, the main shelf broad enough to carry the various ornaments, with perhaps a centre panel for a good portrait or subject-picture enframed in boldly-carved moulding; on either side plain panelling might be carried up to ceiling-line, with recesses for sculpture or bronzes, or tiers of shelves, and the top finished, perhaps, with a bold curved cove, filled in with stamped leather or decorative enrichment. For the drawing-room and library mantels of somewhat similar character might be devised, with subdued delicate embroidery, painted tiles or Japanese lacquer panels, with recessed shelves lined with velvet, the side formed into groups of shelves or brackets, and the centre filled with a splayed Venetian glass. In the library, shelves and flanking cupboards for cigars, china, and books, would carry on the general furniture of the room. Why should not flanking air and dust-tight cupboards be provided for guns, swords, and fishing-rods, and the various paraphernalia of the sportsman or soldier? All these things might be thought to be costly, but they could be provided for from £20 to £100—far less than many would willingly spend on a picture or piece of china, which, however beautiful, would not give half the delight, pleasure, or variety afforded by an harmonious and beautiful mantelpiece. On the walls were hung a number of illustrative sketches, some by Mr. E. W. Godwin, and other architects, but chiefly from the lecturer's pencil, of mantels, which had been, he explained, executed at a cost varying from £20 to £60, inclusive of glasses, grates, and tiles, and in the more expensive examples of wainscot mahogany and American walnut. In small bed or drawing-rooms the mantelpiece might, to a certain extent, be formed into a sort of dressing-table, with a looking-glass in the centre, fitted with movable gas brackets, and flanked by small cupboards. This, in bachelor's rooms, would be infinitely better than the movable table which usually occupied the whole window space, and the white dressing-cover of which, however charming when first put on, soon became spotted with blacks and dust. In ordinary bedrooms, a

plain deal painted and varnished mantel could be put up for a very small expense. Messrs. Longden and Co., of Sheffield, had sent a simple bedroom chimney-piece, made by them from the designs of a well-known architect, in deal, red-lacquer painted, with grate, and decorated tiles, the total cost of which was £4 17s. inclusive. In the hall, this kind of simple design with cupboards, and fitted up for gloves and brushes, and with a lining of tiles (which could be procured of good design and colour at a shilling each), would be a pleasant and useful feature of the entrance. If it were not wished to remove existing grates and mantels, it was possible to adopt a mode of fitting up some useful design over the old shelves, and so to avoid interference with existing arrangements without employing the commonplace, tasteless, and eminently dirty, alternative of a wooden mantelboard covered with velvet or cloth, with senseless and useless fringe, as recommended by some of the authors of the late series of pamphlets on what was, Mr. Edis thought, miscalled "Art at Home." As to grates and fenders, nothing could be worse in taste and design than many of these, the burnished steel with ormolu moulding frequently used necessitated a large outlay of time and labour in keeping clean, and the grates were as extravagant in coal consumption as they were ugly in design. It was feasible to have good artistic grates combined with obtaining a maximum of heat from the fuel, and in large rooms where access could be obtained to the outer air by means of the well-known ventilating grates, fine warm fresh air could be supplied to rooms at comparatively small expense. The slow-combustion grates made by Messrs. Barnard, of Norwich, from the designs of Mr. Jekyll, the architect, were good both in artistic treatment and in construction and scientific arrangement for throwing out the greatest amount of heat with the smallest expenditure of coal. They could be obtained at from 25s. to 50s., according to size, the tiles and fixing being probably about as much more, and the saving in price, labour of cleaning, and coal, would repay the cost of a new grate in an ordinary seven-years lease, so that the occupier would be recouped this expenditure, even if the grate were treated as a fixture to be presented to the landlord. Dog-grates, as now made, cost no more than the usual bright steel and ormolu, and, with tile linings, were eminently adapted for the dining and drawing-room, burning either wood or coal, being more comfortable and more artistic than ordinary grates. In his own house the lecturer had adopted this kind of fireplace and grate, and was quite satisfied with the result from an artistic, useful, and economical point of view. The usual fenders of cast or burnished steel, with ormolu enrichments, were commonplace and hideous; they were constantly becoming unscrewed or offering traps for ladies' dresses, were dust-collectors, and were very costly, and difficult to keep clean. He advised that they should be sold at once and replaced by plain polished marble or hard stone fenders, which could be made at prices ranging from 50s. to £5 or £6, and were better in every respect. Care must be taken that they were not made of the usual section, with a face at right angles to the hearth, as that arrangement rendered it difficult to properly brush out the dust and dirt from the angles. The section should be curved or splayed gradually down to the hearth surface, so as to form a moulded frame. Fire-irons should be as plain as possible, their purpose being for use, not show, and these could be either on the marble fender or on plain movable stands. If marble fenders were objected to, a simply-designed high fender, rising 2ft. from floor, could be substituted, with plain wrought-iron bars, and filled in with pierced brass-work, or, if any additional protection were required, the screen of same height could be made movable, with a steel or wrought-iron frame, filled in with brass or steel wire netting.

In conclusion, the lecturer said he had endeavoured to throw out some suggestions for obtaining art-furniture suitable for modern uses, modern requirements, and moderate purses, and to insist that the aim of all true artists should be to produce furniture at a moderate cost, beautiful in design, detail, and form for everyday use. Now the best of our cabinet-makers had for the most part shown a desire to substitute general simplicity of form and detail for extravagance and eccentricity of design and combination, it was to be hoped that in their conscientious endeavour to produce things artistic they would in articles of domestic use seek to combine comfort and utility with soundness of construction, simplicity of design, and moderation of cost. Everything in the house should first of all be "fitted for a place and subordinate for a purpose," all forming part of a great and harmonious whole in companionship and accord with the beautiful things with which so many delighted to fill their houses. In thus making the home beautiful and attractive, the owner was imperceptibly exercising an influence for good upon all who saw it stronger than any words, an influence that would perhaps continue powerful and intelligible to fellow art-workers, for long years after its originator had sunk in the oblivion and death of the past.

AN IMPROVED GLAZIER'S TOOL.

LETTERS patent have recently been obtained by George Frederick Redfern, of 4, South-street, Finsbury, London, as a communication from and on behalf of Messrs. Savage and Betts, of Kingston, Ont., Canada, for a novel tool for the use of glaziers, picture-frame makers, and all others having anything to do with setting glass. Fig. 1 is a view of the underside of the tool, and fig. 2 a full plan of the same.



A represents a plunger, provided with a handle at one end and having a longitudinal slot *c*, through which is passed a set screw *d*, that enters the bar or plate B. A longitudinal rabbet *a*, is made to the bar B, extending its entire length, and the plunger moves freely in this rabbet, it being limited in its movements by the screw *d*, which likewise holds it in its place. At the front end of the bar B, is a sliding metallic plate *f*, covering the rabbet so that the plunger moves inside of it when reciprocated. The bar B is also provided with a triangular opening under plate *f*, as shown by dotted lines in Fig. 1. From this opening on the opposite side from plate *f*, extends at right angles the prismatic receptacle or triangular trough C, the angles and sides of which coincide with the angles and sides of the opening in the bar B, from which it extends. This trough is provided with a sliding door E, as shown in Fig. 2. The door E is also provided with a slot, which engages the spring and draws the spring with the follower back with it to the top of the trough, thus allowing the trough to be filled with the points with ease; the door E is then pushed down, the slot allowing the spring and follower to remain on the top of the points, the action of the spring keeps the points pressed down to the end of the receptacle, and the last one on the end opposite the spring bears against the inside of the plate *f*, when the plunger is withdrawn, the space being sufficient to admit one point only at a time. The operation of this tool is as follows:—The receptacle being filled with the points and the trough closed in, the plunger is withdrawn as far as it will go. The tool is then placed with the plate *f* bearing upon the wooden back or glass, as the case may be, while the end of the bar B is placed against the side of the frame at the point where the metallic point is to be driven in. The plunger is then driven in, and its end coming in contact with the base of the point (which is towards it, as indicated by the dotted lines in Fig. 1) drives it forward and into the side of the frame or sash. As soon as the plunger is drawn back again another point takes the place of the one driven out by the plunger. In this way, it is claimed, great facility and rapidity in driving these points is obtained, and the trouble and time occupied in picking up the points, and placing them and driving them with a chisel, is avoided.—*English Mechanic.*

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE fortnightly meeting of the Institute was held on Monday evening, the President, Mr. John Whichcord, F.S.A., in the chair. The following new members were elected by ballot:—As Fellows: Robert Willey, Associate, Ludgate-hill, E.C.; and Edward Blakeway I'Anson, M.A. (Camb.) Laurence Pountney-hill, E.C. As Associates: George Ransome, Queen Anne's-gate, Westminster, S.W.; Charles Francis Blackett, late Captain Rifle Brigade, Portman-square, W.; and William Edward Brown, Bramerton-street, Chelsea, S.W. As Honorary Associate: Conrad William Cooke, Westminster-chambers, S.W.

The President said all would be gratified to learn that Mr. T. H. Wyatt, their honorary secretary, who had been so seriously ill that his friends had almost despaired of his recovery, was so much better that he had at first proposed to come that evening, but prudence had prevented the carrying out of that resolution.

Mr. Jas. Allanson Picton, F.S.A., of Liverpool, read a condensation of his paper upon "Iron as a Material for Architectural Construction," which will be found on p. 497. He prefaced his lecture by remarking that he had now retired from the profession, although he took a deep interest in it, and he had therefore ventured to accept the invitation of the council to write a paper on Iron, hoping for it that the members would agree in the words of our great dramatist that "Where good will is shown, though the action comes short, it will be pardoned."

Professor A. W. B. Kennedy followed with a paper on "Mild Steel," which we shall reproduce in a shortened form next week.

Dr. C. W. Siemens, F.R.S., at the President's request, opened the discussion. As his name had, he said, been connected by Professor Kennedy with one of the processes for making mild steel, he should like to make some remarks on the practical use and adaptability of steel as a constructive material. Steel, as the Professor had observed, had not been well defined. We called the material of which watch-springs were made, which was remarkably elastic up to a certain degree, and then proved brittle, and also the material of rails and the tires of carriages, which was hard, tough, and wear-resisting, by the same common term, "steel." And now people called by the same name a metal which exceeded copper in ductility—a substance stretching 25 per cent. before breaking. Yet he was in favour of continuing the use of the name steel in speaking of any of these three materials, because they all had one circumstance in common: that they had been produced from iron ore by the complete fusion of the ingredients of which they were formed. It was by this perfect fusion that their superior homogeneity and strength was acquired. In puddling iron the workman only took out a ball of metal that had been massed together. This one ball of iron was never the same in molecular and chemical composition as any other ball; each successive ball was "older," *i.e.*, more mature, than the last, and although all might be hammered together, careful microscopical examination of the material would show that the metal was not homogeneous; the balls were glued together in welding, but were still distinct and only joined together. Whereas, in producing steel, all portions were perfectly combined, chemically and mechanically, into one pure mass before being run into ingots. Having satisfied himself that he had the required material, the worker deliberately ran the mass into the ladle and then into the moulds to give the particular shape wanted. While harder modern steel was thus more uniform in character than wrought iron, or than the steel previously in the market, which occasionally gave way in an unexpected manner, there was still a feeling of uncertainty as to the behaviour of mild steel, but this would be gradually got rid of, and he predicted that steel would be used with confidence for very many purposes previously unknown, and that it be trusted to a very much higher limit of strength than had hitherto been the case. For large architectural works steel would be found of great service. For purposes where boldness and grandeur were essential no material could rival steel. When a bridge one-third of a mile in span was wanted no other material could be used. That would be readily admitted, but a more important question to architects was how this class of steel would compare with its old

rivals, iron and wood, in ordinary construction. Let them take the building of an every-day house as an example; he would venture to say that the use of steel in such an edifice would not only be safer, but also better constructively and absolutely cheaper than the modes now employed. In ceilings, steel rafters might be introduced; wood would probably be considerably cheaper at the outset, but the other material would be more permanent, and at least six or eight times stronger. Another consideration ought to enter into a comparative calculation. Whereas the depth of floor and ceiling in woodwork would not be less than 14in., in steel a depth of 9in. would suffice, so that the total saving in space in a building five floors high, would be at least 2ft. Now, by simply squaring the area of house, say, 35ft. by 60ft., and multiplying by these 2ft., they would find they had saved in cubic capacity a space which, at 14d. per cubic foot, would be worth not less than £210, and this should be placed to the credit of the steel girders. The speaker mentioned that in his own house he had a billiard-room carried out under a terrace, and that it became desirable to raise the roof of the room, and he also wanted to lower the terrace a little. The roof had been built in the ordinary way, of brickwork, concrete, a lead flat, and asphalte, and he managed, by putting in a steel roof and replacing the lead and asphalte, to gain 18in. in space, and secured what had hitherto been unattained—a water-tight roof. The reproach had been raised by Captain Shaw that steel was unreliable under fire. This was perfectly true as to cast iron, which gave no indication before yielding, and to some extent with wrought iron; but mild steel was so elastic that it gave ample warning by deflecting before giving way, and had much greater strength. Not only so, but it had been fused under such extreme heat that he questioned if any ordinary fire would be of sufficient intensity to produce more than a bend in the material, and if used as a skeleton covered with cement it would be perfectly reliable. There was no necessity architecturally to hide steel, for it could be worked into elegant forms, rivalling the ironwork of Mediæval times. The working of wrought iron into artistic shapes had been given up, owing to the rise of the blast-furnace; but mild steel had again provided a material of extreme tenacity and strength, suitable for such purposes. Thus architects had for use a material homogeneous in character, extremely ductile, and yet very hard, so that it would bear immense strains unimpaired, and gave ample warning by deflection before breaking. All these qualities would, he hoped, make mild steel in the future a valuable material in architectural work.

It being now past ten o'clock, the President suggested an adjournment till the 24th May, the intervening meeting being the annual one. Professor Kerr and Mr. Walker moved that the meeting be adjourned till that day week; but the President stated that the Council would be too busy to attend on that evening, and on a division the longer adjournment was adopted. A cordial vote of thanks was passed to the readers of the papers.

AN ARCHITECT'S EDUCATION.

THE opening meeting of the third session of the Glasgow Architectural Association was held on Tuesday week, when an address was delivered by the new President, Mr. John Honeyman, who said he should avail himself of the privilege of age, and offer some practical advice as to the professional education of students. In order that the Association should do more to encourage and assist its members, it should, first of all, largely increase its numbers, and then it should follow the example of the London Architectural Association, with the necessary variations to suit the needs of Glasgow. While the London classes for practical topics might not be suitable, yet he would propose a scheme which would be an improvement on this—viz., that the association should procure six of the more experienced members of the profession to lecture to them every winter, on such subjects as foundations, walls, roofs, floors, and partitions, the arrangement of apartments, and drainage and ventilation, each lecturer to deliver only one lecture on one of these six subjects in rotation; and, further, that at the end of each session an examination on the subjects embraced in the course should take place, at least two prizes being awarded for the best replies. He should recommend that the same subjects should be hammered at year after year, but by fresh lecturers, and he had no doubt as to the probability of their getting well qualified architects to lecture upon each. He warned the students, however, that any progress made by the Association would depend not on the officers, but on the diffused enthusiasm, the persevering effort of each individual member. Every student ought to devote his mind, during at least a portion of his time, to serious and indefatigable study. There were two kinds of knowledge—theoretical and practical. Every one could acquire the first for himself and by himself, though he would be greatly aided by emulation and sympathy of others; but the latter kind of knowledge could only be obtained from practical men. Of this practical knowledge there were again two kinds—that which consisted in knowing how to do a thing, and the more difficult science of understanding when to do that thing. The last-named kind would only be gained by painful experience, but much of both kinds of knowledge might be learned from other people's failures and successes. Now that office hours were so light, it was possible to get an hour or two's work in a plumber's shop, or other subordinate trades, or in the study of chemistry, geology, &c. At the same time literary and artistic pursuits must not be neglected. In conclusion, Mr. Honeyman urged the necessity for honourable conduct in the minutest particulars, and for paying regard to the rules of professional etiquette so as to increase the feeling of *esprit de corps*, if a student would in after life be respected and looked upon as an architect, and if he wished to enjoy the approval of his own conscience.

THE INSTITUTE REPORT.

THE annual report of the Council of the Royal Institute of British Architects was issued to members yesterday, and will be considered at the annual general meeting to be held on Monday week, the 3rd prox. The report states that of the 339 Fellows on the list at the last annual meeting, three—Messrs. A. F. Livesay, S. W. Mayhew, and E. M. Barry, R.A.—have died, four have resigned, and two have ceased to be Fellows, while twenty-three new Fellows have been elected. Of the 341 Associates at the same time, two—Messrs. H. Field and C. A. Gould—have died, four have become Fellows, and four have ceased to be members, while 44 new Associates have been elected. Of the 106 Hon. Associates, three have died, two have resigned, and the election of one has become void, while 14 new members have been elected in this class. Three hon. and corr. members have died, and one new one has been elected. The roll of subscribing members has risen from 709 in 1878 to 786 in 1879, and 833 at the present time, the increase of professional members being from 639 in 1878 to 680 and 719. The revenue account of ordinary funds for the year ended 31st December last shows an excess of income over expenditure of £671 7s. 11d., and that though £67 10s. was specially expended for professional revision of the account-books; outstanding accounts amounting to £352 18s. 3d. were paid, yet a balance of £530 7s. 4d. was secured, and that notwithstanding the transfer of £63 9s. 5d. from ordinary to the trust fund. All entrance fees of professional members will in future be carried to capital account. A pleasant feature of the report is that arrears of subscriptions have been reduced in the year from £156 to £42. The Council congratulate the members on the satisfactory completion of the alteration to the premises occupied by the Institute, at a total outlay of £4,068 8s. 10d., towards which only £1,026 15s. has, however, been received in subscriptions and interest of surplus income invested for the purpose. Tribute is paid to the services of the chairman of the building committee, under whose direction the work was accomplished, Professor Barry, R.A., whose death occurred after the completion of the undertaking, and whose judgment and eminent business capacities had been of the greatest value. Another committee has just completed a consideration of the examination of candidates for membership, and has prepared a fresh scheme for the examinations, which will be submitted at the general meeting. The scheme, which is arranged under eleven heads, may be stated briefly: that the examination shall be in professional subjects only; that the test shall not at first be severe, and that the names of those who pass shall be returned alphabetically; that the examination shall consist of (*a*) probationary work, consisting of authenticated proofs of the candidate's ability in drawing and perspective; and (*b*) a written and oral examination in history of architecture, features of some selected style, filling-in of outline block plan, specifications, mode of dealing with dangerous structures, strength of materials and contracts, dilapidation, and general practice. That there shall be not less than two examinations each year, and that these may be held in provincial towns, under the supervision of local architectural societies. After some arrangements as to fees and examining bodies, a clause provides that all practitioners who have been in actual practice prior to January 1st, 1875, shall be exempted from submitting probationary work. The "Conditions of Builders' Contracts" have been augmented, after conference with the London Builders' Society, by the following clause:—

"Upon every or any such reference the costs of and incidental to the reference and award respectively shall be in the discretion of the referee or arbitrator, who may determine the amount thereof or direct the same to be taxed, as between solicitor and client, or as between party and party, or otherwise, and may award and direct by whom and to whom and in what manner the same shall be borne and paid, and this submission may be made a rule of any division of the High Court of Justice upon the application of either party, who may instruct Counsel to consent thereto for the other party without any notice being given to such party."

Reference is made to the fact that the Queen has approved the recommendation of the Institute that the Royal Gold Medal for the current year be awarded to Mr. J. L. Pearson, A.R.A. Only two examinations have been held by the Board of Examiners appointed under the Metropolitan Building Act, owing to the large number of candidates already in the field for any vacant post of district surveyor, and the report "warns applicants that this particular examination is one of a statutory character, intended for none but those who are *bonâ fide* candidates for the office of district surveyor." The special committee on professional competitions is continuing its inquiries. In conclusion, it is announced that the next General Conference of Architects will be held during the summer of 1881, and is to be followed in 1884 by another Conference, in celebration of the fiftieth anniversary of the foundation of the Institute.

THE SEWERAGE OF ABINGDON AND TORQUAY.

AT a meeting of the Institution of Civil Engineers on Tuesday, the 13th of April, Mr. W. H. Barlow, F.R.S., President, in the chair, the first paper read was on the "Abingdon Sewerage," by Mr. C. Foote Gower, M.I.C.E. Being under notice to desist from any longer discharging the sewage of their town into the River Thames, the authorities of Abingdon called upon Mr. Bailey Denton, M. Inst. C.E., in the year 1874, to advise them as to the best means of dealing with the sewage, so as to satisfy the requirements of the Thames Conservators. Mr. Denton having, with the assistance of the author, made an inspection of the town and neighbourhood, recommended that 20 acres of land should be acquired, for the purpose of cleansing the sewage by intermittent filtration, and gave at the same time a general description of the necessary sewers, pumping-station, and other works since carried out.

The population of Abingdon was about 6,000; but provision had been made, in the construction of the works, for at least 10,000 persons. The normal flow of sewage, when undiluted, was taken at 250,000 gallons per day. The ordinary level of the Thames at Abingdon was 162ft. above Ordnance datum. In flood time it reached nearly 167ft. The River Ock was kept up for the purpose of working mills at a level of 168ft. The surface levels in the streets of the town varied from about 170 to 200ft. above Ordnance datum. The subsoil water in that part of the town contiguous to the Thames accorded pretty nearly with the river level, 162ft.; but in other parts of the town, previous to the carrying out of the sewerage works, it was regulated by the level of the Ock Mill Stream, and the consequence was that it sometimes rose, in wet

seasons, almost to the level of the streets, and proved injurious to the health of the inhabitants. The sewers in Abingdon were formerly very inadequate for the duty required of them; they had been retained, however, in connection with the street gullies, to carry off rain-water from the streets. The level of the land selected for the purification and utilisation of the sewage varied from 165 to 168ft. above Ordnance datum. From the general surface, height, and contour of the town, it was impracticable to bring the sewage on to this land without lifting it from 10 to 20ft. from the invert of the outfall sewer. In the design for the new sewers no rain-water was to be admitted except from back-yards, roofs and other surfaces, from which it could not economically be kept out. Having regard to the purification of the sewage, and the necessity for pumping, every precaution was therefore taken to keep the quantity to be dealt with within definite limits. The level of the subsoil water in Ock-street and other places had been reduced by laying separate drains, open jointed, beneath or contiguous to the sewers.

In laying the sewers the joints were caulked with tarred gasket and cement, and in some cases were bedded and surrounded with concrete or clay puddle, to prevent the ingress of subsoil water or the escape of the sewage into the surrounding soil. Meanwhile, the town having been without a public water supply, arrangements were made for flushing the sewers by inlets from the river, and from other sources. The main outfall sewer from the town was 18in. in diameter, and was capable of discharging 2,000,000 gallons in twenty-four hours, being eight times the estimated dry-weather flow of sewage. The secondary sewers in the town consisted of 15in., 12in., and 9in. pipes. The lower portion of the outfall sewer was 3ft. 6in. in diameter, and served as a reservoir to hold the night flow of sewage, in connection with the pumping-station. This sewer was at times subject to considerable internal pressure from the sewage collected in it, as well as to external pressure from the subsoil water outside, being 8ft. below the ordinary level of the Thames. Each engine could pump 400 gallons of sewage per minute; thus both engines working together would lift above 1,000,000 gallons per day. In connection with the engines, a storm overflow from the pumping reservoir had been provided to relieve the latter in case of heavy storms, floods, or accidents to the engines; upwards of 100,000 gallons must flow into the reservoir before any overflow could take place. This provision was more than enough for the night-flow of sewage, if the reservoir was pumped empty at the close of the day. The cost of the sewerage of the town had been £8,750, including a portion of the charge for private connecting sewers, which were executed by the contractor for the main sewers up to the boundaries of private properties on each side of the street. The cost of the engines and pumping-station, including fencing of yard, weighing-machine, and sewage-screens, had been £2,500, of which sum the engines cost about £800. The annual cost of pumping for the last two years had not exceeded £150; but with an increase of water-supply it would probably be somewhat greater. The area of land acquired by the Corporation of Abingdon was more than double what Mr. Denton at first proposed. The farm, with cottage and buildings, was let at an annual rental of £4 10s. per acre, the Corporation pumping the sewage. The works were practically completed in 1877, and from that time, with but little exception, the Thames had been free from Abingdon sewage; the land first received it, and after passing through the soil, the effluent water flowed into the river. Samples of the effluent were found by analysis to be better in quality than the water of many of the wells in use in the town. The sewers were freely ventilated throughout the town by shafts, which were also used for inspection and for flushing. The latter operation had to be put into force at least twice a week, owing to the comparatively sluggish flow, the amount of water used for domestic purposes being very small.

The second paper read was on "The Main Drainage of Torquay," by Mr. George Chatterton, M.A., Assoc. M. Inst. C.E.

The author stated that Torquay, on the northern shore of Torbay, had a population of about 30,000. Previous to 1878 the sewage of the town was discharged into the bay by three outfalls, and was a nuisance at low water, and in hot weather. The main sewers were constantly closed at their outlets by the sea, which at high water flowed up a considerable way into the town; many of them were of insufficient capacity, and the ventilation being defective, foul gases were driven into the houses. The scheme described was designed and carried out by Sir J. W. Bazalgette, C.B., V.P. Inst. C.E. Its main features were a high and a low-level system of sewers. The high-level sewer commenced near Tor Abbey, and has an outfall at Hope's Nose, the eastern extremity of Torbay. The set of the tide at the point of outfall was from the bay at all times, and at present no sewage could enter the bay. The total length of the high-level sewer was 17,030ft., and it was 7ft. in diameter for a length of 11,387ft.; the fall was 1 in 1,177; the level of the invert at the outfall was 4·16ft. below high water of spring tides. The quantity of water brought into the town daily was 600,000 gallons; the dry-weather flow of the sewers was about 1,250,000 gallons, the difference being caused by the streams, springs, and overflow of wells, which had been taken into the sewers. In constructing the high-level sewer, it was necessary to drive three tunnels—at Waldon-hill, Meadfoot-hill, and Kilmorie-hill respectively. The Waldon-hill tunnel was in Devonian limestone; it was 1,150ft. long, the size being 5ft. 6in. by 4ft.; it was driven from two open faces, the average progress was 9·12 lineal feet per week from each face; hand labour alone was employed, and the invert portion was lined with Portland cement concrete. The cost of the sewer completed was £1 16s. per lineal foot. The Meadfoot tunnel was 4,458ft. long; the sewer was 7ft. in diameter. This tunnel was in limestone rock for the greater part of its length, but some of it was in soft ground. Hand labour alone was employed, it was driven from four working shafts; the average progress per week from each face was about 15ft. Where the ground was limestone it was lined with Portland cement concrete 9in. thick, while the sewer in soft ground was formed of brickwork. The average cost per lineal foot for driving this tunnel was £1 9s., and the total cost of completed sewer £2 10s. per lineal foot.

A new roadway and sea-wall were constructed along the Meadfoot beach, with the sewer under the road. The sewer consisted of a single ring of brickwork, surrounded with, and founded upon, lias lime concrete carried down to the solid rock. The sea-wall was 1,900ft. long, and was built of random-coursed limestone masonry, backed with rubble. The Kilmorie Hill tunnel was 4,564ft. long. The nature of the rock varied greatly; in some places it was an argillaceous siliceous grit, with bands of pure quartz, and extremely hard; in other places it was of a shaly composition, while near the outfall it was limestone. The advance per week by hand labour was so slow that it was found necessary to introduce rock-boring machinery at the open face and at one shaft. The progress in feet per week was increased by using rock-boring machinery at the open face in the ratio of 2·33 to 1, and at the shaft in the ratio of 2·19 to 1. The cost per lineal foot was also increased but not in a corresponding ratio. Ingersoll rock-drills were used, and the air was compressed by Sturgeon's high-speed air-compressors. Dynamite was found to be the most effective and economical explosive; 11 tons of it were used without a single accident. There were thirteen ventilating shafts on the high-level sewer. The flow of sewage was continuous, so that sewer-gas was not generated to anything like the same extent as in tank sewers. There had been no deposit in the sewer. The low-level system received the sewage of about one-tenth of the population of Torquay; the total length was 5,184 feet. Surface-water was kept out of this system as far as possible. The low-level sewage was lifted about 15ft. by a water-pressure engine, with pumps in duplicate. The pumps were worked by a head of 250ft. of water from the town main, and required no superintendence.

A contract for the construction of the works was entered into in 1875, but in January, 1876, the contractors suspended operations, having executed work to the value of £8,000. On receiving fresh tenders, the Local Board became alarmed; the lowest tender was £75,000, and this did not include the cost of extra work and other items, which would have involved a total outlay of £103,327, while the engineer's estimate for the same amounted to only £65,000. Under these circumstances the Local Board, acting under the advice of Sir J. W. Bazalgette, determined not to accept any tender, but to execute the works themselves by administration. Mr. G. Phillips was appointed resident engineer, and the whole scheme was completed by August, 1878, or in two years and five months from the commencement of operations by the Local Board. The total cost of the scheme to the Local Board was £66,145, a saving to the town of £37,182 by not accepting the lowest tender. The cost of the Kilmorie tunnel was £14,358, or £3 2s. 11d. per lineal foot. Of this amount, the cost of the driving was 74·53 per cent. of the trimming, 15·98 per cent., and of the lining 9·49 per cent. The rock-boring machinery cost £1,395. The execution of the works had involved a rate of about sevenpence in the pound on the present rateable value.

BATTEN'S VENTILATOR AND MAN-HOLE COVERS.

MR. W. BATTEN, C.E., of Lozell's-road, Handsworth, near Birmingham, has invented a new form of road-grating for our sewers, combining a ventilator, flushing-box, and lamp-hole for sewers. He believes, and, we think, with good reason, that it is useless to attempt to connect the drains of houses with sewers in an air-tight manner, and accepts the principle now universally held, that ventilation can best be obtained by providing external openings by leaving the sewers to ventilate themselves by means of grids in the centre of the roadway. There are one or two serious objections made to this plan. As to the escape of gas in the road to the detriment of general health, we are disposed to deny the assertion, for the openings are numerous in the length of a sewer; but the other objection has some weight in it, namely, that a large amount of road waste is washed down into the sewers, which choke them up. Mr. Batten's ventilating man-hole prevents the last-mentioned mischief, by intercepting the road washings, which fall into two external chambers. An opening in the grid allows, at the same time, the sewer gas to escape. The inventor says:—"The removal of the solid matter is easily effected in a few minutes by simply inserting a piece of bent flat iron into the dirt-receiving boxes, or external chambers. By withdrawing a bolt that temporarily fixes the cover, free access is given to the ventilating-shaft for the introduction of a lamp, or for the purpose of flushing the sewers." Mr. Batten claims advantages over other man-holes, especially in regard to the separation of the solid from the liquid matter, readiness of removal of the solid, free ventilation, and easy access. The invention has been adopted largely in Birmingham, Walsall, Warwick, and various other towns and sanitary districts. The section given by Mr. Batten hardly explains the apparatus; a plan is also wanted to make it comprehensible, or another section taken the other way; but the construction is simple, and there is nothing in it that would require attention—no elaborate trays or cumbersome fittings to need constant attention.

CHIPS.

At a meeting of the water committee for Bonhill and Jamestown, N.B., held on Thursday, it was agreed to proceed with the Pappert-muir water scheme, the estimated cost of which is about £5,000.

An inquest was held at Ryde on Saturday on the body of Frederick Feben, a master builder. He was ascending to the roof of a house, when the ladder broke and he fell to the ground, fracturing his skull. A verdict of accidental death was returned.

The opening of a new Congregational chapel took place at Stratford-on-Avon, last Wednesday week. The architect is Mr. H. J. Paull, A.R.I.B.A. of Montague-street, Russell-square, London, and Manchester, and Messrs. Roberts and Son, of Stratford-on-Avon, are the contractors. The style of architecture is English Gothic of the Decorated period. The chapel will seat a congregation of 500, and has cost upwards of £3,000.

The first fleet of timber-vesels for the season arrived at the Hartlepools on Saturday, and with the advance in prices of many classes of wood, and in freights, there is every probability of a brisk importing season, the more especially in that district, as the early opening of the new docks will largely increase the accommodation for discharging.

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ILLUSTRATIONS.

SELECTED DESIGN FOR THE CARDIFF NEW FREE LIBRARY.—ARTISTS' HOMES : NO. 1. MR. WILLIAM BURGES' HOUSE IN KENSINGTON.—AN IRON ROOF, 42FT. SPAN.—MISERERES FROM LINCOLN CATHEDRAL.—OLD LIBRARY AT NOYON.

OUR LITHOGRAPHIC ILLUSTRATIONS.

NEW FREE LIBRARY, MUSEUM, AND SCIENCE AND ART SCHOOLS, CARDIFF.

The necessity for a new free library, museum, and science and art schools in Cardiff has been evident for many years past. Ten years ago a fund of £1,000 for the purpose of erecting a building was realised as the proceeds of a Fine Art and Industrial Exhibition held in Cardiff, and at various times within the last twelve years, schemes for a suitable building have been brought before the Cardiff public. During last year the project was taken up energetically by the corporation, and after considering several sites, it was resolved to erect the building on one adjoining St. John's churchyard, which had become the property of the town. Competition drawings were accordingly advertised for, and on the first day of this year, 107 sets of designs were sent in by architects in various parts of the kingdom. After a lengthy consideration, the committee recommended that the design which we publish to-day, submitted under the motto "Reference," should be awarded the first premium of £100, subject to the authors, Messrs. James Seward and Thomas, architects, of Cardiff, being able to satisfy the committee that the building can be erected for the amount of their estimate, £8,000. The site, although rather small, possesses great advantages as to position, having a frontage on to a main street at each end, and being open for light on the north side, an indispensable requisite for some of the art-rooms. In all their planning arrangements the authors have carefully adhered to the conditions laid down by the committee, notably in the absence of any means of communication between the schools entrances and the library, whereby the chance of the rooms in the latter being used as a thoroughfare by persons passing from one street to the other, is avoided. The librarian and his assistants are so placed that the whole of the whole of the library-rooms are immediately under their supervision, and two entrances to the library are provided, so that ladies and students using the reference library and the borrowers' department, need not encounter the usual newspaper-readers in entering or leaving. As required by the conditions, prominence has been given to the reference library, around which the books are stored in alcoves, accommodation for 100,000 volumes in all, including possible extension of storage-space, having been provided. The science and art schools are arranged to permit of both science and art teaching being carried on without interference, the one to the other, and separate entrances are provided for males and females, an arrangement which greatly conduces to steady work, and to the maintenance of a proper discipline. A laboratory is provided in connection with the science rooms, which is lit by the prescribed end-lights to the working benches, and also by a large ventilating skylight. Economy of space in the placing of the advanced students' table is obtained by continuing it into the recess of the oriel window, shown in the Trinity-street front ; at the other end of the building the front is balanced by a slightly-projecting oriel at each angle ; these contain the staircases and lavatory arrangements of each sex, by which means the latter are kept clear of the rooms and passages, and are also accessible from each room separately. The museum, which occupies the top floor, will be roofed with bold semicircular iron ribs springing from the floor. It has a top as well as side lights. The vitiated air from the various rooms will be extracted by means of a shaft adjoining the staircase, and which passes through the whole height of the building. We shall publish alternative views, submitted by Messrs. James Seward and Thomas in this competition, in an early number.

ARTISTS' HOMES—MR. W. BURGES' HOUSE, KENSINGTON.

See description on p. 497.

AN IRON ROOF OF FORTY-TWO FEET SPAN.

The above roof is designed to cover a building 117ft. long and 41ft. wide between the walls, or 42ft. from centre to centre of columns, if columns are used. The following particulars will be sufficient to base a specification on, together with the details supplied in the above drawings. There are 13 ordinary principals constructed of tee-iron 3in. by 3½in. by ½in. trussed as shown, and resting in wrought-iron shoes on walls or columns ; the shoes are made of ½in. wrought-iron plates, riveted to a sole-plate with rivets countersunk on the under side, and are fastened to the principal with ¾in. rivets or bolts, as may be desired. Each rafter has a tie or truss-rod 1½in. diameter, and one 1⅛in. prepared in centre with eye to receive ends of counterbrace and struts, which are attached with 1¼in. bolt, and at each end a jaw is formed to clip the ½in. junction plates and also the shoe to which the 1½in. tie-rod will be secured by 1⅛in. bolt, and the 1⅛in. rod by 1¼in. bolt as shown in detail. The struts, 3 to each rafter, are formed of two tee-irons 3in. by 2in. by ½in., riveted back to back with ⅝in. rivets and fastened to rafter with 1in. bolt ; the centre strut is fastened to junction-plates with two 1in. rivets. The counterbraces are formed of ⅞in. round iron with jaw formed at each end for fastening to rafter and junction of truss rods with 1in. and 1¼in. bolts ; the rafters are secured to each other with two king head-plates ½in. thick, cut to the form shown, and riveted with ¾in. rivets ; they are further tied together with a horizontal tie formed of 1⅛in. iron, with jaws at either end to take junction-plates, to which they are attached with 1¼in. bolts ; there is a ⅝in. suspending rod secured to king head-plate by ¾in. bolt, to take up any sag that may appear in the horizontal tie. The hip principals are of the same section as used for the ordinary principals, and connected in the same manner, of which details are given. When the tie-rods of these hip principals come together, they are secured by two ½in. plates as shown, with 1½in. bolt. The Jack rafters are trussed with a ⅞in. rod as shown, and with the secondary Jack rafters are 3in. by 3½in. by ½in. tee-iron, having shoes the same as ordinary principals. The slating-laths are placed 10½in. apart for Duchess slates, and are fastened to rafters with two ⅜in. rivets ; they are afterwards filled in with 1¾in. square Memel battens coated with tar and bedded with thick red-lead paint ; they are bolted to slating-laths with 5-16in. bolts, 2ft. apart, with their heads let in flush with the wood. The weight of one principal complete, independent of slating-laths, is about 11cwt. 3qr. 0lb., and the weight per square of 100ft. covered about 809lb. ; this does not, however, include the weight of slate.—F.R.H.

ROYAL ARCHITECTURAL MUSEUM SKETCHING CLUB.

This week we publish another page of Mr. T. F. Pennington's sketches of casts in the Architectural Museum at Tufton-street, Westminster, the selected subject being some quaint misereres of the Decorated period from the choir-stalls in Lincoln Cathedral. Drawings of bosses and crockets from the same cathedral, and also by Mr. Pennington's pencil, were reproduced in the Building News for June 21, 1878, and amongst other recent detail illustrations of this Minster are the wrought-iron chancel-gates, given from Mr. Lethaby's drawings in our issue for Sept. 27, 1878, and the south porch to nave, Feb. 28, 1879. Mr. Mackenzie E. C. Walcott's general plan, showing the cloister and close arrangements, appeared in this journal Feb. 8, 1878.

LIBRARY AT NOYON.

The measured drawing and details of the street-front of the picturesque old library in the city of Noyon, has been executed by Mr. A. Ardron. A clever sketch by the late Mr. F. C. Deshon, showing this library with the huge mass and twin spires of the cathedral rising behind it, was reproduced in our pages on March 3, 1876, and a close comparison of the elevation and perspective of this façade furnished by the two lithographs will afford new proof of the accuracy as well as delicacy, vividness, and piquancy, which marked the productions of poor Deshon's pencil.

COMPETITIONS.

Aberdeen.—Messrs W. K. M'Kelvie and Alex. M'Culloch, A.M.I.C.E. civil engineers, of Dundee, have been awarded the first place for their design for a new cemetery which the Trades' Hospital in connection with the Seven Incorporated Trades of Aberdeen resolved some time ago to lay out on a portion of their land at Gallowhill adjacent to King-street. Competitive plans were invited, and twelve were received, including six from local firms, three from Edinburgh, one from Elgin, one from Forfar, and one from Dundee. The committee appointed to adjudicate upon the plans have, as already stated, awarded the first place to the designs from the Dundee firm, the second place being given to Mr J. Mackenzie, C.E., Elgin, to whom a premium was awarded. The estimated cost of the work is about £4,000.

CHIPS.

A motion is before the Court of Common Council respecting the completion of Blackfriars-bridge. Sir Frederick Leighton, P.R.A, has, it is said, communicated with the Lord Mayor as to the unfinished condition of the bridge, and ample means, now lying ready, have been provided for perfecting the structure and its accessories. The bridge ought of course, to have been before this completed, in accordance with the designs and provisions of the engineer, which include the addition of appropriate groups of statuary to be placed upon the pedestals provided for that purpose at its extremities.

Extensive alterations and additions are now being carried out at the premises of the late West of England and South Wales District Bank at Cardiff, for the National Provincial Bank of England, who have lately bought the buildings. The architect is Mr. J. Gibson, F.R.I.B.A., London, the contractors being Messrs. Jones Bros., Park-street, Cardiff. The London and Provincial Co., and the National Bank of Wales are contemplating erecting new banks respectively shortly at Cardiff.

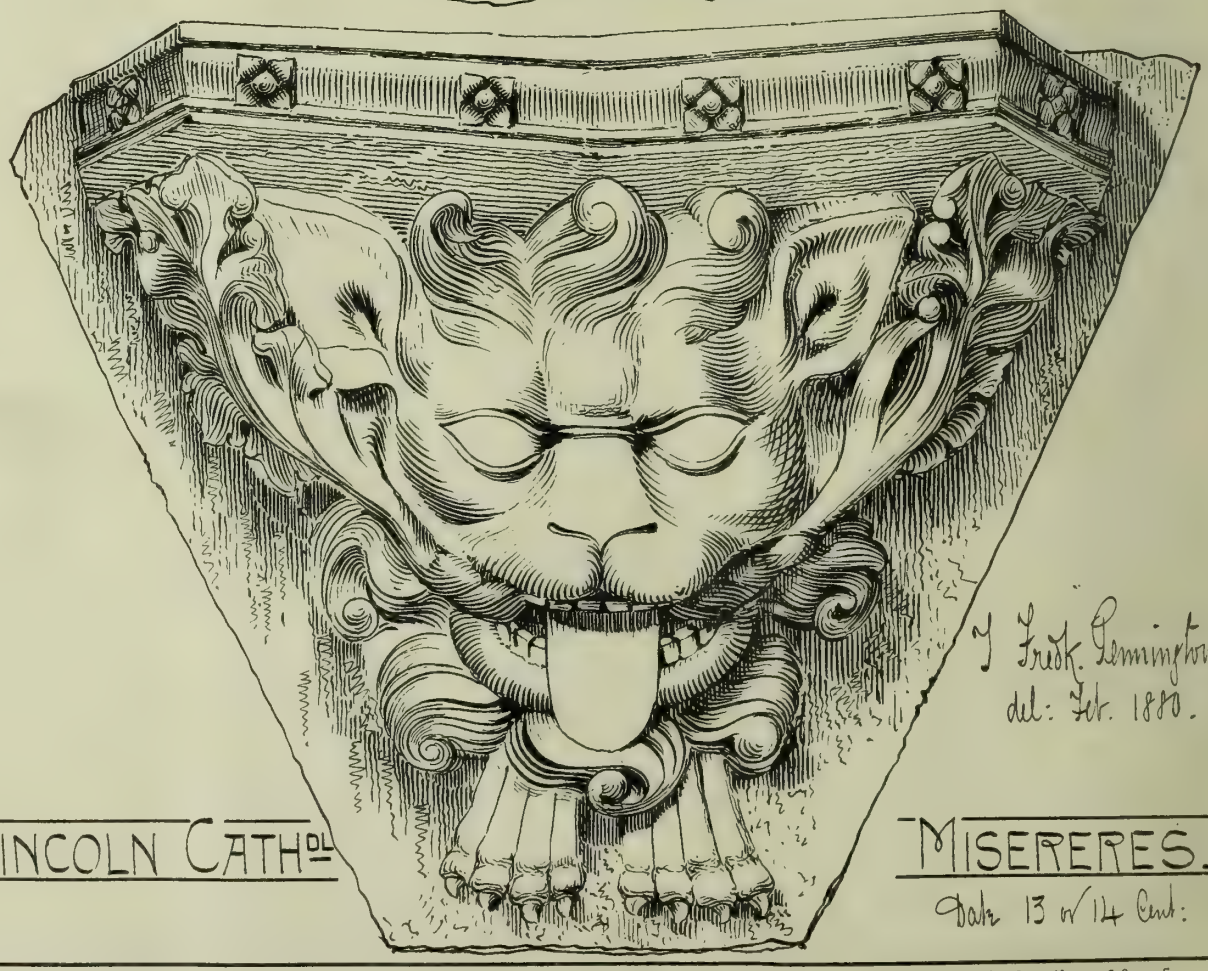
A movement is stated to be on foot in the Chelsea parishes for the formation of a wide thoroughfare, leading with a curve, from the new houses (built in flats) in Sloane-square to Sydney-place, leading into Onslow-square. Part of the proposed scheme is to lay out the whole of the disused churchyard of St. Luke's, Chelsea, which would be passed *en route*, as a beautiful pleasure-ground. New blocks of buildings are to be erected for the displaced poor. The property through which the new or improved street would pass is of a very cheap "cottage" nature. The "Hans-place scheme" is likely to be taken as the model ; and the sites thus thrown open for building are expected to yield a handsome return.

Mr. R. W. G. Haward, architect and surveyor, was, on Saturday, after three days' poll, elected assistant overseer for Newark-on-Trent, in the room of Mr. Geo. Sheppard. Mr. Hayward polled 1,079 votes, and Mr. Dunipace, architect, also of Newark, polled 144 ; majority for Mr. Hayward, 934. It is stated to have been one of the most exciting elections ever fought in Newark, more votes being polled than in the Parliamentary election. The successful candidate was, amidst ringing cheers, carried shoulder high to his residence.

LIBRARY

ROYAL ARCHITECTURAL MUSEUM SKETCHING CLUB.





J. Fredk. Lemington. del: Feb. 1880.

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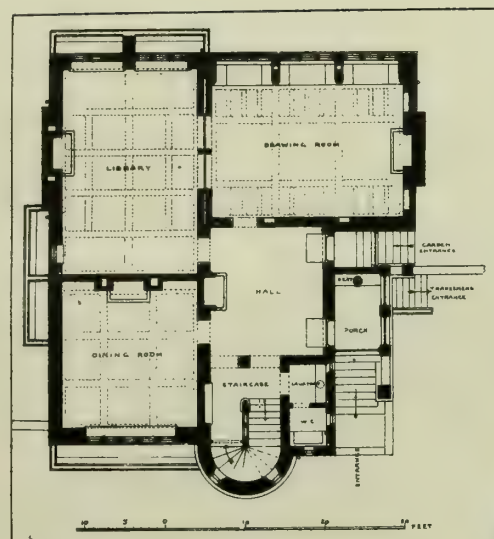
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Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

ARTIST'S HOMES No I

Mr WILLIAM BURGES' HOUSE KENSINGTON

WILLIAM · BURGES · F.R.I.B.A.
· ARCHITECT ·



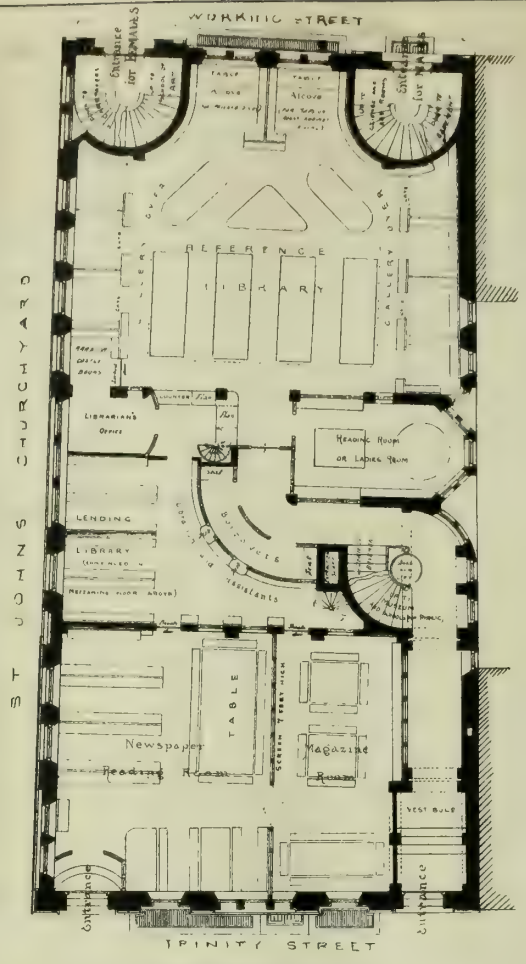
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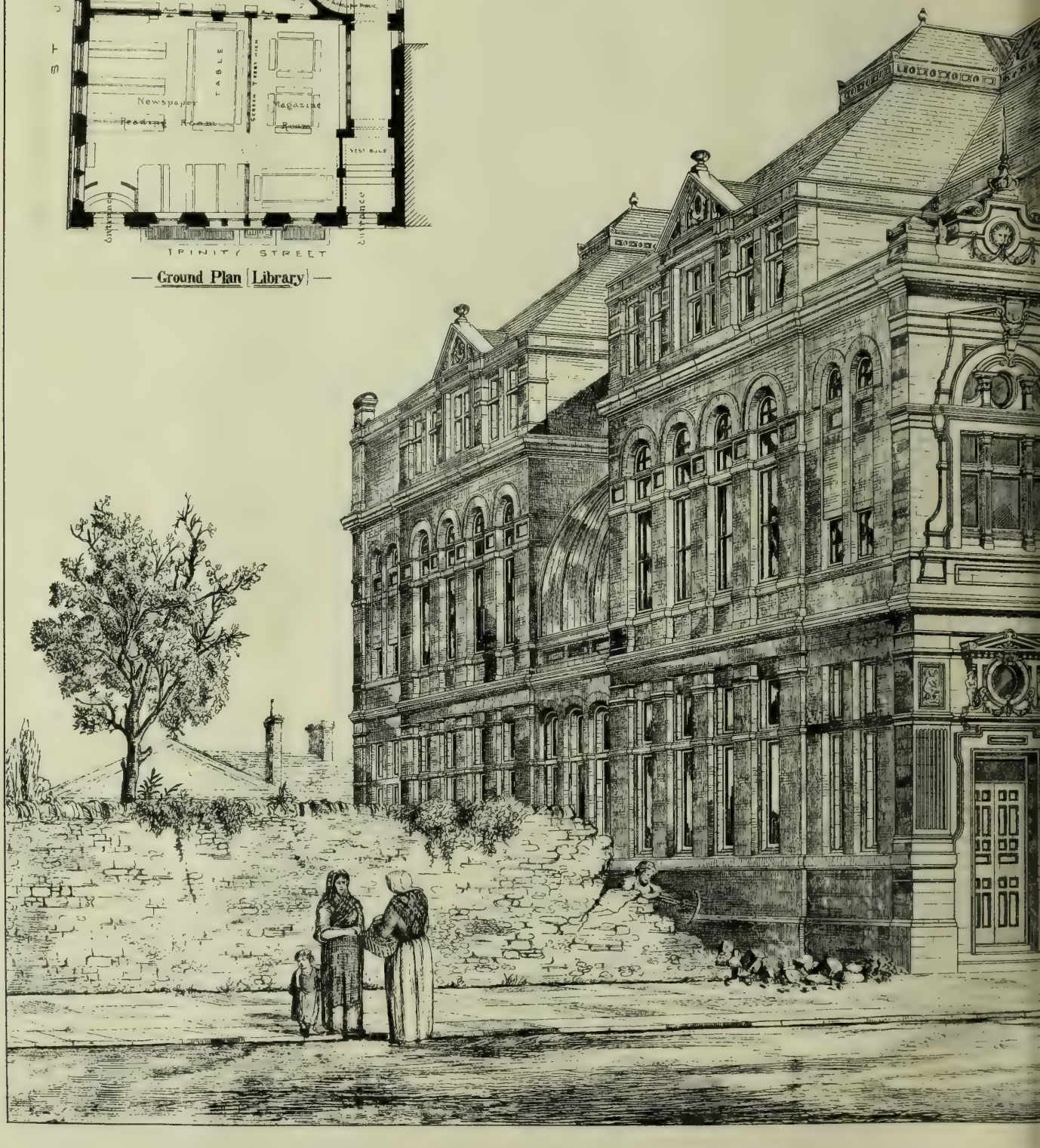
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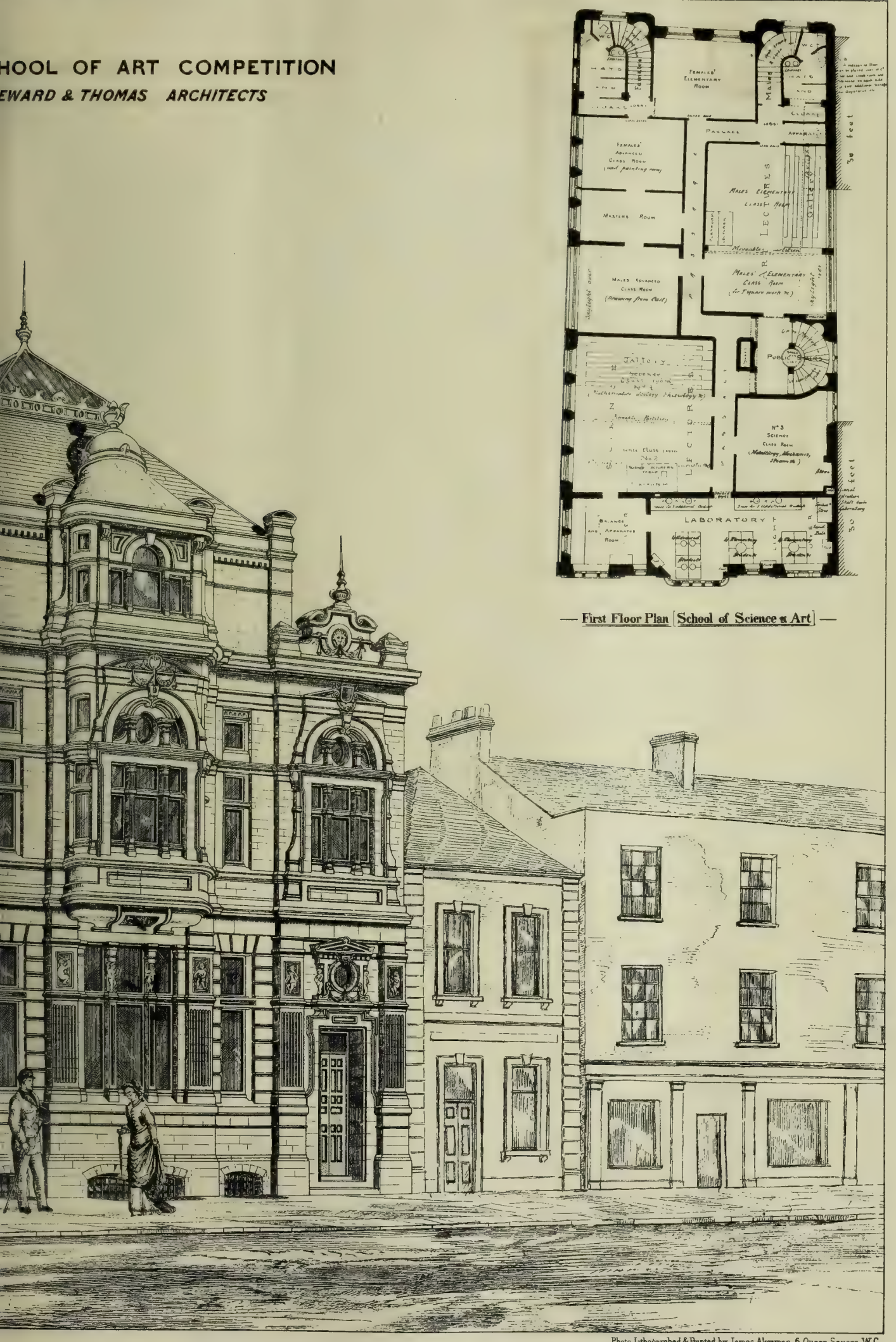


— Ground Plan [Library] —



HOOL OF ART COMPETITION

EWARD & THOMAS ARCHITECTS



— First Floor Plan [School of Science & Art] —

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

AN IRON ROOF 42 FT SPAN

BY F.W. HARTLEY C.E. BIRMINGHAM

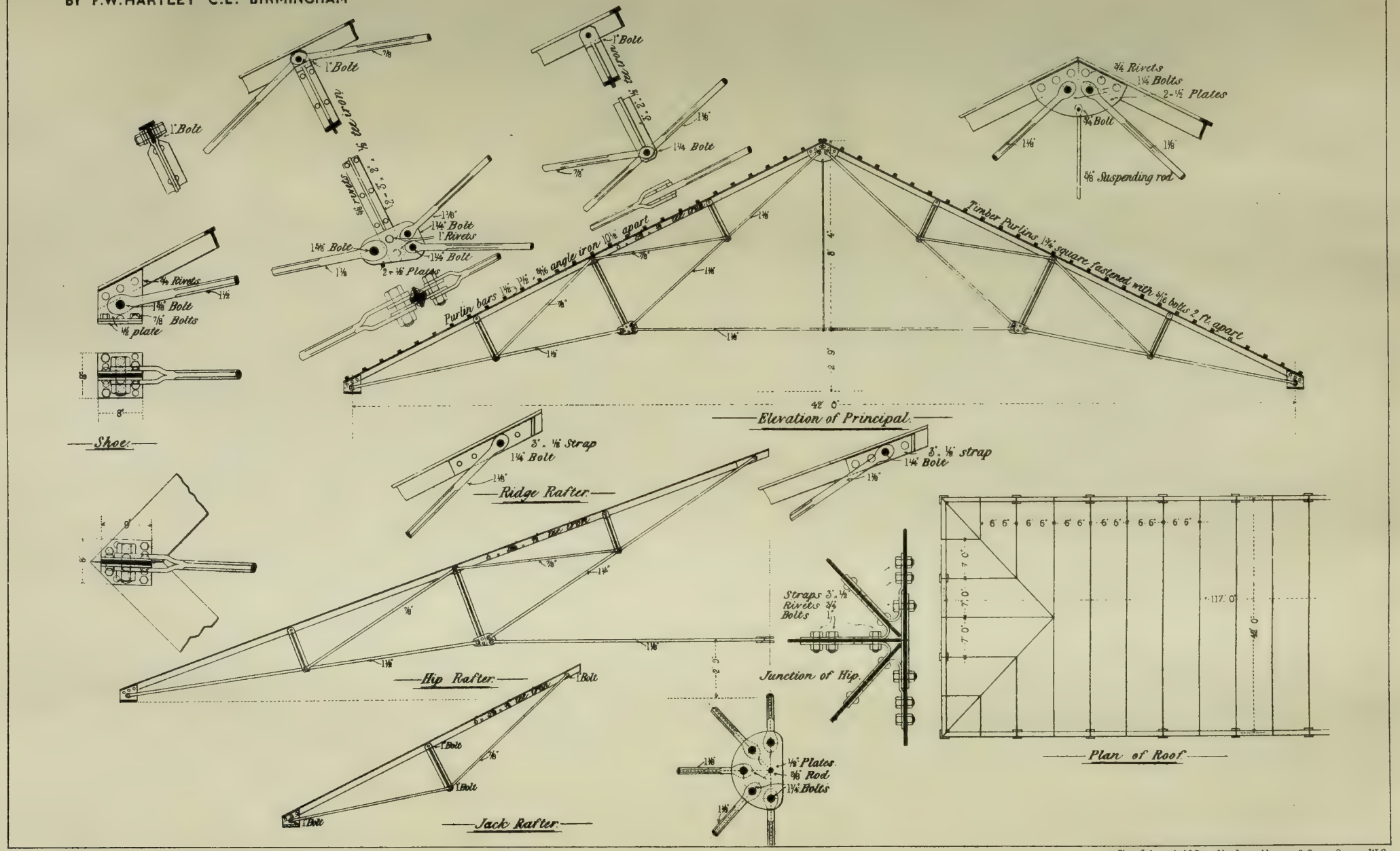
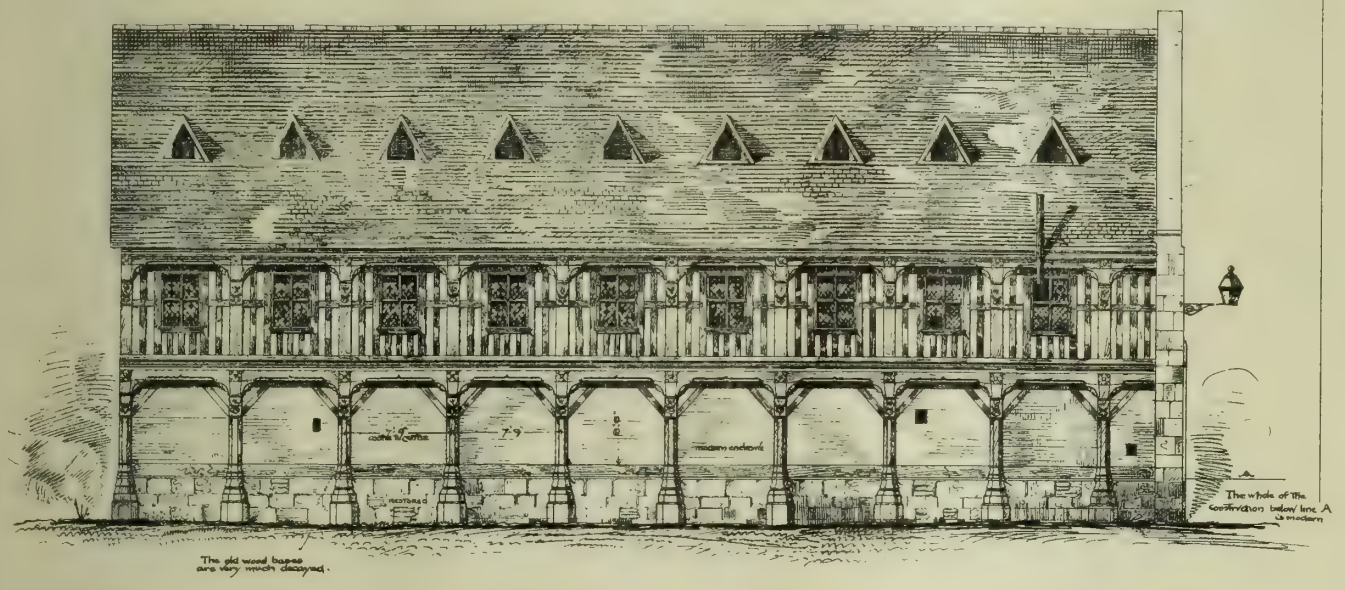


Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

Elevation of Old Library
NOYON



Scale.
10 9 8 7 6 5 4 3 2 1 0 10 20 30 feet

A. Ardron. Del. 1878

Old Library
Noyon
Details

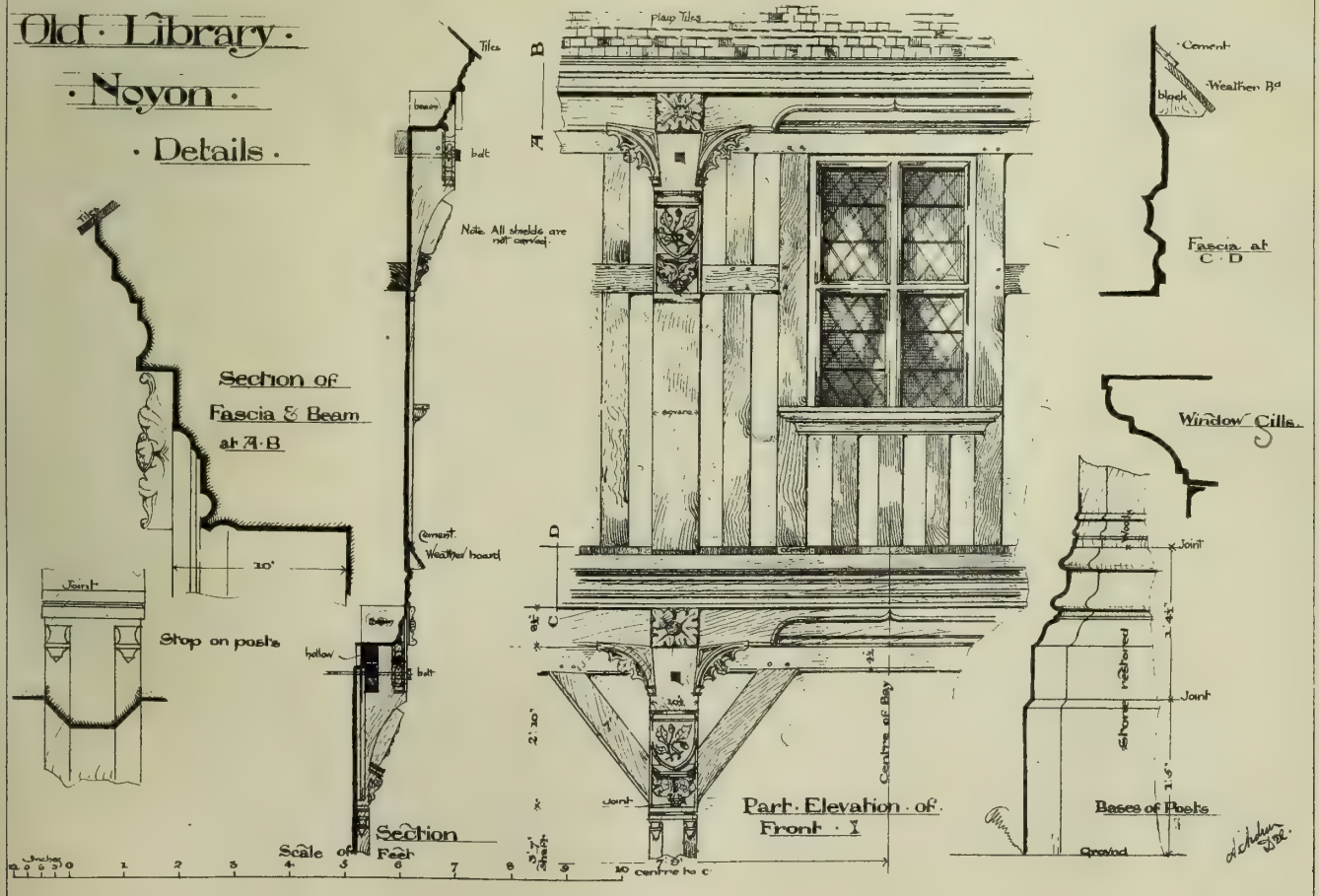


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ARTISTS' HOMES, NO. I.

MR. W. BURGES' HOUSE AT HOLLAND PARK.

TO-DAY we commence a series which we propose to continue, of views and plans, illustrating the houses of some of our leading painters, architects, and sculptors, arranged under the general title of "Artists' Homes." An astute observer who has known Mr. Burges for a very long time, recently remarked that either that architect was fifty years before his day in the matter of style of architectural design and its general scheme of decoration, or else he was working on an entirely mistaken track. This proposition, posterity only can answer completely. Mr. Burges believes in 13th-century Gothic, he always has believed in it, and he acts conscientiously up to the faith which he professes. His buildings, however, have mostly had to suffer under one great disadvantage—viz., that of being judged as examples of art while they are in an incomplete state, simply because their completion, depending so largely as it does on decoration, must be the work of time. The house which Mr. Burges has erected for himself in Melbury-road, Holland-park, and which we illustrate to-day, is intended as a model modern house of moderately large size in the 13th-century style, built to show what may be done for 19th-century every-day wants, with that mode of design and form which Mr. Burges considers second only to Greek architecture, a style which he holds to be unsuited in every way for English wants and manners. Mr. Burges' house, therefore, must, in a special sense, be considered as a trial piece, or rather as a sample of what its author and owner would like to see more generally followed. By the plan which we give, it will be noted that the kitchen and offices are in the basement, the ground-floor being occupied by the three reception-rooms, and hall with staircase. The general outline of the planning is square and simple, giving symmetrically-proportioned rooms, and an exceedingly quiet outline to the exterior. The elevations are executed in red brick, with stone lintels and sills to the windows, cornices, and gables. The roofs are covered with green slates and red ridge tiles. The only external carving is the bas-relief over the library windows in the garden-front, and the gurgoyles to the eaves of porch and back gable. Those who only know the house from the view we now give of it, will have but a small idea of the rich and complete way in which the interior is finished. The entrance and garden doors are of solid bronze, inlaid with silver, having alto-relievo representations of the four ages of man in the former, and a figure of the Blessed Virgin with Child in the upper panel of the latter. The letter-box flap in the side wall has a small figure of Mercury, enriched in his dress by inlaid silver letters. The hall is decorated with light red lines in square and constructional forms, with large-size figures of the sun and moon enriching the end walls. The pavement is in marble mosaic enlivened with figure subjects, while the large window which lights the hall and gallery over is fitted, like the rest of the windows throughout the house, with painted glass of the most beautiful character. The subjects in the hall windows illustrate the four periods of the day, represented by female figures issuing from clanging bells, which proclaim the passage of time as the planets represented mark its progress. The fire-place, like those in the dining and drawing-rooms, is hooded, and contains a dog grate. The dining-room is lined with a dark marble dado, the upper parts of the walls being intended for tile decorations, with the idea of making the room washable, so to speak. The two cabinets on either side of the fire-place contain many choice specimens of Mr. Burges' designs in the way of dining-table silver, and service, a cistern in copper being provided for the supply of water, in which the more valuable and delicate articles may be washed without being removed from the room. Spaces are left in the marble dado for bronze-framed pictures which will be let into the walls. The decorations of the library are completed, and a very splendid effect is undoubtedly obtained. The fire-place is in onyx, having an elaborately-carved cornice over in highly-painted and gilded stone, illustrating the letters of the alphabet, and figures representing the several parts of speech. The library book-cases are enriched with painted panels, chiefly by Mr. Weeks, the figure subjects being taken from the building trades, which follow the letterings which mark the cupboards; thus, for example, A was the architect, B was the bricklayer, &c. The fun and humour of some of the figures is very interesting, especially the pompous strut of the distinguished R.A. Some of the panels in the other parts of the room were painted by Leighton, Burne Jones, Holiday, Albert Moore, and Stacey Marks. The lower parts of the windows are glazed with plate-glass in metal casements, and clear glass is also preserved in the ground-work of the upper lights where the painted glass occurs. A granular surface is obtained on the walls by rough canvas, on which gold diapers of varied design are painted. The ceiling of this apartment, like the others throughout the house, is boldly framed with massive beams and countersunk panels, but is here simply enriched with lines of colour, the main body of the work showing the wood as it left the joiner's hands. The drawing-room is divided by a columned opening, hung, like all the door-openings, with rich hangings, running doors also being in this case used. The fire-place in the drawing-room may well be described as the gem of all the work and design found in the whole house, so charmingly is it conceived and finished, with a series of admirable figures ranged between a conventional treatment of trees, the foliage of which forms the foliation of the cornice. The ceiling is to be richly decorated with figure subjects, like the frieze running round the room. The windows here, like those throughout the house excepting the guest-chamber, are provided with a double set of spring roller-blinds instead of shutters, one set being made of richly embroidered moleskin fabric which is perfectly opaque, so that a thoroughly decorative feature is made of the blinds themselves. The staircase is contained in the turret seen in our view, which we may here remark is from particulars taken on the spot with the material assistance of a fine photograph, taken by Mr. Bedford Lemere, of the Strand. The windows are richly coloured, and the soffit of the stairs is decorated after the manner of the hall, over which runs a projecting gallery communicating with the bedrooms. Mr. Burges' bedroom is immediately above the library, and here bright red is the groundwork of a vigorous scheme of colour in which the ocean and its inhabitants form the figure-subjects for wall and ceiling decoration. The hooded mantel is enriched with a large mermaid, whose head, turned from the light, obtains that which her mirror reflects full in her delicately carved face, which by this means obtains a brilliant prominence. The guest-chamber over the dining-room is simply a magnificent apartment, so gorgeous are its colourings on a groundwork throughout of gold, on which brightly-painted flowers in natural tints and renderings are made to play a most important part. The coloured glazing of the windows through lattice-work of Eastern character completes the story. It is here that Jennings' patent tip-up basin is to be seen, cut out of a solid marble block, and inlaid with gold and silver fish, like that in Mr. Burges' own room. A cistern over forms the water supply instead of the usual water jug, and for taps the most grotesque figures in bronze, set with jewels, play their part. The other principal apartment on this floor is the armoury, in which Mr. Burges' well-known collection is arranged. On the upper floor are the Monkey, and Jack the Giant-Killer hooded fireplaces, the former being in the room known as the night nursery, and the latter as the day nursery; but the owner having thus far remained unmarried, the small occupants usually found in such apartments are conspicuous, at Melbury-road, by their absence. The other rooms are devoted to maids' rooms, and the kitchens and offices are in the basement. The gardens are laid out with raised borders, having dwarf brick walls, and some large marble benches ranged round a mosaic paved terrace, in the centre of which is a carved statue, form a prominent feature at the back of the house, where the richly-wooded expanse of Holland-park completes the background.

New offices for the Clerk of Peace for Glamorganshire, are about to be erected at Cardiff, in Westgate-street, on a site secured from the corporation. Mr. H. Cheston, of London, is the architect.

We are informed that the annual meeting of the Association of Municipal Engineers will be held at Leeds on the 27th, 28th, 29th of May next.

IRON AS A MATERIAL FOR ARCHITECTURAL CONSTRUCTION.*

THE object of the present paper is to trace out the use, progress, and capabilities of iron as a building material, and to inquire in what direction these capabilities are leading us, and what influence they are likely to exercise on construction and design in the future. Important as iron has now become in connection with building, it was the latest of the metals so employed, and is, comparatively speaking, of very late introduction. There is no metal so widely diffused as iron. It exists in the atmosphere of the solar orb, and in that of many others of the heavenly bodies, and on our own planet it occurs in a vast variety of forms, and in many combinations. The reduction of wrought iron from rich ores is not a very recondite process, requiring considerably less knowledge and skill than is necessary for the production of bronze or brass, but the great heat and dexterity of manipulation required, were sufficient obstacles to defer its general use for a very long period. Countless ages existed since man appeared on the earth before metals were employed at all, and then rather in the shape of tools, implements, and weapons, than for any constructive purpose. Gold and silver were doubtless the first metals employed for ornamental purposes in buildings, from their intrinsic brilliance, their ductility, and their occurrence in a native state in superficial deposits. Copper would be the next metal brought into use, occurring as it does in native deposits, and having great facilities for working. How, when, or where the composition of copper and tin forming bronze came into use is a mystery on which investigation has hitherto thrown very little light. It is a remarkable fact that widely diffused as are the deposits of prehistoric bronze implements, extending over the whole of Europe and a great part of Asia, and limited as were the supplies of tin to very few localities, the composition of bronze is found scarcely to differ in the slightest degree, containing uniformly 87·5 of copper to 12·5 of tin.

After some historical references to the use of iron by the Jews, Greeks, and Romans, Mr. Picton said: The smiths of the middle ages laboured under many disadvantages. Rolling mills were unknown; the iron in its reduction from the ore had to be painfully wrought out by manual labour, the only mechanical aid being a tilt hammer worked by a water-wheel. Even the file had not been invented; the hammer, with the assistance of the punch and chisel, was the only instrument available. And yet with these imperfect means, what marvellous works did these old smiths achieve; in richnes of fancy, in beauty of form, in adaptation to special purposes, in soundness of material and excellence of workmanship, nothing that modern times can show is fit to be compared with the smith's work of the middle ages. The free-flowing scroll-work of the hinge bands, branching out into foliated and floral forms; the rich and elaborate intricacy of the locks, frequently cut out or forged from the hardest steel; the bolts, ring-plates, knockers, handles, staples, brackets are each works of art characterised by individuality of conception, and infinite variety of design. Two descriptions of mediæval smith's work are especially worthy of notice; the well-covers, and the grilles or iron screens. Unfortunately, there are not many of the first remaining in anything like perfection, but sufficient fragments are in existence to indicate their extreme beauty. The rich and graceful curves, the combination of lightness and strength, show us what capabilities exist in iron when freely treated in accordance with its nature. Specimens still extant at Troyes, Beaune, Marcoussis, Antwerp, Ghent, and other places, fully bear out this estimate. Probably the grilles or screens, and the gates of the middle ages exhibit the art of the smith in its greatest perfection. Of these, multitudes remain, of an infinite variety of design, no two being exactly alike. The wonder arises, that with such simple means, such wonderful effects could be produced. I may mention as worthy of notice the grilles in St. Gudule at brussels, that round the tomb of Queen Eleanor at Westminster, at St. Denis, six miles north of Paris, and the tombs of the Scaligers at Verona. These glories have passed away, and circumstance have so

* A paper, by James Allanson Picton, F.S.A., read before the Royal Institute of British Architects, April 19, 1880.

changed as to prevent a possibility of their return. M. Viollet-le-Duc on this subject remarks: "In the fabrication of iron applied to works of art it is the same as in many other cases; what is gained on the side of industry, rapidity, power, and economy of means, is lost on the side of art. In perfecting mechanical processes, we gradually neglect that tool which is superior to every other—the human hand." In the application of iron to the purposes of construction, the mediævalists were by no means so happy. During the Romanesque period, iron does not seem to have been employed either in carpentry or masonry. At the end of the twelfth century, iron cramps were employed at the cathedral of Notre Dame at Paris, to connect the stones of the corbelled cornice. The oxidation of these cramps, in the course of time, had the effect of fracturing the stones. A similar result occurred at the Sainte Chapelle, from the introduction of iron chain-bond into the walls. Even at the present day the mistaken use of iron in similar positions has frequently led to similar results. The mediæval period of the use of iron may be said to have terminated about the middle of the sixteenth century. Down to that time cast iron was unknown. The discovery of the process by which fusible iron could be smelted from the ore we owe to Germany. It probably arose from the gradual improvement of the blowing apparatus, by which the old blast bloomeries were transformed into blast furnaces. About 1550 the system was introduced into England, where there already existed great facilities, in the enormous quantity of scoriæ accumulated about the ancient bloomeries, and in the abundance of timber for fuel. Cast-iron ordnance was an article of export from England early in the seventeenth century. As the art of the moulder progressed, the art of the smith began rapidly to decline. The cheapness of cast iron, and the facility with which it could be manipulated, led to its extensive use in every department of life. The balustrade round St. Paul's is a good example of the early adoption of cast iron for such purposes. This was manufactured at the Sussex ironworks, where the abundance of ore led to a profitable trade, until the remains of the ancient Forest of Anderida, which had furnished the fuel, became exhausted. It was not until the year 1735 that the problem of smelting iron with pit coal was successfully solved by Abraham Darby at Coalbrookdale.

The eighteenth century was the period of the commencement of what may be called the iron age. Manual labour was found too slow and feeble to suffice for the rapidly-increasing demands of the world, and machinery was called in to supply the deficiency. But man's ingenuity required to be supplemented by power. It was the mighty force of steam which, at the call of science, stood forth to do man's bidding, and to place the vast resources of nature at his feet. Iron then formed the basis of machinery ever progressing; machinery, in its turn, favoured and facilitated the production of iron; and thus the reciprocal action has constantly proceeded, in an ever-increasing ratio, and will continue to do so as long as mankind have wants to supply, and the physical world has domains yet to conquer.

It is remarkable within what a recent period the advantages of iron on any great scale have developed themselves. Down to the commencement of the present century the casting of iron pipes was so difficult and costly an operation that in schemes for the supply of water to towns, wooden pipes, consisting of elm stocks bored up the centre and socketed together, were adopted for the mains. One of the earliest uses of cast iron in public works was in the construction of bridges. Bridge-building forms the border line between architecture and engineering. Old Westminster and Blackfriars Bridges were designed by architects, but since the erection of London and Southwark Bridges, and particularly as applying to iron structures, the works seem to have been handed over exclusively to the engineer.

Soon after the discovery of cast iron in the sixteenth century, proposals were issued for its adoption in the erection of bridges in Italy. The matter slumbered for nearly two centuries, and in 1755 the subject was revived in connection with a proposed bridge at Lyons, but the project was afterwards abandoned. In 1777 the first iron bridge was erected at Coalbrookdale in Shropshire, from a design by Mr. Pritchard, an architect of Shrewsbury. It is a cast-iron arch of 100ft. span, constructed with continuous ribs, and although not exactly fulfilling the theory of its designer as to its being an arch of equilibrium, it displays great skill, and has stood with success the test of a century's traffic. In 1796, another cast-iron bridge was erected over the Severn at Buildwas by Thomas Telford, 130ft. span. The same year witnessed the completion of the celebrated iron bridge over the river Wear, connecting Sunderland with Monk Wearmouth. This structure is remarkable from the boldness of the design, the novelty of the principle adopted, and the mystery which has hung over its actual authorship. It has usually been attributed to Thomas Paine, and is so recorded by Mr. Robert Stephenson and Mr. Samuel Smiles in their respective works, but more recent investigations have proved that the bridge was designed and erected by Mr. Roland Burdon, M.P. for Durham, with the assistance of Mr. Thomas Wilson. Paine had previously, in 1786, patented an invention for the construction of bridges with cast-iron voussoirs, and a model was erected near London carrying out his views. The principle adopted in the Sunderland bridge is identical with Paine's, but probably modified in its application. Burdon and Wilson took out a joint patent for the invention in 1802. The finest example of a bridge erected with cast-iron voussoirs, and one of the latest so constructed, is Southwark Bridge, built by Rennie in 1814, with a central arch 240ft. span, and two lateral arches 210ft. span.

The next development in iron bridge building was that of the suspension principle, of which undoubtedly the most beautiful specimen is the Menai Bridge, erected by Telford, and completed in 1825. The design prepared in 1814 was originally intended to span the river Mersey, at Runcorn, on the site of the present railway bridge, but the funds not being forthcoming the matter was laid aside, and revived in 1819, when Telford was employed in improving the communication with Holyhead. This bridge is 460ft. between the piers with a versed sine of 40ft. Suspension bridges are of course constructed with wrought iron, but down to the rise of the railway system, wrought iron had not been manufactured of dimensions and strength suited for large works where rigidity was required. The demands of the railways stimulated invention in this direction. Steam power facilitated the puddling and forging of much larger masses than heretofore. Rollers of a power and adaptability previously unknown, turned out plates, bars, beams, and rails, of patterns and forms unlimited in their dimensions. This improvement did not come all at once. Most of the early railway bridges were of cast iron, sometimes attended with disastrous results, as in the case of the unfortunate Dee bridge at Chester. At this period cast iron was much used in private buildings for bressummers and beams, wrought iron not being obtainable in suitable sections and lengths. The hazardous nature of cast iron when subject to cross strains, and the difficulty in many cases of obtaining abutments for bridges with cast ribs, led to the adoption in many of the early railways of cast-iron bow and string bridges, the rails being carried at the level of the ties. These expedients were ultimately rendered unnecessary by the progress of the iron manufacture. The erection of the tubular bridge over the Menai was preceded by many interesting experiments by Messrs. Fairbairn and Hodgkinson, which threw a flood of light on the nature and strength of the metal. The result in the bridge as executed, is satisfactory as to strength and stability, but neither economically nor æsthetically can it be pronounced a success. The quantity of material far exceeds the necessities of the case, and compared with its sister structure it must be pronounced unsightly in the extreme.

The latest development in iron bridge building, and that which bids fair to supersede the others, especially for railway purposes, is the lattice, the principle of which, scientifically applied, combines the greatest amount of strength with the utmost economy of material. A very satisfactory example of this principle is to be found in the London and North Western Railway Bridge over the Mersey at Runcorn, designed by the late Mr. Baker, but in length, span, and dimensions, it is far exceeded by the viaduct over the St. Lawrence, and others since constructed. The most notable, owing to recent unfortunate circumstances, is the Tay Railway Bridge, two miles in length, in 85 spans, from 245ft. downwards. Several principles of construction are introduced the larger spans having lattice-girders, the smaller ones some bowstring, and some plate-girders. Concerning this bridge, it may be remarked that experiments in tensile strength and bearing power may be perfectly satisfactory, and science and skill of the highest character may be employed, apparently leaving nothing to be desired, but there is one factor outside all these which it is possible to forget, that is the element of simple dead weight, which offers a resistance to the elements, without which science may struggle in vain. The Britannia tubular bridge may be criticised for its wasteful expenditure and its unsightly appearance, but nothing short of a convulsion of nature could remove it from its base. The proposed railway bridge over the Forth at Queensferry, if ever executed, bids fair to surpass all its predecessors. Girders, with a span of 1,600ft., and towers, for the purpose of suspension chains, nearly 600ft. in height, almost take away one's breath in the conception, but the facilities afforded by wrought iron and steel are destined to carry the art of bridge-building to an extent utterly inconceivable in previous times.

To the extension of the railway system, combined with the use of wrought iron, we owe the progress of roof-construction. So long as timber was the only material available the span to be covered was necessarily very limited, 90 to 100ft. being the extreme. The celebrated Riding School at Moscow had a span of 235ft., but its construction was not successful, and it had no imitators. The modern railway stations at St. Pancras, Birmingham, Liverpool, and elsewhere, exhibit roofs with a width of span, and scientific simplicity of construction, which would have been impossible in any material except wrought iron. For domical roofs, wrought iron affords special facilities. The Halle aux Blés at Paris is one of the earliest examples. The largest and finest probably is that constructed by Mr. Sidney Smirke over the reading room at the British Museum, 140ft. in diameter. In the construction of floors, the improvements in the manipulation of wrought iron have provided special advantages. The ponderous and treacherous cast-iron beams have been replaced by wrought rolled girders for moderate spans and rivetted I or box girders for those of greater extent, whilst smaller scantlings of all forms can be had for every requirement. Our French neighbours have availed themselves of these advantages to a greater extent than prevails in England. A large proportion of the modern buildings, both in Paris and in the provinces, have both roofs and floors fireproof. The main beams, cross girders, and joists are rolled iron, with light iron laths or bars dropped in between the joists, resting on the lower flange. A coat of concrete is spread over all, forming a solid durable floor. A wrought-iron floor has recently been constructed for the new reading-room at the Liverpool Free Public Library, a circular building 100ft. diameter, without any support from columns or piers. The progress of wrought iron has not been confined to building construction. In marine architecture it has effected a complete revolution, and in so doing has placed our own country far in advance of every other nation. The first sea-going iron ship was the *Richard Cobden*, built in Liverpool in 1844, by Jas. Hodgson and Co., 522 tons burden. The *Great Eastern*, built on the Thames in 1858, of the burden of 12,000 tons, was before her time, and the result was very unfortunate; but the gradual and natural progress of steam navigation has almost bridged the interval, the latest ship now in process of building having a tonnage of 8,500. It is remarkable as showing the direction in which improvement is tending, that whilst the earlier ship of 12,000 tons had only 2,600 horse-power, the later one with a burden of 8,500 has horse-power of upwards of 8,000. Great as has been the change in our mercantile marine by the adoption of iron, the revolution in the ships of the Royal Navy has been of a much more startling character.

We have thus cast a hasty glance at the progress of iron construction to the present time. The inquiry remains, What is to be its influence in the future? That it will contribute materially to aid man's power over the material elements of nature is certain. The moral results lie beyond the province of this paper, but it may be permitted to cast a forward glance at the pro-

table influence of iron in one department, that of architectural construction and design. To what extent can iron be advantageously employed by the architect, and how far will it affect the æsthetic character of his work? All true design arises out of construction. Every style which has attained any eminence owes its effect to the adoption of its essential parts as sources of beauty, rather than to any attempt to conceal them. The use of iron, whether in construction or design, is a new source of power and effect put into the hands of the architect for good or for evil. The adoption of a new material should lead to new canons for its suitable employment, or rather to new applications of the eternal principles of truth and beauty.

Mr. Ruskin, who may justly be called the Corypheus of architectural critics, has some pertinent remarks on the use of iron in architecture in the "Seven Lamps":—

"Perhaps the most fruitful source of those corruptions which we have to guard against in recent times, is one which nevertheless comes in a 'questionable shape,' and of which it is not easy to determine the proper laws and limits—I mean the use of iron. The art of architecture . . . having been, up to the beginning of the present century, practised, for the most part, in clay, stone, or wood, it has resulted that the sense of proportion and the laws of structure have been based, the one altogether, the other in great part, on the necessities consequent on the employment of those materials; and that the entire or principal employment of metallic framework would, therefore, be generally felt as a departure from the first principles of the art. Abstractedly, there appears no reason why iron should not be used as well as wood; and the time is probably near when a new system of architectural laws will be developed, adapted entirely to metallic construction." This was written in 1849, before the era of great Exhibitions, Crystal Palaces, enormous railway-station roofs, and previous to the great improvements in the manufacture which have so much facilitated the employment of iron. At the present day, it is scarcely probable that he would have written as follows:—"The fact is that every idea respecting size, proportion, decoration, or construction, on which we are at present in the habit of acting or judging, depends on the pre-supposition of such materials, and so . . . . . it may perhaps be permitted to me to assume that true architecture does not admit iron as a constructive material, and that such works as the cast-iron central spire of Rouen Cathedral, or the iron roofs and pillars of our railway-stations and some of our churches, are not architecture at all." There is more to the same effect, the rule laid down being "that metals may be used as a *cement*, but not as a support."

I have made these copious extracts from a writer whose power and influence we all admit, for nowhere else do we find the objections against iron as an æsthetical element so clearly and lucidly stated. I would, however, with all modesty suggest that much may be advanced on the other side. The principal use of metals, including iron, we are here told is a *cement* for connecting stones together. Every practical builder knows that for this purpose iron is about the worst material that could be employed, its operation being to disintegrate and separate by its oxidation and expansion, and to destroy rather than support. The unfortunate cast-iron spire of Rouen cathedral I give up as deserving the severest reprobation of the critic, not because of its being iron, but for its tastelessness and incongruity; but what about "the iron roofs and pillars of our railway-stations," which we are told "are not architecture at all"? Writing thirty years ago, there was very little in such structures to attract admiration or attention; but look at them now. Westminster Hall, apart from its historical associations, in its wonderful roof exhibits a signal example of skill and beauty combined. This, says Mr. Ruskin, is true architecture. Turn, then, to the railway-station at St. Pancras, with a noble roof four times the span of Westminster Hall, in the construction of which simplicity and skill have produced a result, perfectly satisfactory to the eye on the score of strength and stability, whilst the grand sweep of its gigantic curves fills the mind with a sense of harmony and fitness which it is difficult to separate from a feeling of the beautiful. Why are we to deny to structures of this class the claim of being "true architecture"? Surely the radical principle of all true architecture is to use the materials within our reach in such a manner as will bring out their capabilities most efficiently for strength and commodity, and superinduce upon their employment such decorative forms as the nature of the material may suggest. It is on this foundation that every style which has obtained a footing in the world has been based. What can appear more opposed to each other at first sight than the pure Greek of the age of Pericles, and the pure Gothic, say, of the 13th century? Yet, diverse as they seem, they are equally developments of the principle of truth and adaptation. The materials of both are stone; but the Greek stone being marble, led to a delicacy and refinement of detail of which the northern style was incapable. Given, then, the material to work with, and keeping in view that the main idea of the one was trabeation or horizontality, and that of the other pointed arcuation, the mind can follow the consistency and adaptation of all the parts, even to the minutest detail. Now can anyone doubt for a moment that if iron had been equally available at the two periods in question, the genius which designed the Parthenon or that which soared aloft in the nave of Amiens or the choir of Le Mans would have been equally successful in the design of a metallic structure, especially looking at the beautiful bronze works of the Greeks and at the rich fancy which characterises the metal works of the Mediæval artists. To prohibit such an attempt or to limit the exercise of invention would be "to put a yoke upon the necks" of our rising architects, "which neither our fathers nor we were able to bear." The mischief arises from the attempt to "put new wine into old bottles," to cramp and confine the use of the new material within the lines of the old, with which it is altogether incongruous. A curious illustration of this tendency may here be mentioned. During the revival of Gothic architecture, about the early portion of this century, the late Thomas Rickman, who did excellent service in explaining and popularising the study, was employed to design a considerable number of churches in the revived style. Whether, owing to the want of skilled masons or from motives of economy, a large portion of the details of these churches were executed in cast iron; tracery, mullions, labels, finials, crockets, even piers and arches. The effect was poor, thin, and incongruous, and the attempt was an utter failure. If iron is ever to take its place as an independent factor in architectural design, it must be by adopting a new point of departure, ignoring its conventional uses as a mere auxiliary to other materials, and treating it boldly on its own merits and capabilities. The Scylla and Charybdis of architectural art have hitherto been concealment and imitation; concealment of the real construction, and imitating in one material the characteristic properties of another.

Let us turn to Mr. Ruskin again. He sets out with the plain principle:—"Know what you have to do and do it, . . . expressing the great principle of success in every direction of human effort; for failure is less frequently attributable to either insufficiency of means or impatience of labour, than to confused understanding of the thing actually to be done.*" "Whatever is in architecture fair or beautiful is imitated from natural forms; and what is not so derived, but depends for its dignity upon arrangement and government received from human mind, becomes the expression of the power of that mind, and receives a sublimity high in proportion to the power expressed. All building, therefore, shows man either as gathering or governing, and the secrets of his success are his knowing what to gather and how to rule."† These observations are just and true. Let us now endeavour in a general way to apply them to the subject before us. What are the peculiar properties of iron, more especially wrought iron, as a material for building? I should sum them up briefly, as strength combined with lightness and plasticity. These qualities are admirably fitted for construction and decoration in some cases, and not so well adapted in others, and skill and taste are required for their just discrimination and application. When the scheme for the first great Exhibition in 1851 was launched, proposals of all sorts were broached as to the design and construction of a suitable building. They all fell flat, and were pronounced by the public voice to be cumbrous and unsuitable, being based on the conventional forms of brick or stone building. In a moment of inspiration Sir Joseph Paxton pointed out how the difficulty could be surmounted by a structure of iron and glass. It is easy to ridicule this as a mere gardener's idea of an enlarged greenhouse. When Columbus made the egg stand on its end by giving the shell a slight bruise, the bystanders exclaimed that "anybody could do that"; but the same fertile imagination and readiness of expedient led to the discovery of the new world, and Paxton's happy thought has been further expanded and developed, so as to furnish a principle of construction now universally adopted in all buildings for a similar purpose. Where a large area has to be covered for bringing together a numerous assembly for a temporary purpose, there is no material and no mode of construction so economical and effective as the combination of iron and glass. It is, in fact, a tent constructed with durable materials. Modern improvements in the manufacture of iron have rendered that easy which would formerly have been impossible. But it may be said this is a development in one direction only. What about houses, public buildings, churches, street architecture? I am not preparing a book of designs, nor can I point to a visible embodiment of the tendencies I am pointing out; but in all these departments there is progress already attained, and a reasonable prospect of further rapid advance. I have already alluded to the increased employment of wrought iron in the roofs and floors of private buildings, especially in France. Beyond the merely constructive portion, its use is extending in dome-lights, galleries, entrance doorways, windows, and balconies. In public buildings and churches there has been a timidity in the use of iron for roofs in a manner to combine strength with beauty. The iron roof when adopted is usually concealed. If an ornamental or decorated open roof is designed it is usually of timber, except vaulting is introduced. There seems no good reason for this neglect. The adoption of iron might, in the first instance, require more invention and thought, but the great advantage of security from fire should be a sufficient inducement for the change. In all roofs of great span, the facilities of iron have utterly discarded timber. Street architecture, especially of a commercial character, seems to afford a wide field for the application of iron in a decorative form, but the hand of skill combined with taste will be requisite to prevent its becoming an abortion. Nothing could be more odious or repulsive than long lines of glazed fronts with no relief but flimsy metal bars, looking like houses of cards ready to fall with a breath of wind or the slightest concussion. I have known structures of this kind, perfectly safe in reality, but the outward aspect so flimsy and insecure that tenants were afraid to trust themselves within the precincts. The true principles are not far to seek. The main lines should not only be strong but made to appear so, massive if you will, exhibiting weight as well as strength. Within these outlines there may be wide open spaces where the true artist can exercise his taste and give play to his fancy in a material plastic enough to take any form, strong enough for protection and resistance, and light enough to irradiate the interior, even in the murky atmosphere of a city. We are not without hints even from the olden time. In many of the frescoes on the walls of the Pompeian houses, or of the ruined halls on the Palatine, there is a style of architecture displayed which may be the mere fancy of the artist, but which, whilst preserving the leading forms of Classical designs, exhibits a lightness and grace which would easily serve for models for execution in metal. Many of the shafts of bronze candelabra display the same grace and elegance of form. Amongst the arabesques of Raphael in the Vatican there is a display much of the same character. There is ability enough amongst our modern architects, if this course were pursued, to strike out a new path for the progress and adaptation of metallic and especially wrought-iron construction, which would undoubtedly lead to advantages and results not hitherto anticipated. Science has placed within our reach a new constructive element, so to speak, of which the engineer has hitherto almost enjoyed the monopoly. Let the architect put in his claim. The material is plastic and ready to take any form that genius and taste may suggest, and in this way the motto which should characterise all true archi-

* "Seven Lamps," p. 1. † Ibid, p. 64.

tecture, "Strength, commodity, and beauty," may be fully realised.

[We shall publish Professor Kennedy's paper on "Mild Steel" in our next issue.]

THE PAINTING MATERIALS OF THE OLD MASTERS AND OF OUR OWN DAY.

MR. W. HOLMAN HUNT addressed a crowded audience at the Society of Arts, on Wednesday night, on the present system of obtaining materials in use by artist painters as compared with that of the old masters. The lecture gave evidence of a wide and varied course of reading on artistic subjects, and abounded in anecdotes of painters and painting of all periods, illustrative of the modes and materials of working adopted by the greatest artists. At the outset Mr. Holman Hunt disclaimed all pretension to chemical knowledge, observing that his main object was to explain what were the most serious difficulties and wants of painters, in the hope that a greater interest and spirit of investigation might thereby be awakened in chemists. The Egyptians, the Assyrians, and the people of Pompeii had for colours, he showed, not only natural earths and the pigments made from stones, but also manufactured tints which analysis proved to require no small skill on the part of the workers. The revivers of the art in Italy not only availed themselves of the traditions handed down from Classic times, but as we learned from the art craft secrets recorded by Eraclius in the 10th century, thus early mixed their colours with oil and even with varnish. But the great mouthpiece of the new living art was the handbook for painters written six centuries ago by Cennico Cennini. In the 13th century, the Italian artists of the highest rank cultivated mechanical skill and chemical knowledge, and many recorded incidents of their lives showed to what an extent this acquaintance with the preparation of materials was carried. On taking a retrospect of painting from the days when the process called oil-painting was invented by the Van Eycks, the remarkable fact appeared that the earliest works were still the brightest as to light, and the strongest in colour; the most ambitious in these particulars originally, and the best preserved in white and colour to this day. A magnifying-glass revealed no defects in the ground beyond minute cracks, the result of dilation and contraction of the wood or canvas. It was clear also that the peculiar climate of England had not had a ruinous effect upon oil-paintings. At the same time it was edifying to reflect upon the comparative poverty of pigments beyond the simple earths amongst the old masters. The only one of importance which had fallen out of use was kermes, an invaluable crimson which, like madder, was driven out by cochineal, but which, although not revived in a form for use in oil, had been reintroduced, through the enterprise of Mr. William Morris, for dyeing purposes. When the resuscitation of painting took place in this country in George II.'s time Fortune wrote her fair words anew in foulest letters—every high gift and genius in art short of sublimity was conjoined with an absence of practical skill, which told its tale in the mechanical portion of the work of the great English school. The reason for this was that there was no thought of the need for the old cunning in preparation of materials, for the means had been provided to save painters from the labour which before it had been their duty and pride to undertake in their workshops. Although the essential work had been delegated to the artist-colourman, the artist still had certain traditions, and these special secrets were handed by an artist to the tradesman very much as the prescriptions of a physician were confided to a chemist. The paintings of the periods were executed on white-lead; the use of varnish had been lost, and at first oil alone was used with the colours, the effect being that no strong or bright colours could be retained. Of the character of oil as a vehicle the audience could judge from the paintings of Barry, which surrounded the walls of the Society of Arts' room, and would show what was Sir Joshua Reynolds' inducement to seek means of painting more like those of the first painters. He had no experience or tradition to guide him in his trials, and the results of his experiments with wax, asphaltum, and other luscious compounds was that many of his pictures were now only ruins. Reynolds made no complete set of experiments with explanatory notes, so that although he learned much, nothing but fragmentary records and mere notes remained. Wilkie, Maclise, Landseer, and occasionally Turner and Etty, employed asphaltum, to the ultimate injury of their works; indeed, the use of this fatty vehicle, from the great revival of art in England to the early days of this generation of painters, had been such a prolific cause of ruin to works, that it deserved consideration as a sure provoker of punishment. An important change in modern work was consequent on the essays of Mr. Sheldrake, written between 1791 and 1801, advocating the use of amber and copal varnish in place of the weaker medium then in use; and good was effected by the scientific researches of the French Academy, who published Merimée's books, supplied us with French ultramarine, and revived the manufacture of madders. Mr. George Field, a chemist, pursued his studies in colour-manufacture with great success, but died without disclosing his secret for the preparation of vermilion, for which he had, in vain, asked an award from Government, and from learned societies, of £100. Copal and amber varnish were not approved by all artists, and so patent combinations, forming lighter dilutants, were introduced by the colourmen. The change of practice was now complete; for in our own day the artist, who formerly kept the secrets of his craft, was now the last to understand what he was using. While the artists' colourmen of London were at the present day men of intelligence, character, and great enterprise, yet he urged that the system was radically wrong, and that the painter ought to have the power to judge himself of the character of his pigments. Not only so; but there should be some guarantee that the colourman had an interest in his work. At present at only one artist-colour establishment in London were colours extracted from their roots, and even there certain colours were purchased from irresponsible wholesale makers. The lecturer exhibited samples of paintings executed by himself since 1860, in proof of the instability and evanescence of many of the colours now in the market, and also showed paintings executed with new pigments procured for him in China, Japan, and the Madras Presidency. The evidence procurable showed that at this day, 150 years after the commencement of English art, we had no more mastery of our craft, as such, than that with which Hogarth, Gainsborough, and Reynolds commenced their careers. The cure for this uncertainty was to establish a means of transmitting the practical wisdom of one generation of painters to another, and this, it seemed to himself and certain other painters, would be effected by founding a society for looking after the material interests of painting, which should make a complete collection of experiments with colours, varnishes, and oils, mixed and simple, or to experiment with what might be the bases of the great secret which originated the modern school of painting, *i.e.*, the distilled oils which Leonardo da Vinci would not do without, and which now no painter used.

CHIPS.

The Archæological Institute proposes to hold, in its rooms, 16, New Burlington-street, a special exhibition of English and foreign helmets and mail, to be open for a week, after Thursday, June 3rd.

New schools at Barnard-town are about to be built for the School Board of Newport, Monmouthshire, from the designs of Mr. A. H. Goodman, architect.

At the last meeting of the town commissioners of Abergavenny it was decided to appoint a town surveyor and inspector of nuisances for the district, at a salary of £150 per annum.

The death is announced of Mr. Robert Futcher, of Fisherton, Salisbury, who was well known as a building contractor in the South-Western counties, chiefly in connection with church restoration.

A new passenger-station at West Hartlepool, erected at a cost of £15,000, has this week been opened to the public.

The Corporation of Hastings on Friday took formal possession for the town of what have hitherto been known as the St. Leonard's subscription Gardens, which have been purchased for £9,000.

Building Intelligence.

Ipswich.—St. Peter's Church, Ipswich, was reopened on Sunday. An expensive part of the present restoration has been the nave-roof. It was hidden by a flat plaster ceiling, which, when we reported the last restoration, we noted as cutting into and spoiling the effect of the fine new chancel-arch. This plaster ceiling has now been removed, and a plain cradle roof of large timbers—of not later than the 15th century and possibly earlier—is revealed. It was found to require considerable repair; the timber had gone over very much indeed to the eastward. The roof was completely taken off, the principals renewed where necessary, and the roof boarded internally between the rafters. During the restoration it was found that the columns in the nave arcades were almost entirely without support from the foundation, and it became necessary to temporarily shore up the church and rebuild every one of the columns. The south arcade and wall above were very seriously out of the perpendicular, from this reason, and have been put right. The removal of the west gallery has also necessitated the building of an organ-chamber, and this has been provided in the south chancel aisle. Throughout the church the floor has been paved with oak and elm blocks, marked off into panels with Portland stone. The work has been done by Messrs. J. B. and F. Bennett, from the designs of Mr. Gilbert Scott.

Edinburgh.—The Free Church congregation of Granton and Wardie are about to erect a new church, from plans prepared by Messrs. Hardie and Wight, architects, which provide for future economical extension, without crowding any large portion of the audience into galleries, or injuriously affecting the aspect of the interior as now to be completed. The relative proportions of nave, aisles, and transepts are made to form a ground-area large enough to easily accommodate the increasing congregation, and galleries will be provided as required. This area is nearly all within the nave, and is lighted by a clerestory, buttressed with flying buttresses, which serve also to support the roofing of the aisles. The style is Early English. Behind the apse is a large session-room and small vesting chamber and offices. The tower is 75ft. high.

Baxenden, near Accrington.—The Bishop of Manchester opened St. John's Schools on Easter Monday. The accommodation is for 400 scholars, and comprises a large room for boys and girls with two entrance porches, and two classrooms divided by a revolving screen, so as to provide a large room for Sunday-school purposes. The building has been erected with pier-points and ashlar dressings, slated with Welsh slate. The windows are glazed with roller plate-glass, having ventilators fixed in same; the large front tracery window has rolled cathedral plate-glass in the tracery: the whole of the timber is pitch-pine. Adjoining the school is a master's house, comprising parlour, kitchen, scullery, and bedrooms over. The work has been carried out by local tradesmen, under the superintendence of Mr. William S. Varley, F.R.I.B.A., architect, Blackburn, at a cost of about £3,500.

The Corporation of Dublin on Monday received tenders for the paving of the south side of the city. Thirteen tenders were originally received in January, the work to be completed in nine months. This period was represented as too short for the work to be done properly and economically; the period of completion was accordingly extended to eighteen months, and a number of new tenders were received at considerably lower prices. The contracts were divided: the tender of Messrs. Spaight and Son was accepted at 13s. 8d. per superficial yard, with an allowance of 1s. 7d. per yard where concrete was not required, and of Mr. Worthington at 13s. 7½d., allowing 1s. 6d. where concrete was not used, a clause in the contracts providing that "as much Irish stone of equal quality to be tendered for, approved by the engineer, to be used as may be practicable." The total cost of the scheme, which has been urgently needed, is about £100,000.

A new Roman Catholic church is in course of erection in the town of Emley, on the site of the old cathedral. Dedicated to St. Ailbie, the church is being built from the plans and designs of Mr. G. C. Ashlin, of Dublin, and the builders are Messrs. Healey Brothers, of Tralee.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. Passmore Edwards.

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Sub. from 1860. (The articles referred to have not been reprinted, and we do not know of a good book on the subject. Batsford, 52, High Holborn, might possibly recommend one.)—Jas. P. Norman. (1. Berger, Spence, and Co., 31, Lombard-street. 15s. per cwt. 2. We think not; we never heard of the book.)

"BUILDING NEWS" DESIGNING CLUB.

List of Subjects.—1. A tower and spire for a village church, forming an entrance at the west end. Material, stone and shingle. Height, 70ft., 40ft. for the tower, 30ft. for the spire. Plan, elevation, and section. Scale, 4ft. to the inch. 2. Details of a doorway to the above, with interior screen forming a lobby. 1½in. scale.

Drawings Received.—Alfred, Our Praises are our Wages, Ernest, Attempt, A.U.C. in Triangle, Heart and Arrow, Mot, Stefano, Sagitta (too late for boat-house), Pupil J., Fleur-de-lis, Burswell, Clansman, Boz, No. 90, B, Fogo.

Correspondence.

ARCHITECTURAL EXAMINATIONS.

To the Editor of the Building News.

Sir,—As this subject is now being discussed in your columns, will you kindly allow me to draw attention to a matter in connection therewith, which, I am of opinion, cannot be too soon rectified?

In looking over the various papers set by the R.I.B.A. in their voluntary examinations, I find that a candidate who is not a proficient at German will find himself (although otherwise the better man) at a manifest disadvantage in competing against one who has made that language a study. This, I submit, is not a fair state of things. In all our best schools a pupil has the choice offered him of learning either Greek or German. Very seldom can he learn both without curtailing the time for the still more necessary Latin and French.

Now, no one will venture to affirm (independently of its being of enormous use in the right understanding of our tongue, to which the German is so nearly akin as to be practically nowhere in the comparison) that the claims of Greek upon the architect are not greatly stronger than those of the German; the words, *stylobate, echinus, octagon, triglyph* (without a knowledge of Greek you are apt to spell it *tryg liph*), *diameter*—nay, *architect* itself, and a host of others of every-day use in the profession, suggest nothing to the "anti-Greek," while readable translations of every good German work on architecture are within the reach of all.

In a word, the argument narrows itself into this: "Is the student who, besides bearing in mind his ultimate destination for the profession, desires to have a more than *surface-acquaintance* with his mother tongue, and who, to that end, sets himself to the attainment of the Greek tongue rather than the German, as being incomparably the more useful, to be for this very reason (meritorious though it be) worsted in competition with his less-educated brother, because the latter, "funking" the Greek, preferred the easier German?"

I might also add that many persons (myself included) have been quite undecided *until after leaving school* as to their choice of a profession.

In conclusion, I cannot but think that the present curriculum for the R.I.B.A. Voluntary Examinations should be altered so as to give the candidate the option of an alternative set of questions in Greek, and trust that, by your giving publication to this, it may meet the eye of the proper authorities.—I am, &c.,

One Who Values the Claims of Greek.

Sir,—I am pleased to see in your last issue the letter signed "A Provincial Architect" in reference to the above.

I can fully endorse what he states, and it is high time that the matter was seriously considered.

Is it not unfair that persons having had no professional education should "set up," as it is termed, as architects in the provinces, and take the same position, in the eyes of many, as those who have served their articles and spent many years since in finishing their professional education? Some call themselves architects after having been clerks in builders' offices for a few years, whilst others have only served the office of clerk of works. My humble opinion is that no one should be allowed to practise as an architect until he has passed an examination, or served his articles, and received a fair professional training.—I am, &c.,

Another Provincial Architect.

Sir,—On reading your last week's edition of the Building News, I noticed a letter from a correspondent urging the necessity of architecture being made a closed profession, and requesting any one at the same time to confirm his opinion. This I wish to do; and not only do I agree with all that he says, but I also am of opinion that the matter should no longer remain in the state it is in at present. Why should it not be taken up by the Institute at the present time?

They are about to make laws now to defend the competition architect from being subject to all the unjustness that is daily occurring, and I ask why should they not at the same time make laws, as far as possible, to defend those architects who are architects in the real meaning and sense of the word, and many of whom have studied at home and abroad in order that true art shall be practised in this country, from being lowered to the level of those who do not deserve the name of "architect," and who can do little else than draw and trace, and many of whom know not the difference between a Classic style and a Gothic one, by instituting compulsory examinations, and closing the profession as far as possible, if not altogether.

I sincerely hope that this important matter may be taken up by some influential members of the R.I.B.A., and well thought over. Apologising for taking so much space of your valuable paper.—I am, &c.

Provincial Architect No. 3.

LORD COLERIDGE ON ARCHITECTS' CHARGES.

Sir,—In his summing-up on Tuesday, in an action brought by a firm of civil engineers against the Floating Swimming-bath Company, Lord Chief Justice Coleridge said: "The claim of 1½ per cent. on the outlay was plainly ridiculous. It was one which he had often heard architects gravely make, but never knew a jury sustain." Do any of your readers understand this remark of his lordship? To me it is incomprehensible. If the Lord Chief Justice could be induced to state in your columns the fractional percentage a humble architect might venture to charge for his wretched services it might interest—perhaps amuse—a few of your readers. I trust the subject may be brought before the Institute by a more influential member than—Yours, &c.,

April 21, 1880. F.R.I.B.A.

EXETER GIRLS' HIGH SCHOOL COMPETITION.

Sir,—In last week's issue the letter of "Never No More" touches a matter in the above which I, in common with other competitors, feel strongly.

When a considerable amount of time and labour has been spent in preparing plans of public buildings for competition, it is but proper, usual, and courteous, that the competitors, and public generally, should have an opportunity of seeing the drawings submitted, so as to be able to judge for themselves of the merits and demerits, after the premiums have been awarded.

In the present case nothing of the kind has been done, and all the authors of rejected plans have to console themselves with, is the uncourteous letter of Messrs. Daw and Sons, clerks to the governors, requesting them to send for their plans.

I should be sorry to impute anything unfair to any body of public men, but cannot help thinking it is very strange that father and son, who send in plans in the same style, carry off the only two premiums, whilst all other drawings, of whatever style or merit, should be rejected. Had the governors wished any particular style of architecture, in common justice, it should have been stated in the conditions issued to competing architects.

The authors of the premiated designs were competitors and architects for the Albert Memorial Museum, Exeter, when cost of building was restricted to £5,000, and the selected designs of the senior member of the firm cost £15,000. Bearing this in mind, may I ask if the tenders for building the High School are much in excess of £5,500, the limit given by the trustees, whether they will not ask their awarding architect to reconsider his decision, and select another design from the drawings submitted, the names of whose authors are so privately kept by the clerk to the governors?—I am, &c.,

A Competing Architect.

Exeter, April 21st.

CHIPS.

New public recreation grounds at Milnshaw are being provided by the town council of Accrington, for the benefit of the townspeople, and will be opened at Whitsuntide. The grounds, six acres in extent, are being laid out at a cost of £2,500, by a committee of the council, and will contain promenades, a bowling-green, oblong plunge bath of bricks lined with tiles, and from 3ft. to 7ft. in depth, and gymnasium.

The new military barracks in Bowerham-lane, Lancaster, are completed, and have been occupied for the first time this week.

A new church is about to be built at Hutton-roof, Cumberland, on the site of the present one, which was erected 120 years ago from the debris of a previous church. The style will be Early English, and the building will accommodate 110 persons, at a cost for erection of £1,700. Mr. W. R. Greg has given £400 worth of stone from his quarries. Mr. J. Cory, of Carlisle, is the architect.

A course of lectures on the "History of Greek Sculpture" is to be delivered at the Fizwilliam Museum, Cambridge, by Herr Charles Waldstein, Ph.D., of Heidelberg, during this term.

The town council of Carmarthen, at their meeting on Tuesday, rejected several proposed schemes of water-supply by gravitation, and resolved to obtain the additional supply needed by means of an extended pumping-system, similar to that which has been in use for the past twelve years. The probable outlay will be £3,000.

Intercommunication.

QUESTIONS.

[6098.]—**Cleaning Sand in Reservoir Filter.**—Would any correspondents inform me of the best method of cleaning the silt deposit from the sand employed in the filtering of a reservoir?—E. C.

[6099.]—**Tinting Pitch Pine.**—I shall be thankful if some kind correspondent will favour me by informing me the materials to be used, and the mode of applying them, to tint pitch pine a transparent green, and if copal varnish will do, or must French polish be used to gloss it.—Ulster.

[6100.]—**Mitreing Machines—Cast-Iron Sash Frames.**—Could anyone kindly ascertain for me if there is such an article in the English market as a mitreing machine that may be worked by hand, such as might be used for the construction of picture-frames and similar small work, and who are the makers or patentees thereof? I am told that such an article has been manufactured, but I cannot ascertain where or by whom. Could they also inform me if cast-iron window-sash frames have ever been used in English house building, or if they have formed the subject of an English patent?—A Subscriber.

[6101.]—**Valuing Property.**—I shall feel very much obliged if you or some of your correspondents could kindly put me in the way of obtaining a little information as to the system of valuing property? I am interested in the purchase of some freehold property in Liverpool, and I, acting for the purchaser and the gentleman acting for the vendor, have each had two valuations taken by surveyors in Liverpool; all the valuations having been taken independently of each other but from the same instructions. To our astonishment, on comparing the valuations, although the extreme value of the property is under £2,000, we find—1st. A difference of nearly £150 between the valuations of my two surveyors, and of over £80 in the estimates of the surveyors employed by the vendor. 2nd. The extreme difference between the purchaser's and vendor's valuations is over £250. I am naturally very much puzzled at these discrepancies, and if you can enlighten me as to the principles upon which valuations of freehold and leasehold property are based, or if you could refer me to some reliable works upon the subject, I shall esteem it a great favour. Perhaps some of your valuable correspondents will kindly assist me.—J. G. H.

[6102.]—**Decorating Bare Brick Walls.**—Can any reader inform me of the best and simplest mode of decorating the bare brick walls of a room, either in oil or distemper?—Amateur.

[6103.]—**Oak Wainscot.**—I have been restoring and making up with new the oak wainscot round a dining-room. Will some one kindly tell me a good way to darken the new and wax-polish the whole?—J. N. J.

[6104.]—**Architects' Charges.**—An architect is employed by a school board "to carry out and superintend" the erection of schools according to plans and specifications prepared by himself for a fixed rate of percentage remuneration. Plans and specifications are made, and the architect, without mentioning the matter to the Board, takes off the quantities. When contractors go to inspect plans, they may either take off their own quantities or use those taken off by the architect. In the latter case they are bound by the architect to pay him 2½ per cent. on the amount of their tender if accepted. Is it customary and proper for the architect, under the circumstances to make the above or any change for supplying quantities, and if so, what is the usual rate? The building will cost less than £3,000.—School Board Clerk.

REPLIES.

[6085.]—**Book on House Painting and Decoration.**—I am obliged to "A. G. B." for answering my query as to this, but I cannot agree with him in considering Davidson's book a reliable one. The Editor has dealt with this (see Building News, Dec. 10, 1875). I have the book, and I want a better. In this book, which is entitled "A Practical Manual of House Painting . . . containing full information on . . . . the principles of decorative art, &c.," one-third of the book, say, 126 pages, are given to elementary drawing, the problems being such as How to bisect a straight line, How to erect a Perpendicular, &c., all of which may be found in any elementary work on practical geometry, and 12 pages (!!) to the enunciation of "The Principles of Decorative Art." The other work named is too dear for me.—H. G.

[6092.]—**Payment for Plans.**—In answer to your question, I think the previous action will preclude C. suing A. for any former matter connected with the house. The charge for plans for local board should have been included in the claim, as I do not think a judge would allow a claim to be set up now.—G. H. G.

[6094.]—**Late Gothic and Queen Anne Work.**—If "Bayswater" wants examples of the styles, I hardly know what books to refer him, except, perhaps, Richardson's "Old English Examples" or Hurst's "Exemplars," second-hand copies of which may be obtained probably of Batsford or other booksellers; but if he requires a historical account of Elizabethan and Jacobean styles he had better get Fergusson's Handbook or Mr. J. J. Stevenson's recently-published book on "House Architecture," reviewed lately in the Building News.—G. H. G.

[6095.]—**Redress Wanted.**—No legal redress can be obtained in the case mentioned by "Invenis," as the words he quotes, "lowest tender not necessarily accepted," fully relieve the advertisers or inviters of tenders of liability.—G. H. G.

[6097.]—**Weight of Wrought-Iron Girder.**—An "Old Tory" is scarcely so constant a reader as he should be, or he would have seen that his question was answered in the Building News in 1879. It was there explained that the error was "clerical," that 17cwt. 2qrs. 0lb., is the correct weight. Also that in my book on "Quantities," second edition, the mistake is again corrected. As "Old Tory" might not have last year's Building News, I give the calculation.

20·0								
1·6	30 : 0	1¼″	web	=	7·6 at 1″ thick.			
20·0								
9	15 : 0	½″	flange	=	7·6 ,,	,,		
20·0								
9	15 : 0	¾″	flange	=	11·3 ,,	,,		
4/ 20·0								
8	53 : 4	⅝″	angle iron	=	20·0 ,,	,,		
					cwt.	qrs.	lbs.	
					46·3	16	2	2
6′ 60 = 360 — ¾″ rivets 2½″ long = 75ft. of ¾″							3	26
Round bar =					Cwt.	17	2	0

—Banister Fletcher.

[6097.]—**Weight of Wrought-Iron Girder.**—"Old Tory's" question has been asked and answered before; see pp. 265 and 290, Vol. XXXVI. 12cwt. 1qr. 25lb. misprint. The correct weight is 17cwt. 2qr. 0lb. The 2½lb. difference arises thus:—B. Fletcher multiplies by 1·471b. in rivets, and "Old Tory" by 1½lb. All the other figures are right.—Young Whig.

LEGAL INTELLIGENCE.

Civil Engineers' Claims. — Whitaker and Another v. the Floating Swimming-Bath Company.—This was an action brought on Tuesday in the Common Pleas division before Lord Chief Justice Coleridge and a special jury, by a firm of civil engineers, to recover a sum of money for work and labour performed by them on behalf of the defendant company. The work in question consisted in preparing plans for certain baths, which it was proposed to establish in the Thames, near Pimlico, and the orders were given by the Board of the company in 1873. The estimated cost was £16,000, and the plaintiffs claimed upon this, by an alleged custom of the profession, 1½ per cent.; but in the course of the case, Lord Coleridge having intimated a strong opinion that such a scale was absolutely unreasonable, the plaintiffs contented themselves by asking the jury to name a sum which would fairly compensate them for the labour of preparing four plans, of surveying the proposed site, and of attending various Board meetings. For the defence no director was called to dispute the original order, but the liability was contested upon the ground that since 1873, while a great deal of work had been executed by the plaintiffs and duly paid for, this particular claim had been kept in the background, and was only now brought to light. Lord Coleridge, in summing up, said the case was almost an undefended action, but the claim of 1½ per cent. on the outlay was plainly ridiculous. It was one which he had often heard architects gravely make, but never knew a jury sustain. The plaintiffs were entitled to what their labour fairly represented, and that was a sum which the jury must assess. The jury gave a verdict for the plaintiffs for £70.

CHIPS.

At the meeting of the committee of the Carlisle Diocesan Church Extension Society, held on Wednesday week, the following grants were made:—Long Merton Church, £50, towards restoration (estimated cost, £1,800); Over Denton Church, £25, ditto (estimated cost, £394); Holy Trinity Church, Ulverston, £50, ditto (estimated cost, £2,500); Kirkhampton new parsonage, £200; and Newbegin new parsonage, £150. Mr. John R. Cory, the diocesan architect, will carry out most of these works.

The foundation-stone of a new Congregational church, at Floore, near Weedon, was laid on Monday week. The architect is Mr. E. R. Hewitt, of Hildrop-road, Camden-road, London. The building is in the Romanesque style, and is of brick with stone dressings. The entire length of the building internally is 39ft. 7in., and the width 23ft. 4in. This area will give accommodation to 180 or 200 persons. The plans included a minister's vestry, and the original contract for £670, taken by Messrs. E. Roberts and Son, of Weedon, covered that work.

A new Board school for 802 children, built from the designs of the architect to the London School Board, was opened in East-street, Lambeth-walk, S.E., on Tuesday week.

A Welsh squire has just completed an excellent form of memorial to a deceased son. Captain Taylor, of Tynllyn, has erected a reservoir, and supplied the village of Cynwyd with waterworks.

The new Grammar School at Thetford, erected from the designs of Mr. Boardman, of Norwich, was opened on Tuesday week.

The foundation-stone of a new Roman Catholic diocesan seminary was laid on Sunday, at Ashurst Beacon, near Upholland, by Dr. O'Reilly, Bishop of Liverpool. The cost of the first part of the building will be £25,000.

The Social Science Congress will be held at Edinburgh in the autumn.

Our Office Table.

A series of lectures is being delivered at the Royal Institution on "Art and Vision," by Mr. James Sully. The first of these related to the physiological and psychological conditions of the pleasure of light and colour in relation to domestic art, dress, and painting. The second, which was delivered on Saturday, treated on the eye's innate and acquired feeling for beauty of form as illustrated in the arts of design. In dealing with such a subject the complexity of the phenomena must not be overlooked. What did the eye do when it perceived a simple outline, say that of a circle? The eye obtained a pretty just idea of the roundness of the object. Suppose the two eyes were fixed on some object at a distance, the movement of the eye would change with every movement of the head. The oblique movements of the eye were somewhat complex in character. The difference between lines and moving objects was, that a moving object might take the eye by surprise, a line never. The line was a proper element of form. But then came the question as to what form of line. The answer was one that might be followed in one of two directions. The straight line might be regarded as the true element of form. A straight line, as distinguished from an irregular one, had its own special work, as in architectural work, and in mural decoration. The curve was often very grateful to the eye. What kind of curve was the most pleasing? A curve of large radius had a charm of its own. Curved lines gained in value according to the form. There was what might be called the "melody of form," referring to music for analogy—he referred to equality of proportion. The eye did not at once recognise one line as the multiple of another. All change of distance obviously affected the appearance. A continuous group of lines would be agreeable to the eye when they diverged from one point. Regular figures, rectangular and curvilinear, would be pleasant to the eye; those which were rectilinear showing relation and proportion. As to the association of form, the eye stood in intimate relation to the other organs. Symmetry was a regulating principle, but a considerable departure from regularity was often agreeable. The third and concluding lecture will treat of the way in which the eye habitually recognises external objects considered in relation to the interpretation of the imitative art of painting.

A somewhat remarkable exhibition of objects on loan is now open in Amsterdam. This is a collection of Dutch gold and silver smiths' work of the 16th, 17th, and 18th centuries. The selection is good, the specimens well shown, and the characteristics of these various periods of art are well brought out. On no previous occasion, it is said, has there been in Holland an opportunity of studying in one exhibition so varied and representative a collection of an art interesting from various points of view, besides that of its technical importance. Many good examples of 16th century plate are brought together, and the artists—goldsmiths such as the Vianen and Lutma, of the 17th century—are also well represented by their works; the table plate of the 18th century is abundantly illustrated, a complete service for about 16 persons being lent by Mr. T. P. Six, a descendant of the burgomaster immortalised by Rembrandt. Curious collections of silver toys, for which the Dutch have been famous, are shown, and these, including every object in miniature of household use and of trade appliance, are by no means the least interesting part of this very attractive exhibition. The collection is shown at the Société Arti et Amicitiæ, and will be open for about two months.

The twentieth annual report of the Amalgamated Society of Carpenters and Joiners, for the year ending December 31st, 1879, has just been issued. The general secretary, Mr. J. D. Prior, of Manchester, remarks that if the society best fulfils its highest mission when it renders most effectual assistance to its unemployed sick and distressed members, then the work of the past year may be reviewed with pride and gratification. The depression in the building trades has been unparalleled during the present generation, and during the year £55,000 have been expended in benefits to members, an amount granted without calling for an extra penny as subscrip-

tion or levy, and without prejudicially affecting the financial stability of the society. In spite of these difficulties there has been a substantial addition to the numerical strength of the society of 460 new members, making a total membership at the date of report of 17,034. This is due rather to the lessened number of exclusions than to the new admissions. During the year the income fell off from £41,598 14s. 3d., in 1878, to £39,854 17s. 5d., while the expenditure was increased by £17,969 6s. 9d., reaching £62,446 1s. 4d. The total loss of the year was £22,591 3s. 11d., but even then there remained a cash balance in hand of £48,779 3s. 5½d., and the total value of assets as shown by the valuation was equal to £3 2s. 11¼d. per member. The expenditure to members thrown out of work through slackness of trade had been the highest known in the society's history—viz., £27,902, rising from 18s. 8d. per member in 1878, to 32s. 9d. in last year. Mr. Prior expresses a hope that the coming year will be more prosperous than the past few have been, although the building trades cannot be in so good a position as during 1873-7, and that the improvement if slow will be permanent. Turing to legislative questions, great hopes are expressed as to the character of the new House of Commons, the majority of the members of which are, it is stated "pledged to support two of the most important items in the programme of the Trades Union Congress Parliamentary Committee, a reform of the land laws and extension of household suffrage to the counties."

The Council of the Society of Arts, having had their attention directed to numerous cases of reputed poisoning by arsenical wall-papers and other articles in general household use, have appointed a Committee to inquire into the practicability of preventing the employment of arsenic in any processes by which it is allowed to remain in finished goods, and to obtain evidence as to the effect a total prohibition of the use of such processes, or the prohibition of the sale of articles produced thereby, would have upon various trades. To promote the object in view, this Committee has issued a circular to manufacturers of colours, dyers, and others using colours in manufacturing processes, asking for information on certain specific points. The following are the questions to which answers are asked for, such answers to be returned to the Secretary of the Society of Arts, John-street, Adelphi, London, W.C., on or before the 30th April:—1. In what colours, dyes, mordants, or other preparations used in trades or manufactures in this country, is any preparation of arsenic employed? 2. For what other purposes and processes is arsenic employed? 3. Do you attach any special importance to the continued use of any arsenical colours or preparations, such as leave arsenic in the finished goods? and, if so, what preparations, and for what reasons? 4. Would it be any disadvantage to you if the use of such colours, dyes, pigments, or arsenical preparations, both of home and foreign manufacture, were prohibited? and, if so, what disadvantage?

A stone-like mass for various purposes is produced, according to a recent German patent of Her Stener, in Blasewitz, by mixing ground quartz sand with 2 to 10 per cent. finely-ground lead oxide (the more of this, the harder the mass is desired to be). Then, for colouring, a suitable finely-ground metallic oxide is added. The mixture is sifted, moistened with soda or potash water-glass, further mixed, then pressed or stamped in moulds, dried with moderate heat, and finely burnt (at a greater heat, the harder the mass is to be).

At the Church of the Holy Nativity, in the southern suburbs of Bristol, while the Rev. R. J. Ives was pronouncing the Benediction on Sunday evening, an alabaster figure of an angel, weighing more than 1cwt., placed at the top of the baldacchino which overarches the altar, fell at the feet of the reverend gentleman, who had a narrow escape. The piece of statuary was smashed to fragments, and carried with it one of the altar candlesticks. We have wondered many times at the hardihood with which some priests venture their lives beneath temporary decorations of considerable weight and magnitude, not very securely fastened by means of the hammer and tin tacks dear to the female decorator. Alabaster angels ought to be made fast: unlike their prototypes, they fly not heavenwards when disturbed.

The Board of Trade inquiry into the Tay Bridge disaster has been resumed during the present week. Mr. H. Law, C.E., who had three times inspected the bridge by order of the Board, has been the most important witness examined. In the course of his evidence he stated, with regard to the strength of the material of the piers, that, whereas the specifications required a tensile strength of 21 tons to the square inch, some of the tie-bars gave way in the testing at a tensile strength of little more than 15 tons to the square inch; some of the rivet-holes were too large for the bolts, and several of the nuts were defective; and that in each of two piers two of the columns were cracked and had bands round them. Many other very important points have been raised during this week's inquiry, on some of which we find it difficult to refrain from commenting. We wait, however, as we have done, until the completion of the inquiry, when we trust to review at length some of the causes of the terrible disaster, and to indicate some of the lessons to be learned by engineers in connection therewith.

A catalogue has been sent us of a collection of pictures and sculpture now being exhibited at the Royal Manchester Institution. The works are all by Mr. G. F. Watts, R.A., and have been lent to the council of the institution by Mr. Charles H. Rickards, J.P. They comprise mainly Scriptural and Classical subjects, besides a few portraits. Many of the early works of Mr. Watts are here brought together, as the portrait of Miss Montgomery, No. 4. There is also a portrait of the artist himself, painted in 1879. Among other subjects exhibiting the power in composition and colour of Mr. Watts we notice "A Reverie," "The Island of Cos, showing submerged figures, emblematical of lost Greek Art," No. 12; "Hebe," "The Cap of Liberty," "Althea," "The Rider on the Black Horse; an Apocalyptic Dream"; "Time, Death, and Nemesis"; "Love and Death"; "Dedicated to all the Churches"; "Daphne's Toilet"; "Il Penseroso," "Ariadne deserted by Theseus," "Portrait of Herr Joachim"; Portrait of the Rt. Hon. Russell Gurney; Portrait of Tholey Prinsep, Esq.; "Edith"; "Phyllis," "Orpheus and Eurydice;" "By the Sea"; besides one or two landscape subjects. Two busts, one of the Head of Medusa, and Clytie, comprise the sculpture. We commend the exhibition to all lovers of art; the surplus funds accruing from the exhibition are to be devoted to the building-fund of the New School of Art, and a General Hospital and Dispensary for Sick Children, Pendlebury.

CHIPS.

The inaugural meeting of the Session of the Irish Institute of Civil Engineers was held, on Wednesday week, at Trinity College, Dublin. After the award of the first Mullins gold medal to Mr. W. G. Strype, of Wicklow, for his paper on manufactured sulphuric acid, the president, Mr. John Bailey, delivered an inaugural address, in which he referred to the many eminent members of the profession who had been removed by death since the last inaugural address was given, treating specially on the careers of Sir Richard Griffith, Major-Gen. Sir S. Larcom, Sir John MacNeil, and Mr. John Harty, C.E.

A new Baptist chapel has been opened at Mold. It has been erected from designs by Mr. J. Humphreys Jones, of the same town, at a cost of £1,100. Messrs. R. and W. Pierce took the contract for brickwork, and Mr. Robert Edwards, also of Mold, that for woodwork and joinery.

The foundation-stone of the new High School for Boys at Oxford was laid on Tuesday week by Prince Leopold. The building is being erected from the designs of Mr. T. G. Jackson, M.A., whose designs were selected in a limited competition of three architects. The tender of Mr. C. Claridge, of Banbury, the lowest of thirteen received, has been accepted for the execution of the portion of the scheme now being carried out. Our readers will remember the charge of plagiarism made against Mr. Jackson when we published his modified design for the school, by Mr. T. Codd, one of the unsuccessful competitors, and that we subsequently published side by side the original designs of both gentlemen.

The works at Portskewet, in connection with the construction of the Severn Tunnel, have been recommenced, and are being carried on vigorously. Mr. Walker, who is contractor for the whole scheme, has begun the sinking of the three shafts, one near the river and two near where the spring was struck. Engines will be erected to pump out the water instead of stopping it back.

A statue of the late Chief Justice Whiteside was unveiled, on the 15th inst., in the entrance to Queen's Bench, in the Hall of the Four Courts, at Dublin. The statue is in fine marble, and represents the Chief Justice in a frock coat, instead of the judicial robes; he stands in an erect attitude, the right arm is half-raised, and in the left hand, which is drawn a little back, is a roll of paper. Mr. T. Woolner, of London, was the sculptor.

The death is announced of Mr. Humphrey Baker, for many years architect and surveyor, of Colchester, in his 59th year. Another Colchester architect, Mr. H. W. Hayward, has, we regret to learn, lost his wife.

A new church of St. Matthew is about to be built in Derby-square, Preston, from the designs of Mr. J. Hibbert, of that town. The nave only will be erected at present, at a cost of about £5,000.

A Local Government Board inquiry took place on the 1st inst. at the "Chequers Inn," Horley, Surrey, with reference to an application from the Reigate rural sanitary authority for power to acquire certain lands otherwise than by agreement for the proposed sewage works for the parish of Horley. Mr. Walter Kelsey, C.E., attended to give evidence on behalf of the said sanitary authority.

Aston—the great suburb of Birmingham, with a population as large as that of the city of Bath—has been much divided in opinion lately, mainly upon the question of erecting the new public offices; and at the recent election of members to the local board feeling ran rather high between the "party of progress" and the "economists"; but in Brook Ward the contending parties agreed to bury the hatchet and return Mr. John Roddis to the board. The Aston Public Offices have already been described in these columns, and building operations commenced this week. Messrs. Alexander and Henman are the architects.

Tenders were accepted on Monday night by the Halifax School Board for the erection of new schools in three departments on a site at Lee Mount, contiguous to Shrogg's-park. The schools will accommodate 650 scholars, and will be planned with infants' room, 36ft. by 25½ft., in centre, and on either side a school-room 50ft. by 22ft.; three class-rooms, teachers-room, cap-room, and lavatory; the covered playshed over, 50ft. by 22ft., will be provided as well as open playgrounds. The style of the building will be Second Pointed Gothic, and the infants' front entrance will be emphasised by a tower 75ft. high. Messrs. Leeming and Leeming, of Halifax, are the architects for these schools, and also for those just completed for the same board at Haugh Shaw.

An inquiry was held by Mr. Arnold Taylor, C.E., one of the inspectors of the Local Government Board, at Heckmondwike, on Tuesday week, respecting an application from the Board of Health of that town for sanction to put in force the compulsory powers of the Lands Clauses Consolidation Act, for the acquirement of an outfall for the sewage of that town, within the township of Dewsbury. The application was opposed by the town council of Dewsbury, and much evidence was taken on both sides.

The foundation-stone of the new town hall for Yarmouth, now in course of erection at a cost of £30,000, from the plans of Mr. J. Bond Pearce, F.R.I.B.A., of Norwich, was laid on Tuesday.

MEETINGS FOR THE ENSUING WEEK.

Monday.—Society of Arts. Cantor Lecture No. 4, by R. W. Edis, F.S.A., on "The Decoration and Furniture of Town Houses." 8 p.m.
Institution of Surveyors. Discussion on "Quantity Practice." 8 p.m.

Tuesday.—Society of Arts, "Iceland and its Resources." By C. G. W. Lock. 8 p.m.

Wednesday.—Society of Arts. "Recent Improvements in Gas Furnaces for Domestic and Laboratory Purposes." By T. Fletcher, F.C.S. 8 p.m.

Thursday.—St. Paul's Ecclesiological Society. "Teraphim." By Rev. S. M. Mayhew. 7 p.m.
Society for the Fine Arts. "Wood Engraving: its Past, Present, and Future." By J. C. Griffiths. 8 p.m.

Friday.—Visit to South Metropolitan Gas Works, 589, Old Kent-road, by students of Institution of Civil Engineers. 3 p.m.
Institution of Civil Engineers. Student's meeting. "Description of a Light Draught Steel Paddle Steamer." By J. A. Thompson. 7 p.m.

Saturday.—St. Paul's Ecclesiological Society. Visit to St. Mary Overie Church, conducted by F. T. Dollman, F.R.I.B.A.

Lamplough's Pyretic Saline is refreshing, most agreeable, and the preventive of FEVERS, BILIOUSNESS, SMALL POX, SKIN DISEASES, and many other spring and summer ailments. Sold by chemists throughout the world, and the Maker, 113, Holborn Hill. *Use no substitute.*—[Advt.

Holloway's Ointment and Pills exercise priceless power over lumbago, all pains of the muscles, nerves, and joints, and quickly reduce all swellings caused by accidental injuries, weakness, or hereditary taints. The intelligible instructions enveloping Holloway's medicine give full counsel for using it most advantageously for regaining health, strength, and mobility.

Trade News.

WAGES MOVEMENTS.

Aberdeen.—The Builders' and Operative Masons' Associations of Aberdeen have agreed:—"That both Associations use their utmost endeavour to abolish sub-contracting and piecework in every form except quarry-wrought materials for exportation." Also, "That a committee of four masters be appointed to meet with an equal number of operatives, to whom all differences likely to involve them in any dispute shall be submitted, with a view to an amicable settlement; and in the event of their not being able to agree, they will appoint an oversman, whose decision shall be final and binding on both parties."

North Wales Slate Trade.—The management of the Llanberis quarries, instead of reverting to the four days' working, have decided upon making a reduction throughout the quarry of 5s. poundage. At the Bethesda quarries, the output is still limited to four days.

Potteries.—At a meeting of employers and operative masons of the Potteries and Newcastle district, held at Burslem, on Tuesday, it was unanimously decided to accept a reduction of ¼d. per hour in the rate of wages for the next twelve months. The hour system received general acceptance in this district yesterday.

BATH STONE.

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McLACHLAN & SONS, 35, St. James's-street, S.W. Builders, Decorators, and House Painters. Designs and Estimates.
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Experienced Workmen always in readiness, and sent to any part of the country.—[Advt.]

TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate of the accepted tender—it adds to the value of the information.

Banstead, Surrey.—For the following fittings at the Village Home, Banstead, for the Managers of the Kensington and Chelsea School District. Messrs. A. and C. Harston, architects, 15, Leadenhall-street, E.C.:—

Bakery fittings:—
Smith & Son (accepted) £386 0 0
Chapel fittings:—
Crockett (accepted) 317 0 0

Bermondsey, S.E.—For the erection of a school for 800 children, in Kirby-street, Snow's Fields, for the London School Board. Mr. E. R. Robson, architect to the Board:—

Marsland, J.	£8,434 0 0
Higgs & Hill	7,974 0 0
Atherton & Latta	7,800 0 0
Hobson, J. D.	7,788 0 0
Hart, H.	7,745 0 0
Shepherd, W.	7,549 0 0
Grover, J.	7,494 0 0
Brass, W.	7,480 0 0
Sheffield and Prebble	7,373 0 0
Wall, Bros.	7,336 0 0
Lawrance, E.	7,319 0 0
Nightingale, B. E., Lambeth*	7,181 0 0

* Accepted, with addition of £420 for provisions.
[Cost of site (area 11,840 square feet), £6,030 15s. 6d.; cost of (*a*) school buildings, including closets, £5,731; cost of (*b*) tar pavement and playground, £192; cost of (*c*) boundary walls and gates, £325; cost of (*d*) covered playgrounds, £467; cost of (*e*) schoolkeeper's residence, £350; cost of (*f*) three teachers' rooms, £300; cost of (*g*) extra depth of foundations, £236; total, £7,601. Cost per head of (*a*), (*b*), (*c*), and (*d*), £8 7s. 10d. Total cost per head, £9 10s.]

Bethnal-green.—For alterations and additions to two houses and shops in Green-street, Bethnal-green, for J. Orlopp, Esq. Mr. H. F. Simmonds, surveyor:—

Wheeler	£257 15 0
Coles	246 10 0
Edwards, C. and R.	235 0 0
Hughes	229 10 0

Bethnal-green.—For alterations at the "Watermans' Arms," Bethnal-green, for Messrs. Laurance and Co. Mr. Edward Brown, architect, 5, Church-street, Spitalfields:—

Marr (accepted).

Bethnal-green.—For rebuilding the "Old George," Bethnal-green-road, for Mr. A. Buckley. Mr. Edward Brown, architect, 5, Church-street, Spitalfields:—

Salt	£4,629 0 0
Linzell	4,590 0 0
Shurmur	4,437 0 0
Hughes	4,417 0 0
Good	4,200 0 0
Hearl & Son	4,193 0 0
Outhwaite & Son	4,053 0 0
Marr (accepted)	3,885 0 0
Uff (too late)	3,690 0 0

Beverley.—For iron roof for the new gasworks, for the Town Council of Beverley:—
King & Co., Hull (accepted) ... £145 0 0

Beverley.—For the erection of new gaswork buildings, exclusive of roofing, for the Town Council of Beverley:—
Pape, Beverley (accepted) £325 0 0

Blackburn.—For the erection of a foundry and machine works, for Mr. William Carr. Mr. William S. Varley, architect, Blackburn. Quantities supplied:—

Cronshaw, Blackburn	£1,510 0 0
Arkwright, W. & T., Blackburn	1,407 0 0
Higson, J. & Son ,,	1,406 0 0
Coffey ,,	1,400 0 0
Abbott, Blackburn (accepted)	1,355 0 0

Bristol.—For the erection of Baptist chapel, vestries, schoolroom, and boundary walls, at Knowle. Mr. Alfred Harford, architect, of Bristol. Quantities supplied:—

Davis, J. E.	£2,975 0 0
Church	2,944 5 0
Cowlin, W. & Son	2,763 0 0
Howell, E. C.	2,700 0 0
Veals	2,622 0 0
Crick	2,600 0 0
Cowlin, S.	2,540 0 0
Forse & Ashley	2,525 0 0
Banner & Co.	2,480 0 0
Hodges	2,430 0 0
Beaven, A. J. (accepted)	2,395 0 0
Roberts, Thompson, & Co.	2,350 0 0

Bristol.—For the erection of stables and workshops, Castle Mill-street. Mr. Alfred Harford, architect, of Bristol. Quantities supplied:—

Green	£1,490 0 0
Rossiter & Seymour	1,300 0 0
Baker & Son	1,281 0 0
Hatherley	1,215 0 0
Clark, E.	1,212 0 0
Davey	1,210 0 0
Humpage	1,200 0 0
Gay, E.	1,183 0 0
Williams, W.	1,147 10 0
Crocker	1,135 0 0
Davis, J. E.	1,134 0 0

Bromley-by-Bow.—For cleansing, distempering, &c., at the Poplar and Stepney Sick Asylum, for the managers. Messrs. A. and C. Harston, architects, 15, Leadenhall-street, E.C.:—

Shepherd, junr.	£480 0 0
Wright	350 0 0
Derby	259 0 0
Wythe (accepted)	250 0 0

Bromley-by-Bow.—For repairs and alterations to the dead-house, St. Leonard-road, for the churchwardens and overseers of Bromley St. Leonard. Messrs. A. and C. Harston, architects, 15, Leadenhall-street, E.C.:—
Cocks, J. and H. (accepted) £90 0 0

Bures.—For the erection of an iron bridge at Bures, for the county magistrates of Suffolk and Essex. Messrs. H. M. Eyton and H. Stock, county surveyors:—
Runnacles, Halstead (accepted) ... £1,833 0 0

Chelsea.—For alterations and additions to the Infirmary laundry, for the Guardians of St. Luke, Chelsea. Messrs. A. and C. Harston, architects, 15, Leadenhall-street, E.C. Quantities supplied:—

Shapley	£3,770 0 0
Thorn	3,645 0 0
Crockett	3,592 0 0
Linzell	3,586 0 0
Williams	3,535 0 0
Langmead & Way	3,426 0 0
Braid & Co.	3,385 0 0
Craske	3,360 0 0
Wilson & Exton	3,343 0 0
Wilkins	3,296 0 0
Judd	3,197 0 0
Wall (accepted)	3,060 0 0

Croydon.—For villa residence, Stafford-road. Mr. Fredk. West, architect, Croydon:—
Bristy, Croydon £680 0 0

Croydon.—For further alterations to the "Railway Hotel." Mr. Fredk. West, architect, Croydon. Quantities supplied by the architect:—

Legg, Croydon	£623 0 0
Taylor, Croydon	616 0 0

Croydon.—For the erection of a granary, Overton's-yard. Mr. Fredk. West, architect, Croydon:—

Mutch, Croydon	£780 0 0
Taylor, Croydon	775 0 0
Bristy, Croydon	600 0 0

Drewsteignton, Devon.—For alterations and additions to Martin Farmhouse. Mr. James Crocker, architect:—

Ellis & Pardon	£440 0 0
Underhill & Aggell	430 0 0
Tapper	375 0 0
Stratford	375 0 0
Brimblecombe & Ellis	372 0 0
Perkins (accepted)	367 0 0

Dublin.—For the extensive paving works about to be carried out on the south side of the city, under the superintendence of the engineer to the town council:—
Lowest and accepted tenders:—

	Per yard Super.	Rebate where no Concrete is used.
Spaight and Son	£0 13 8	£0 1 7
Worthington	0 13 7½	0 1 6

Darenth, Kent.—For bakery fittings at the Asylum for Imbeciles, for the Managers of the Metropolitan Asylum District. Messrs. A. and C. Harston, architects, 15, Leadenhall-street, E.C.:—
Smith & Son (accepted) £675 0 0

Egham.—For the erection of a coffee tavern for the Englefield-green Coffee Tavern Company. E. Low, Esq., architect, Staines. Quantities by Mr. P. J. Byrne:—

Bushell	£1,150 0 0
Simpson	985 0 0
Squelch	980 0 0
Oades and Sons (accepted)	945 0 0
Goodman	892 0 0

Esher.—For alterations and additions to Horton Mount, for H.R.H. Prince Leopold, K.G. Mr. P. J. Byrne, architect. Quantities supplied:—

Garrod and Pratt, Esher*	£664 0 0

* Accepted subject to revision.

Exeter.—For the erection of the Eastgate Arcade. Mr. James Crocker, architect. Quantities supplied by Mr. S. W. Elliott, Plymouth:—

Pink, Surrey	£11,250 0 0
Trevena, Plymouth	10,345 0 0
Phillips, Exeter	10,083 0 0
Scadding, Exeter	9,740 0 0
Crocker, Bristol	9,572 0 0
Stephens & Bastow, Bristol	9,399 0 0
Matcham, Plymouth	9,372 0 0
Gibbard, Exeter	9,270 0 0
Berry, Crediton	9,220 0 0
Howell & Son, Bristol	9,209 0 0
Finch, Plymouth	9,186 0 0
Stephens & Son, Exeter*	9,000 0 0
Veals, Bristol	8,999 0 0
Smith, Exeter	8,875 0 0
McMillan, Plymouth	8,674 0 0

* Accepted.

Exeter.—For the erection of the Eastgate coffee tavern. Mr. James Crocker, architect. Quantities supplied by Mr. S. W. Elliott, Plymouth:—

Phillips, Exeter	£3,146 0 0
Pink, Surrey	3,126 0 0
Trevena, Plymouth	3,123 0 0
Matcham, Plymouth	2,869 0 0
Gibbard, Exeter	2,750 0 0
Finch, Plymouth	2,689 0 0
Crocker, Bristol	2,684 0 0
Howell & Son, Bristol	2,671 0 0
Stephens & Bastow, Bristol	2,599 0 0
Veals, Bristol	2,574 0 0
Berry, Crediton	2,475 0 0
Smith, Exeter	2,475 0 0
Stephens & Son, Exeter*	2,473 0 0
Skinner, Exeter	2,433 0 0
McMillan, Plymouth	2,300 0 0

* Accepted.

Gipsy Hill.—For additions to schoolroom at Gipsy Hill. Mr. Ernest Turner, Regent-street, architect:—

Jenkins	£1,480 0 0
Tyerman	1,460 0 0
Hitchcock	1,443 6 0
Bowyer (accepted)	1,430 0 0

Harborne.—For the erection of schools and residence in Heath-road, for the Harborne School Board. Messrs. J. P. Sharp and Co., architects, Cherry-street, Birmingham. Quantities supplied:—

Smith, J. & Son, Birmingham	£4,775 0 0
Whitehouse & Jones, Birmingham	4,755 5 0
Smith, H., West Bromwich	4,745 0 0
Newey, J., Harborne	4,698 0 0
Wilson & Son, Handsworth	4,680 0 0
Bowen, J., Birmingham	4,673 0 0
Corbett, C., Birmingham	4,434 17 0
Stockton & Son, Oldbury	4,384 0 0
Whitehouse, W., Smethwick	4,380 0 0
Briley, J. Y., Birmingham	4,365 0 0
Bennett, W. Y. ,,	4,346 0 0
Sapcote & Son ,,	4,194 0 0
Jeffery & Son ,,	4,172 0 0
Brooker, W. ,,	4,000 0 0
Garlick, J. ,,	4,000 0 0
Harley & Son, Smethwick	4,000 0 0

[The above amounts include £100 provided for desks. The three lowest tenders being the same amount, it was decided to accept Messrs. Harley and Son's tender, they being ratepayers in the district.]

Hendon.—For detached villa, Hendon. Mr. Banister Fletcher, architect:—

Burman	£1,897 0 0
Donne	1,698 0 0
Burch & Moor	1,691 0 0
McCowan	1,595 0 0
Garrud (accepted)	1,531 0 0

Horley.—For billiard-room, stabling, &c., at Horley, for G. Russell Miller, Esq.. Walter Kelsey, architect, Bonehurst, Horley:—

Wilkins, A., Charlwood	£1,255 10 0
Dives, T., Lingfield	1,175 0 0
Newdon, J. O., Crawley	1,153 5 0
Cook, R., Crawley	1,133 15 0

Hull.—For the erection of a pavilion in the park, for the Town Council:—
Ling, G. (accepted) £369 10 0

Iver, Bucks.—For erection of water tower and engine-house (exclusive of engines), at Coppins, for J. E. Taylor, Esq. Messrs. Tarring and Wilkinson, architects, 69, Basinghall-street, E.C.:—
Fassindge & Sons, Uxbridge ... £469 0 0

Kings Cross, N.—For the erection of a school to provide accommodation for 600 children, on the site in Newmarket-terrace, York-road, N., for the London School Board. Mr. E. R. Robson, architect to the Board:—

Boyce, T.	£5,789 0 0
Grover, J.	5,682 0 0
Brass, W.	5,623 0 0
Lawrance, E.	5,600 0 0
Hook and Oldrey	5,575 0 0
Pritchard, G. S.	5,555 0 0
Sargeant, J. F.	5,495 0 0
Nightingale, B. E.	5,481 0 0
Higgs and Hill	5,474 0 0
Wall, Bros., Kentish Town*	5,436 0 0

* Accepted, with the addition of £300 for provisions.
[Cost of site (area 13,125 square feet, £2,162 10s.; cost of (*a*) school buildings only, including closets, £4,822; cost of (*b*) tar pavement and playground, £263; cost of

THE BUILDING NEWS.

LONDON, FRIDAY, APRIL 30, 1880.

THE MANUFACTURE OF PORTLAND CEMENT.

NO. 1.—RAW MATERIALS AND THEIR TREATMENT.

MUCH has been said and written during the last ten years of this valuable constructive material; but, notwithstanding the light which has been thrown on the subject, considerable ignorance and misconception still prevail. We purpose in the course of a few brief essays to put the matter before our readers in a clear and intelligible manner, so as to free the question of Portland cement, at least from the dogmatism with which it has hitherto been surrounded. In our description we shall, for the present discussion, confine our observations to the production of Portland cement from chalks and clays, and limit the inquiry to the systems of manufacture as now practised in what may be called the London districts on the banks of the rivers Thames and Medway.

Before entering into details of our subject, we will shortly give some explanation of what Portland cement really is, and the rationale of its whole process of manufacture. A few preliminary remarks on this important head will enable a better understanding to be formed when the more practical points are being discussed.

Portland cement, as generally understood, is the product of a compound (mechanical and chemical) treatment of chalks and clays, the former being the carbonate of lime ingredient, which may be regarded as the most important, and the other the silica and alumina agent, which, on being combined with the chalk, renders it hydraulic in quality.

Chalk, the well-known earthy mineral, amorphous in texture, may, for the present, be regarded as pure, and containing in its chemical analysis a small percentage only of silicious or other impurities. The first process adopted is to render the chalk *still less* pure by imparting to it from the clay ingredients their silicating influence. There are many ways by which this effect can be produced, but the method usually practised is by the agency of water which may be, for the present at least, regarded as a mechanical process. The amalgamation of the two materials must be of the most perfect kind, so as to secure in the future processes the full value of the chemical or heat (kiln) action. The proportions of the chalk and clay are generally measured in a somewhat arbitrary manner, because the continually changing condition of their latent moisture requires an amount of care and vigilance seldom applied in the manufacture of cement. However, before any beneficial admixture of the raw materials is accomplished, the natural condition of the chalk and clay must be changed; otherwise the necessary accuracy of contact of their several particles could not be secured. Varying amounts of the water vehicle are used, sometimes as much as six times the weight of the chalk and clay; but whatever the quantity, it must be again completely eliminated before further progress in their conversion can take place. The difficulties and dangers surrounding this apparently simple operation are numerous, the more important of which may be described as the irregularity of the settlement of the combined or "washed" materials in the settling "backs" or reservoirs of deposit. The deeper the back the greater the risk of imperfect subsidence of the washed mass.

By way of illustrating this branch of our subject, we will refer to the "natural processes" which have, during geological periods, brought about somewhat analogous results. In the well-known Lias (sedimentary) deposit of considerable extent in several districts of England, the various "layers" or strata differ much in chemical value: but none of them are absolutely pure carbonates of lime, but have had during their time of deposition, different portions of silica and alumina blended with the lime ingredients. This natural operation must have been one of almost inconceivable duration, and at varying intervals of time; for each strata, however insignificant in its extent, has a distinct and truly marked chemical value of its own. The sources of supply which built up this interesting series of rock and shale strata must have been changeable in character, for while the one class of the strata has an excess of carbonate of lime, in the other class silica predominates. In all, however, the most accurate blending of the various ingredients has taken place, and with an evenness and smoothness of texture truly wonderful. This, then, is the process so well done by nature that the cement-maker, in his best efforts, but clumsily imitates. To the Lias deposit we are indebted for the best of hydraulic limes, known amongst builders as the Barrow, Aberthaw, Warwickshire, and Somersetshire which have been used successfully in this country for upwards of a hundred and fifty years. There are, however, other hydraulic limes, more especially those found in the series of rocks composing the "coal measures," which are also of good repute, but they are not so well known as those which we have referred to.

The curiosity excited in the minds of many thoughtful engineers to unravel the mystery of the "setting" process of these limes when placed under water, happily led to a rational discussion of the question, which eventuated in the discovery of Portland cement. Vicat, in France, and our own renowned countryman, Smeaton, had much to do with the subject, and are entitled to all honour as the first pioneers and investigators. It is just possible that if Lias limestone could have been obtained in all districts of this and other countries, that our much-prized Portland cement would not have been invented, or, at least, discovered. Aspdin, of Wakefield, who obtained the original patent for the manufacture of Portland cement, operated in a part of the country where natural hydraulic limes were not easily obtained, and the want of good "water-setting" limes was regarded as an inconvenience much felt by builders of that time. With these remarks as a guide to an intelligent understanding of the problem of Portland cement-making, we will proceed to describe, in the first place, the primary process of "hydraulizing" the chalk.

The great bulk of the cement at present produced in the London districts (rivers Thames and Medway), is from the white, or "upper chalk," and, generally speaking, the manufactories are situated so as to command a cheap and plentiful supply of that indispensable material. Portland cement-making may be said to begin almost within the metropolis, for at Millwall and Greenwich manufactories have been established for many years, the point next reached being Purfleet, and Grays, in Essex, while at Greenhithe and Northfleet, in Kent, the largest works are—and have been for nearly half a century—located. These are all white chalk cement works, and, and after leaving Cliff, and proceeding up the Medway, the locale of the grey chalk cement industry is reached. Although quite within the influence of the supply of the grey, or lower chalk, some factories on the Medway prefer to use the white chalk, as being more easy of conversion. All of these works, however, are more or less dependent for a supply of the clay ingredient to the esturial shores of the river Medway, below Rochester.

Pasley's well-known cement experiments were carried on at Chatham, and it was there that he first used blue river clay in the endeavour to hydraulize the chalk; but he had not the good fortune to appreciate the value of the clinkered mass which he obtained in his investigations and left for others the discovery which he might have made. Pasley's rejection of the semi-vitrified mass from the kiln was due, in a great measure, to the prevailing experience gained in the manufacture of the then favourite Roman cement (Parker's patent), which required that all the clinkered stone should be rejected, as it was worthless, owing to its want of initial-setting energy. The favourable character of the Medway clay, owing to its capacity of being reduced to an almost soluble state, well fitted it for profitable amalgamation with either kind of, but more especially with the white, chalk. The mud, as it is sometimes termed, is dug from the marshes on the river banks at low water, and loaded into barges placed conveniently alongside. There is considerable care necessary to select the clay of the required quality, owing to the variability of the diluvial deposit, some of it being impregnated with coarse silt of a sandy nature, which, if allowed to mix with the chalk, would have an injurious influence on the resulting cement produced. There is also, unavoidably, a large amount of moisture in the clay, when first dug, amounting to as much as 60 per cent of its own weight, and in that state it is delivered to the cement works as near as possible to the site of the wash-mill, through which it has to be passed and mixed with the chalk.

White chalk and soft river-mud, or clay, present no great difficulty apparently to interfere with, or prevent, their being accurately mixed together, but it is found in practice that the task is not so easy nor so simple a one as at first sight appears.

The latent moisture in white chalk is also variable in quantity, and its amount fluctuates with the condition of the weather, and other surroundings, being as much sometimes as 20 per cent. of its weight. Of course, the physical condition of both chalk and clay have an important bearing on their relative proportions, and it is at this point where, unfortunately, the greatest risk of faulty manufacture arises. It should be remembered also that the operation of washing, in this country, at least, is performed in the open air, and during exposure to all weathers, which helps to increase the difficulty of accurate adjustment of the required proportions. But for our present purpose, we may discard all these niceties of calculation, and assume the proportions required to produce a high-class Portland cement to be three parts of chalk and one part of clay, either by measure or weight, according to the fashion prevailing at each manufactory.

To reduce three parts of chalk and one of clay to the required fineness, appears, at first sight, an easy operation, and, theoretically, it is so; but when materials of such different characters have to be intimately blended, a compound process of maceration and trituration has to be resorted to. The machinery generally used is what is technically termed a "wash-mill," which is simple in character, being merely a revolving beam, on which are fixed, or attached, knives, or harrows with tines. The spindle, or upright shaft, actuated by bevel gearing on the top, is generally used; but in some wash-mills the motive power is applied by toothing on the

external periphery of the mill. The knives and harrows traverse the trough of the mill, the usual speed of which is twenty revolutions per minute. This speed, in a properly-proportioned trough, induces a considerable swell of its contents, and by the consequent attrition of the chalk, beneficially assists in its reduction. The chalk and clay are tipped or thrown into the trough, the proper quantity of water being added by the agency of pumps or a direct supply from a high-level source, as is most convenient. The mill trough, by its swelling, overflows either through sieves or a simple arrangement of sloping edge, and thus provides for the passage of the washed material, at about the consistency of thin cream, to the "shutes" or conduits by which it is conveyed direct to the "backs" or reservoirs.

The backs are placed at convenient distances from the wash-mill, being substantially built of brick or concrete, and should be as nearly water-tight as possible, so as to prevent any waste of the washed material. As the liquid contains so much water, the back is seldom filled in one direct operation, and, therefore, after some time has elapsed and a considerable amount of the water has been decanted, the shute is again opened to receive another supply from the mill. It will be seen from our description that under such circumstances there is considerable liability to error in this initial process of cement-making:—1st. The imperfect amalgamation of the chalk and clay; 2nd. The unequal subsidence of the liquid in the backs; and 3rdly. The waste during its conveyance from the outlet of the mill to the backs. Another source of unavoidable error by such a process is the unequal precipitation of the chalk and clay during settlement. This difficulty is in some measure remedied by what is termed "luting" or raking up the liquid by a specially constructed "lute" or rake. Even with all these precautions, it is found when the "slurry"—for in its partially-dried state it is so termed—becomes nearly dry, that an irregular deposit has taken place—something like the thin laminæ or leaves of a book—resembling in character some of the Lias deposits. To this point, therefore, Portland cement-making is conducted with a liability to error in two directions, viz., the one arising from inaccuracy of proportion of materials, and the other from their unequal or imperfect consolidation when mixed and placed in the back. The result, however, of this, the first stage in the Portland cement-manufacture, is to associate with the chalk the silicating agent. It is very imperfect in character when compared with the naturally-compounded Lias limestone we have referred to, however, both as regards accuracy of admixture and resulting density. The most accurate method of cement-manufacture would no doubt be that which would approach nearest to the condition of the Lias stones or shales, we mean as regards their closeness of texture, for their chemical values are too variable and uncertain.

Nine-tenths of the Portland cement manufactured in the London district is produced in the manner shown, but of late years considerable effort has been made to reduce the quantity of water used, and the object is now in some manufactories accomplished by the use of what is called the Goreham patent semi-wet process. Instead of five or six times the weight of raw materials of water being added, about one-fourth suffices to bring about the desired amalgamation of the chalk and clay. The ordinary wash-mill is used, but it revolves at a somewhat slower speed, and the process approaches more in character that of maceration than mixture. In this somewhat thick pasty condition the product from the wash-mill is raised by elevators to a higher level, at which point is arranged the machinery of final reduction or mixture. This consists of a series of horizontal mill-stones, into the hopper of each of which is poured the slurry from the wash-mill, which in its passage between the stones becomes comminuted to the supposed necessary fineness, and during the process is intimately mixed. After leaving the mill-stones the completed and somewhat viscous mass is forced or driven by a pump to the point where it is finally desiccated and rendered fit for the kiln process.

At this point it will be as well to examine the several means used for effecting the drying or desiccating process. The original, or what may be termed Aspdin's method of drying the slurry, is still practised in some manufactories, and simply consists of placing the slurry from the backs in all stages of its condition on the top of drying-floors, usually heated by the waste gases or products from the ovens used in coking the coal. This system involves a distinct and separate series of buildings, which provides for the manufacture of some, if not all, of the coke required for burning the dried stuff or slurry into cement. Another plan is to distribute the waste gases of the kiln through a series of flues covered with tiles, on which the slurry is placed. This is a somewhat protracted process, and it also necessitates firing at one or more intermediate points to impart the required degree of warmth to dry the slurry. Such a system of drying also requires the "shutting down" of the kilns, but their draught in such cases is increased and assisted by a tall chimney with which all the flues are connected. This system of drying also requires, in the absence of coking ovens, the entire use of gas or other suitable coke produced elsewhere than in the cement works.

It will be observed that the time required to wait upon the drying or solidifying of the slurry in the backs extends over a considerable time, according to the state of the weather, and may occupy a period of from two to four months before the raw materials are in a fit condition to be passed on to the drying-floors; whereas by the "Goreham or semi-wet process" one week suffices to prepare the slurry and place it in the kilns. To account for such a beneficial acceleration it becomes necessary to describe the means by which this is accomplished. The best and most successful plan is that secured by Johnson's patent kiln, which is simply a kiln of the ordinary form as far up as the dome line, but, instead of the ordinary vertical truncated shaft to encourage its combustion, it is laid horizontally and connected with a high chimney, which provides the requisite draught. The form of this horizontal dome is segmental, and on its chord or bottom side is placed the slurry as it arrives from the horizontal stones (Johnson's kilns being used in conjunction with the semi-wet process), and during the passage over it of the waste gases from the kiln is sufficiently dried to admit of its being placed in the kiln when emptied of its burnt contents. The time occupied in this desiccating process is accomplished in a week, the same object being performed through the agency of the coke ovens in about twenty-four hours, or in prolonged cases, forty-eight hours. There are other and somewhat similar kilns which aim at the same object of utilising the waste heat for drying purposes, such as Burge's and others, while Wilson's patent double-flue floors also furnish an economical mode of drying the slurry produced by the semi-wet process. Before leaving this branch of our subject, we will shortly describe another semi-wet process through the agency of De Michele's patent machinery, which consists of an improved form of wash-mill, on the outer wall of the trough of which runs a roller or rollers, traversing a circular iron plate. There is required, or, at all events, there is at present used at the Cliff Cement-works, near Gravesend, a somewhat larger amount of water in reducing the chalk and clay than by the Goreham process. The proper proportions of chalk and clay are tipped into the trough of the mill, and, after being cut and partially mixed, are in their passage from the trough acted upon by the rotating rollers, and finally reduced and mixed, in which condition it passes into a tank or cistern, and from thence is forced on to an elevated position to Johnson's patent kiln-flues or horizontal chimney. To show with what alacrity Portland cement-makers now avail themselves of the slightest possible improvement whereby the cost of the production is lessened, or the speed of the ouput accelerated, we may state that Mr. De Michele has patented the use of the external surfaces of Johnson's kiln-flue for drying purposes. This is a healthy sign, and we trust that the same desire for improvements in the mixing of the raw material process will extend to the other branches of this important industry, so as to further cheapen its cost without lessening its quality, and thereby extend its sphere of usefulness in the wide field of construction.

(*To be continued.*)

ARCHITECTURE AT THE ROYAL ACADEMY.

THE Annual Exhibition of the Royal Academy of Arts opens on Monday next, and although we are prevented by want of time and space to-day from critically remarking at length and in detail upon the drawings exhibited in the Architectural room, it may not be uninteresting if we here briefly allude to some of the more prominent works. It was said that no drawings which had been published in the professional journals would be accepted this year for exhibition, but we find that no such rule has been in any sense adhered to, seeing that an unusually large number of the exhibited architectural pictures have already been given in our own pages. Thus, for instance, the catalogue opens with Mr. T. E. Collcutt's admirable Council Chamber from Wakefield Town Hall (1084); and, as another prominent example, the three fine perspectives illustrating Mr. James Brooks' noble new church of St. Mary, Woolwich (1164, 1218, and 1219), may be mentioned. The work of all others in the Architectural Gallery, which this year will necessarily attract attention, is Mr. J. L. Pearson's truly grand design for the new cathedral at Truro. It is equal to anything which this gifted architect has yet produced, and we question if any other living architect would have produced a more suitable and masterly design. The cathedral is well shown by a large pen-and-ink perspective (1165) from the S.E., as well as by a longitudinal section (1129) and elevations 1105 and 1118. The same architect has two nicely-drawn elevations of the chateau-like fronts of Westwood House, Sydenham (1120 and 1130), a building about to be recast by Mr. Pearson, who exhibited a view showing this same work at the Royal Academy two years ago. Mr. G. E. Street, R.A., is not very strongly represented in the present exhibition, an event probably due to his recent extended visit to Italy. His chief work is a water-colour interior view, by H. W. Brewer, of the Guard's Chapel, Wellington Barracks (1134), which is in Romanesque design, having a chancel and barrel-vaulted nave, with apsidal chancel, decorated in mosaic. The garden-front of Mr. Street's own house (1091), and the interior sketch, very roughly executed, of St. James's Church, Paddington (1162), are in pen and ink, by the architect himself; but No. 1185, which shows the south gable of the central hall at the Royal Courts of Justice, with the

lead-covered flèche behind, is in water-colour, by the same artist as the first-mentioned picture. Mr. R. Norman Shaw, R.A., exhibits only two drawings, both in one frame, showing a house erecting at Sunninghill. The design is in the author's well-known half-timbered style, and the drawings are by Mr. Lethaby. The late Mr. E. M. Barry, R.A., is not represented, and we miss his contributions, though his place is in some sense filled up by his brother, Mr. Charles Barry, whose set of pictures, the work of Mr. H. W. Brewer (1125), shows the wrecked mansion of Clumber, near Worksop, Notts, with the reconstruction of the buildings on an enlarged scale, now being executed by Mr. Barry, in which work he is assisted, we believe, by Mr. L. Harvey. Messrs. Bodley and Garner have this year departed from their usual practice of exhibiting only water-colour drawings, and show two examples of pen-and-ink draughtsmanship by Mr. W. S. Weatherly. The works thus illustrated are the new wings about to be added to Magdalen College, Oxford, and an interesting view of a proposcd new church to St. Michael, at Camden-town. The place d'honneur on the large wall of the gallery is devoted to a drawing by A. H. Haigh, giving a view of Mr. Wm. Burges' Library at Melbury-road, Kensington (1178), which we described last week when illustrating this architect's house. The perspective here seems rather forced, and however charming this picture undoubtedly is, it unquestionably makes the room and its detail look more lumpy and massive than the actual work really warrants. Immediately above the last-named, Mr. Fred W. Stevens, of Cumballa Hill, Bombay, shows by a highly-tinted water-colour, by the same painter, his new great Indian Peninsular Railway Terminus and Administration Offices, Bombay (1181). Mr. Alfred Waterhouse, A.R.A., exhibits three of his own water-colour sketches, or rather drawings, the chief of which shows some new buildings for St. Paul's Schools, at Kensington, in his well-known collegiate style. The remaining two show the large cortile of the Renaissance-mannered mansion of Haythrop Hall, Oxon (1175), and a building now erecting at the corner of Old Bond-street and Piccadilly (1119). Mr. T. E. Collcutt's design (1117) for a house is marked as about to be built, and like Messrs. Ernest George and Peto's (1131, 1132, 1163, 1214, and 1216) designs we shall, in an early number, present to our readers. Mr. J. D. Sedding exhibits a design for an Elizabethan mansion (1146), by the side of which the same artist shows his proposed new church at Salcombe, Devon. Near here Mr. T. E. Knightly is represented by the drawing we published of his premiated design for the City of London Schools (1147), Mr. T. E. Collcutt's design for the same work being exhibited at the other end of the room (1217), near Mr. E. C. Robins' tinted view (1204) for the same building. The selected design is conspicuous by its absence, and so is that for the Over Darwen Town-Hall, although the second premiated design, by Messrs. Salomans and Wornum (1202), is exhibited. Mr. Arthur Blomfield has two large pen-and-ink drawings, illustrating the proposed new buildings for Sion College Library, on the Thames Embankment (1152), and the Mission Church (1189), in John-street, Berkeley-square, W. Also on the line is a view in black and white of the Boys' High School at Plymouth, by Messrs. Paull and Bonella, next to which in the same position is shown by a pen-and-ink picture, a block of new offices and warehouses in terra-cotta, for Messrs. Wilcock and Co., at Leeds, by Mr. Maurice B. Adams (1153), in a Queen Anne style of treatment. Below these Mr. Wm. M. Fawcett is represented by a pen drawing, illustrating his recent restorations at Queen's College, Cambridge (1149), and Mr. Ed. I'Anson and Son exhibit a water-colour of the new Corn Exchange, Mark-lane, E.C. (1143). Mr. Edward Clark shows his two competitive designs (1161 and 1198) which he submitted for the Soane Medallion this year and Bootle Town-hall. Both have misleading titles, which would have been better avoided. Mr. J. M. Brydon exhibits his competitive scheme for the Theological College at Handsworth (1199), a work which we favourably remarked upon at the time as an admirable treatment in the Tudor style of Late Gothic, and the same architect, in rather too high a position, has hung a drawing of a house at Aigburth (1100). Mr. Gribble's oratory church at Kensington is represented by a large tinted interior, showing the sanctuary in detail (1,170), and a similarly conspicuous picture close at hand is exhibited by Messrs. J. and J. Belcher (1195) for a proposed South Kensington Gallery. The Skeldergate Bridge, at York, over the river Ouse (1194) by Mr. G. Gordon Page, C.E., is shown by a pen-and-ink perspective, and the new cathedral at Lahore, of which Mr. John O. Scott is the architect, figures as the subject of a water-colour which hardly does the design justice (1172). Holy Trinity Church, Burton-on-Trent, by the same author, is also exhibited (1141). Mr. Robert W. Edis sends the house which we illustrated a short time ago, from Brighton (1108), and the West London School of Art (1103), next to which is a design (1116) about to be built at Plymouth, for St. Peter's Church there, by the son of the vicar, Mr. Geo. H. Fellowes Prynne, whose drawing showing the interior of this church is also exhibited (1209). The now-abandoned R.C. School at Kensington for Mgr. Capel, is illustrated by Messrs. Goldie and Child's two pictures (1092 and 1095) the same architects exhibiting a rather singular drawing (1148) of the Chateau de la Jouardaye, Morbihan, France, to which Mr. Goldie has made restorations and additions. Of drawings showing the treatment for interior domestic decorations, probably Mr. J. J. Stevenson's Grand Saloon, Kenhill, Norfolk, will attract attention (1088), and Mr. Geo. Aitchison has a drawing-room in yellow and black, designed for Sir Wilfrid Lawson, at Grosvenor Crescent (1179), and also Sir F. Leighton's Arab Hall, at Holland Park, where carte blanche was given the architect to produce a really beautiful hall, whose only use should be to contain the beautiful collection of Eastern art which Sir Frederick Leighton is fortunate enough to possess. The more usual sort of interior decoration is shown after the manner of Mr. Talbert, by Mr. Walter Hensman's morning room (1139) and by Mr. Wm. Wallace, in the vaulted dining-room of Crathes Castle, Aberdeenshire (1115). Mr. John B. Gass has a drawing of the fine old fireplace at Rawdon House, Herts (1167), and Mr. Maurice B. Adams' two entrance-halls decorated in "Burmantoft's Faïence," for James Holroyd, Esq. (1208). Of old buildings, we may mention Mr. C. H. Rew's sketch of St. Michel, at St. Quentin (1104), and Mr. P. J. Marvin's Old House at Strasbourg (1211). We may also note Mr. Howard Gaye's water-colour of the proposed new Tower to St. Lawrence, Ipswich (1122), Messrs. Dunn and Hansom's Monastery near Canterbury (1089), and St. Oswald's College, Ellesmere, Shropshire, by Messrs. Carpenter and Ingelow (1090). About one hundred and forty architectural drawings in all are hung, which is twenty-five more than were admitted last year.

WATER-COLOUR EXHIBITIONS.

THE Exhibition of the Society of Painters in Water-colours, now open in Pall Mall, is as attractive a show of good pictures as we have seen on any former occasion, and the works of many new associates will be found to rival in merit some by the older members. Taking them in the order of the catalogue, we may draw attention to a series of sketches by Mr. William Callow, who contributes, in his usual spirited style of unassumed finish and transparent colouring, a variety of architectural views of streets and buildings on the Continent. We may mention, for instance, the grey-toned sketch of houses in No. 1 ; the grouping and colour in Nos. 16, 32, and 66; the play of light and shadow and tone in the archway and tower of Nos. 72 and 156; the charming view of the Lions of St. Mark, Venice, No. 176 ; the delicate handling in blue and brown in 190. Mr. Callow works in a style peculiarly his own ; his drawing is free, somewhat like Prout, rendered in grey or brown lines over clear washes of warm or cool colour ; they are genuine sketches, without the laboured attempts of finished water-colours. We remark also a few masterly landscapes by Mr. R. Thorne Waite, who is an associate exhibitor of considerable power. What can be more natural than the open common and figures in his "Halfway House," or his "Romney Marsh" (55), or his view of "Amberley Village" (111), with hay-makers returning home ; his "Town of Rye" (127), or his "Autumn Weather" (178), with its bold and massive colouring, and blue distance ? Mr. Herbert M. Marshall, a recent Associate, turns out some excellent work in No. 7, "Greenwich," "Frosty Morning in St. James's Park" (44), admirable in its rendering of mist ; his river scenery, as in "Southwark" (65), soft and aërial in tinting, and especially in his view of "Oxford Street" (169), where the artist has succeeded in depicting the combined effect of sun and mist, in which the orb of day is gradually dispelling the fog that hangs in the street, and is casting its warm rays upon the houses. Mr. E. Radford happily conveys the poetic sentiment in his picture of "The Poem" (9). The young gallant, dressed in cavalier costume, with lace collar and sash, who stands against the old chimney-piece reading, appears as deeply absorbed as the young lady seated near. There is a fine treatment of atmosphere in Mr. T. M. Richardson's "Glencoe from the Hills" (17), and the hills and rocks are skilfully managed. Another grand landscape is Mr. Alfred P. Newton's "Mountain Pass" (34). The gleams of light on the mountain, and the soft granular texture of the colouring produce an atmospheric effect that well conveys the lines of Scott:—

> "Bright gleams of gold and purple streak,
> Ravine and precipice and peak."

Mr. Walter Duncan exhibits a cleverly worked-out conception "The Legend of the Mountain," in which a monk is shown enlisting the attention of two watchmen clad in armour on a fortress or rampart. Mr. Birket Foster sends a few striking drawings. His "West Portal of Rheims Cathedral" is a large view, exhibiting some good drawing. The cool tinting of the stone and the detail are noticeable. The drawing of "Venice" (24) is vivid in tone; but his best picture is "The Corn Field" (109), where the artist's elaborate manipulation is seen at its best. The leafy neatness of the trees and bushes would not gain admirers among those who study the broader effects of landscape, but the colour and delicacy of execution are admirable. At the end of gallery we notice several grandly-painted subjects; and we may here specially draw attention to some bold, excellent work by a new associate, Mr. E. A. Waterlow. Take, for example, his "Watching the Flock" (62), "Spring Evening" (171), or "A Day of Rest," where a poor grey nag is resting near a stream. The latter is perhaps the best by this young artist; it is a little hard, but the drawing and colour are truthful and decisive, and the subject is appreciatively rendered. Mr. Thomas J. Watson, another new asso-

ciate, is a powerful colourist, and exhibits a precision of touch and a solidity of colouring that shows sustained effort in the department of landscape he has taken up. "Autumn Leaves" (68), "Autumn" (81), and "The Common" (101), are all forcible renderings. The last is remarkable in its solid massing of gorse, in the depth of tone, and the handling of the subject generally. No. 129, "In a Wood," exhibits a massive depth of colour in the pine forest, with a breadth of treatment that imparts grandeur to the scene; we may also point to (175) a sharp crisp piece in low key of colour. Mr. Geo. H. Andrew, the treasurer, sends a capital sketch of "Honfleur" (89), and we notice in passing No. 85. The pictures by Miss Clara Montalba, sustain the reputation of that lady. Last year we spoke in special praise of her sketches of Thames scenery. This year we are treated with a few equally beautiful specimens of her work, in which she loses none of her energy and tenderness of touch. What can be finer than the "Boats, Venice" (124); the marvellously reflected lights and colour in 185; "A Wharf Below Bridge"; or "Leaving Port, Venice" (186)?—the latter in a different key of colour, but a specimen of manipulation worthy of the highest praise. Her Venetian sketches show that she can depict craft under the Italian sun, with as much power as she can that on the Thames under leaden skies. There is equal breadth and feeling in both. "Ailsa Craig" is a grand subject, painted with much power, and it well occupies a prominent position on the walls. Mr. Francis Powell is a master of atmosphere; his tints are well granulated, no opaque pigments are used, yet the handling is crisp, and the lights are defined and sharply brought out. The same artist exhibits a masterly sea-piece in 110. Mr. Norman Tayler, the son of Mr. Frederick Tayler, exhibits a work of much promise in "Flooded Out," representing a man carrying a child, and his wife a little boy, through inundated meadows; the colouring is soft. Sunny and clear in precision is Mr. W. E. Walker's sketch of "Old Beech in the New Forest" (97). We note a fine work by Mr. E. Duncan in "Old Billingsgate" (98); and a pleasing sketch of coast-scenery in 100, "Kynance Cove." Mr. E. A. Goodall's "Interior of Mosque of Sultan Hassan, Cairo" (106), has a thoroughly Eastern brightness about it, and the drawing of open court is excellent. No. 120, "The Battle of the Standard," by Sir John Gilbert, will not lack admirers. The memorable incidents recorded of this remarkable English battle, fought at Northallerton in 1138, between Stephen and David I. of Scotland, have been graphically portrayed by Sir John Gilbert with his usual mastery of figure composition and grouping, while the balance of colour is admirably sustained. Carl Haag sends a few drawings of beauty; we notice "The Sphinx of Geezeh and Pyramid of Cheops" (121), and "An Egyptian Ballad Singer" (237). Mr. Arthur H. Marsh's "Blow, Blow, thou Wintry Wind" (187), cannot fail to enlist the attention for its boldness and delicacy of treatment, and the drawing of the fisherwomen in their blue serge, braving the wintry blasts, is tenderly told. To the visitor interested in architecture the grand "Interior of Burgos Cathedral," by Mr. Samuel Read, affords a rich climax. Mr. Read has brought to bear all the wealth of tone and colour he could upon this charming example of Late Flamboyant Gothic. The interior crossing, lighted by the lantern above, forms a rich contrast with the dark oak stalls of the choir and the screen, both Renaissance in design. "The South Door of Roslyn Chapel" (203) is another drawing by Mr. Read, and shows the peculiar arch between the buttresses. We note also a delicate study of "Apple Blossom," by Mrs. H. C. Angell (139); a touching incident in the "Suppliant," by Mr. Walter Goodall; a fine picture entitled "Vespers"—Cathedral at Bruges—in 174, glowing in its warmth of tone; No. 182; and a rich piece of colour by Mr. Collingwood Smith in 147. Mr. Edwin Buckman's drawing, "A Scramble—Yarmouth," is an animated subject, and is clever in its light and shade. No. 201, by Mr. J. W. North, is also worth a glance. On the screens Mr. Henry Wallis is represented by a humorous study depicting the Life of the Man of Letters in the eighteenth century, suggested by a passage from Boswell. We must also point to a lovely study of colour in Mrs. Angell's "Chrysanthemums and Raspberries" (217, 227), and to a few small sketches by Mr. Charles Davidson and Mrs. Allingham.

The first studies to strike us on entering the gallery of The Institute of Painters in Water-Colours, at 53, Pall Mall, are the charmingly-finished flower-subjects of Mrs. William Duffield. That lady's "Geraniums" (No. 1), and the "White Roses" (No. 3) are exceedingly true as natural renderings, but are at the same time remarkable for breadth and feeling. The geraniums and roses in blue vase, and the latter subject, are, as usual in all Mrs. Duffield's flower-studies, refined in colour. Mr. R. K. Penson has displayed his power for the grander subjects of landscape by his admirable sketch of a "Salt Marsh at Llangennech" (5), a finely-granulated piece of colouring of an expanse of marsh land, to which an atmosphere has been well given. Mr. E. M. Wimperis, whose water-colour drawings are always bold and vigorous, this year contributes several excellent landscapes. His "Old Road to Gwynant" (6), "A Quiet Vale" (44), "A Rushy Common" (52), "Through the Park" (145), &c., are all distinguished for breadth and vigour of colouring. Mr. G. G. Kilburne is another artist whose works, in a different branch, have always a charm of truthfulness and feeling, and his "Toilet in Venice" (7), though itself modest in subject, has much that is striking in it. The old woman seated outside the door plaiting, we suppose, her daughter's hair, has touching features; the wrinkled face and furrowed brow are tenderly drawn, as if expressing the pleasure she felt in tending the dark tresses of her daughter's hair. The latter's face is that of a dark beauty, and the background of wall, the boy watching, and the view of the water-girt palaces are in good keeping and quiet. Mr. J. W. Whymper, in his "Saddle-back, Cumberland," has given us a striking drawing in his usual powerful style. His "Bass Rock—Early Morning" (17) showing that remarkable and precipitous island of greenstone, also had an irresistible charm for his pencil; the little island rock is shown with its base obscured by a white mist, which often hangs about it. Architectural subjects are few, but two drawings by Mr. L. J. Wood, in his usual style, meet our view at different parts of the room. No. 11, "Abbeville," is a careful drawing in the artist's manner, a trifle too stippled to please everyone; but still careful in detail. "Portail-de-la Calende, Rouen Cathedral" (110), is a fine bit of architectural colour and drawing; the depth of grey tint, and the rich tracery of the gabled portal make a rich piece of effective sketching well suited for the broken dotty touch of the artist, who delights in the choice of highly articulate detail. A trifle too corporeal are the figures in Mr. Henry J. Stock's "Two Lovers Meeting after Death," in spite of much power of conception. They are shown rushing towards each other with outstretched arms. The colouring is suggestive, but the figures hardly appear to express disembodied spirits. His other pictures exhibit the talent of Mr. Stock for works of imaginary character, and we must award praise for a certain degree of power in this direction to No. 102, "The Soul leaving the Body"; "The Guardian Angel" (133), a poetic composition suggested by Milton's "Comus"; and "Orpheus and Eurydice" (174), where Eurydice vanishes suddenly away like smoke, in allusion to a passage in Virgil. Mr. J. H. Mole is a large contributor; we note a bright landscape with luxuriant foliage in No. 23, and several sketches in Wales. "Mill near Greystock, Cumberland" (113), is a fresh, bright sketch of a brook, and Mr. Mole is certainly happiest when he is painting bits of wild or rugged scenery. "In Charge" (24) is a very clever study, by Mr. E. Bale, representing a child with a pitcher, admirable alike in drawing and transparency of colour. Miss Mary L. Gow, generally sends something interesting depicting life or manners. No. 26, "Fairy Tales," shows a little girl seated in a large wicker-worked chair looking at a book or album. The child is absorbed in her tale, and there is an air of grotesqueness in the large chair and surroundings, with its youthful occupant. A clever misty effect is "Messina" (28), by Mr. Edwin Hayes, R.H.A.; and near it Mr. Charles Cattermole contributes a pleasing subject, "A Heath" (29), and Mr. Towneley Green "A Professor" (30). Rather chromo-like is Mr. Charles Vacher's view of "Monteleone, South Italy" (33). Mr. J. G. Philp has a striking mountain sketch in his view "Near Dolgelly, South Wales" (34); while in some contrast to this is Mr. Leitch's "Capo del Lago" (39), an Italian lake scene, breathing of the sunny, almost dreamy, stillness of the South. Remarkable for depth of light and shadow is Mr. Josef Israel's piece, No. 42. Very spirited and amusing is the same artist's study, 49. "The Holy Family Approaching Jerusalem," by J. R. Herbert, R.A. (45), has too much blue in it; the sky and hills are painfully vivid in that colour, and the figures and foreground have a laboured and realistic appearance. Vigorous and quietly painted is Mr. C. H. Boughton's "Home"—a labourer with bundle of wood approaching his lonely cottage; and genial in treatment is Mr. Harry Johnson's "Isles of Greece" (51); the landscape is bathed in a soft light and sleepy stillness, characteristic of the climate. Mr. James D. Linton, with a decided dramatic effect, has rendered Sir Walter Scott's "Scene from Peveril of the Peak" in a thoroughly artistic manner. The tapestried walls, blue couch, and the drawing of the figures are given with considerable force and character, and the colouring is in keeping. The composition picture of Mr. Edmund E. Warren, showing a shallow stream between banks of trees, is painted with care, but lacks repose, perhaps scarcely suggestive of the symphony intended by the poet; and near it Mr. Augustus Bouvier shows one of his decorative-figure subjects "Mundus Muliebris" (56) classically conceived and coloured. "Grave and Gay" is a poetical contrast with a moral. There is a depth of tone in the sylvan jungle which forms the background, and the owl and butterflies are well introduced. "Millersdale, Derbyshire" (60), is a charming dell with roseate tints in the sky, contrasting with rich massive foliage and worthy of Mr. Hargitt's skill as a renderer of landscape. "Stokesay Castle" has been made a subject by two artists. Mr. Harry Johnson's drawing shows the old stronghold at its best, with an octagon tower and overhanging story on corbels (64), but Mr. J. W. Whymper's sketch of it (120) shows a circular tower,—which is right? but we must not look too closely at architectural correctness; the drawings are both vigorous and clever. Mr. H. B. Roberts's "Village Optician at Freezing-point" is a humorous composition. An old man, clad to chin and muffled up, is

carrying through a snowy path two barometers, one under each arm. The drawing is admirable. Mr. Carrick sends a clever study of cows in "Fresh Pasture" (67). Mr. Edmund G. Warren contributes another of his sketches of famous trees in the "Greendale Oak, Sherwood" (80) with the same truthfulness; "Elizabeth Murray," in No. 74, depicts a Jewish marriage festival with power. Hung at the end of gallery is a large composition subject full of figures, by Mr. Augustus Bouvier, in his usual key of colour, and quite worthy of his ability as a decorative artist. It represents a procession of damsels in ancient Athens. In the centre are the aristocratic maidens, dressed in white, bearing vases, &c., for offerings, on each side being the daughters of strangers (metoikoi), in red dresses, carrying umbrellas and folding seats in token of servitude. We are struck chiefly with the singular likeness in the features of the damsels; the arms are not faultless in one or two instances, and it is a pity the Doric temple shown in the background had not been drawn with a little more accuracy; the figures are well balanced and the colouring delicate. We can only mention a few other pictures on the walls: amongst these we note a rather too gorgeous display of colour in Marian Chase's "Roses" (89); a clever sketch by Walter W. May (70); No. 94; Mr. Harry Hine's "Ely Cathedral," a large drawing taken from the river, feelingly treated with a soft mingling of colour, though hardly equal in the drawing; a fresh study by Geo. Clausen (100); and pleasing studies by Harry Hine (103); John Tenniel (112); Mr. T. Walter Wilson (114); a bold study by G. H. Boughton (121); a bright coloured subject by Frank W. Topham (123); a vigorous common by T. Collier (125); Nos. 130, 132, 137 (rather graceless figure), 144, 145, 146, 148, 158, 159, 161. Mr. Charles Vacher's "Hypæthral Temple, Philæ, on the Nile," is well-drawn and bright in colour; and Mr. Chas. Cattermole's "Dead Men's Shoes" (170) is a telling satire, while it points a moral. On the screens we meet with a few well recognised hands: Mrs. Duffield exhibits a few delicate studies of Flowers (180), and Lady Lindsay, of Balcarres, one or two sketches. Mr. Walter May's "Running for Ostend" (188), and Mr. C. Green's "Old Curiosity Shop" (189), are both excellent, the last a beautifully-finished cabinet picture. We also note Nos. 195, 202, 203, 205, 209 as studies well worthy of their authors' reputation.

"MILD STEEL" AND ITS APPLICATIONS TO BUILDING PURPOSES.*

UNTIL some twenty years ago, it would have been safe to define steel as iron which possessed the properties of hardening and tempering, those properties depending essentially on the presence with the iron, in a state not even now fully understood, of a small percentage of foreign material, primarily carbon. Within that time, however, the popular meaning of the word *steel* has very greatly changed, and it now includes, as generally accepted, many varieties of material which can be no more tempered or hardened than many qualities of wrought iron. The use of iron on any large scale in the construction of bridges, buildings, or ships, is comparatively very recent. Even cast iron only made its first appearance in large structures in this country when Abraham Darby built the Coalbrookdale arch of 100ft. span over the Severn, in 1779. Wrought iron came into use for such purposes only about half a century ago, when Fairbairn began building iron ships,—the first large wrought iron bridges being some years later. Once the suitability of wrought iron for such constructive purposes was fairly demonstrated, we all know the enormous, the almost unexampled, rapidity with which its use became general. As soon, however, as the novelty of construction in the new material had worn off, and the first glow of enthusiasm about its strength and capabilities had cooled down, engineers began to find out its defects, and to see that, good as it was, there was plenty of room for something better. Many times the wish came that *steel* could be used, but its enormous comparative expense almost prevented the wish finding expression. Steel was then crucible steel of extremely great tenacity, as well as hardness, and the advantages which its enormous tenacity would give to it in construction were fully understood. The effect of looking at the matter from this point of view was, not unnaturally, that general attention became more concentrated on the *strength* of steel than on its other characteristics. We had already got a material as good as we could hope for for tools and instruments, but now there was wanted something resembling it for totally different and infinitely more extended uses. For these uses, too, the capability of hardening was a positive drawback instead of an advantage. The material had often to be heated and re-heated, cooled and re-cooled, over and over again, in the course of using it, and if each time that this happened it became hard, it would have each time to be annealed, or softened again, before anything more could be done with it. It seems as if we had come unconsciously, in this way, to be looking for some material which should have the tenacity of steel *without*, as far as possible, its other and more characteristic properties. There was no name for this "not impossible" hoped-for material, and it was called always *steel*, without recognising fully, perhaps, that, whatever it might be, it could hardly be steel if we had succeeded in eliminating from it the particular properties which for centuries had been considered the essential characteristics of that metal. Thus it came about that when, in recent years, Bessemer, and Siemens, and others, have, after many attempts, succeeded in producing such a material—a material from which, in many cases, nearly all the characteristically steely properties have disappeared, which is really sometimes a very pure iron, with a specially high tenacity, it is still called *steel*. To distinguish it from the tempering steels, it is now generally known as *mild steel*. The crucible cast steel, which was introduced by Huntsman, about 140 years ago, contained a considerable percentage of carbon, and was, therefore, comparatively fusible; the chief difficulty in the way of making the milder or purer steel, of which we are now speaking, has lain in the fact that, as its proportion of carbon diminished, the temperature necessary to melt it increased. Until twenty years ago, practically no means existed for obtaining such a temperature (except in a laboratory) and, consequently, none of our malleable iron, nor iron nearly free from carbon, had ever been melted. It was rolled, at a welding heat, from piles or faggots of separate bars, just as it is now. To give it the wished-for additional strength, it was essential that it should receive that homogeneity which could only be obtained by melting it, and then rolling it from solid homogeneous ingots, instead of from welded piles. Two essentially different processes, both in daily use, now exist, by which the enormously high temperature necessary for making melted ingots of nearly pure wrought iron can be obtained, as well as many modifications of them. The Bessemer process, which, in a little more then twenty years, has revolutionised one of our most important industries, was first published to the world at the meeting of the British Association at Cheltenham, in 1856, when Sir Henry (then Mr.) Bessemer read a paper with the somewhat startling title, "On the Manufacture of Iron and Steel without the use of Fuel." This title, it must be confessed, is somewhat misleading; fuel there is in plenty, although a certain characteristic part of the process takes place without the separate addition of any substance specially intended to act as fuel. The Bessemer process rests on the discovery of its inventor that, by forcing air, at a high pressure, through a bath of liquid cast iron, the combustion of the carbon and silicon in the iron by means of the oxygen thus brought into intimate contact with it, would generate so intense a heat as not only to keep the cast iron melted while it remains cast iron, but to keep it still fluid after all the carbon and silicon are burnt out of it, at a temperature in comparison with which melted cast iron might almost be said to be lukewarm. The method by which the requisite high temperature is obtained in the "open hearth" process is entirely different from that used by Bessemer;—it is by the use of the well-known "regenerative" principle of Dr. Siemens, without which, in some application or another, scarcely any metallurgical operation now goes on. The Siemens' furnace itself is a large shallow hearth, having on one side doors by which the materials can be introduced and on the opposite side a tap-hole for the removal of the melted metal. At each end of the furnace, near its roof, are openings communicating with four chambers, placed below it, and filled with fire bricks in open stacks. The fuel is burnt in a separate furnace called a gas producer, where only an imperfect combustion is obtained, and the resulting carbonic oxide passes along to the furnace through one of the regenerative chambers. Air at the same time is allowed to pass in through the adjoining chamber, the two gases mix just where they enter the furnace, and a very intense combustion ensues. The gaseous products of combustion, having done their work but being still at an extremely high temperature, pass away through the other two chambers, parting with the greater portion of their heat to the fire bricks stacked in them and leaving eventually comparatively cool. After this has gone on for some time the directions of the air and gas currents are reversed, the cold air and cool gases are brought in through the chambers just heated up, while the other chambers, now much less hot, become the recipients of the heat of discharge. And so the process goes on, each pair of chambers receiving and giving up heat alternately. Mild steel is made in the open hearth chiefly by two processes, the one known as the Siemens, or *ore* process, and the other as the Siemens-Martin process. In both processes spiegel or ferro-manganese is added at the end, and then the contents of the furnace are run into ingot moulds. After discussion of the question with many engineers and shipbuilders who had used both the Siemens and Bessemer process, the author has not found one who can give from his own experience any very decided preference to either. Two great difficulties still stand in the way of the manufacture of mild steel. The first is that as neither of the two processes get rid of either phosphorus or sulphur to any sensible extent if they are once in the pig-iron, and as both these materials have a most deleterious influence on the steel, only very fine and pure qualities of ore (mostly imported) or of pig can be used in them. This difficulty seems in a fair way of disappearing. The process introduced within the last two years by Messrs. Thomas and Gilchrist, and Mr. Snelus, seems already to have advanced beyond the stage of experiment. The principle of the process is the addition of some basic material (lime) so as to make the slag basic instead of (as heretofore) acid, in which condition it will take up the phosphorus as phosphoric acid and keep it out of the steel. The chief difficulty has been that of finding a new lining for the furnace which should have the necessary refractoriness, and yet should be basic instead of silicious, and this difficulty, it is believed, has practically been overcome. The second point is that it is very difficult to obtain ingots free from blow-holes or honey combing, which without great care affect the rolled products injuriously. This difficulty is certainly surmounted by the method of Sir Joseph Whitworth in subjecting the ingot while still liquid to an enormous pressure by means of hydraulic apparatus, and the same method is also used in some Continental works to a considerable extent. But the great cost of "compressed steel" places it out of reach for ordinary purposes, and we have to be content with taking all precautions to insure that the ingots shall be as sound as possible. By the use of the regenerative system it is possible now to make mild steel in crucibles, by the old method, and such steel is frequently made of magnificent quality. Its cost, however, puts it out of the question for use in building construction. Having now concluded this brief outline of the present position of the steel manufacture, so far as it concerns such steel as is at all commonly used for constructive purposes, I must next say something more as to the characteristics of the material itself. I may class these under four heads, viz:—1. Uniformity and trustworthiness. 2. Workability. 3. Strength, and 4. Rigidity. That so-called steel of many different

* By Alex. B. W. Kennedy, M. Inst. C.E., Professor of Engineering in University College, London: a Paper read before the Royal Institute of British Architects, April 19, 1880.

qualities could be made much stronger than iron has never been denied, but for many years there stood in the way of its extended use the belief—at one time too well founded—that it could not be trusted. And further, if the material were uniform in quality, it was believed to require—perhaps it did at one time require—specially careful handling while being worked, specially trained workmen to handle it, and altogether a gingerly kind of treatment which could not be obtained in ordinary circumstances. Not a few manufacturers saw that much of this was at least great exaggeration, if not pure fancy; and were firmly enough convinced of the value of the new material to go on using it through evil report and good. They staked much upon their belief, however, and were compelled to insist strenuously upon the steel-makers leaving nothing undone which should insure the uniform character of their material. The steel-makers were nothing behindhand in the matter, and have probably done more in ten years to perfect their material than had ever before been done, in such a case, in half a century. Mr. Barnaby, in a paper which he read before the Institution of Naval Architects in 1875, put the question definitely thus:—"What are our prospects of obtaining a material which we can use without such delicate manipulation and so much fear and trembling? . . . . We want a perfectly coherent and definitely carburised bloom or ingot, of which the rolls have only to alter the form in order to make plates with qualities as regular and precise as those of copper and gun-metal, and we look to the manufacturers for it." I believe it may now be said with certainty that we have not been looking to the manufacturers in vain. In the first place, within the last few weeks, I have been testing in my laboratory at University College ordinary commercial samples of all the three materials mentioned by Mr. Barnaby, and the following are the results; three similar pieces of each material being tested at a time. The difference between the highest and lowest tenacities of three bars of ordinary (cast) copper amounted to 29·5 per cent. of the strength of the highest, the same difference with ordinary gun-metal being 21·6 per cent., and with hard gun-metal 12·4 per cent. With five sets of steel samples, on the other hand, of different sizes, cut from ordinary boiler-plates, the differences were 1·5 per cent., 0·7 per cent., 7·1 per cent., 4·8 per cent., and 2·9 per cent. respectively. Taking the means in each case as a rough comparison, we have 21·2 per cent. in copper and gun-metal against 3·40 per cent. in mild steel, and even taking the highest and the lowest of the fifteen steel specimens (although they were of very different sizes) the difference is only 9·6 per cent. It is hardly too much to say that there is no iron in the market that can hold its own for uniformity and freedom from failure in working against the steel now supplied by our leading manufacturers, or that can stand equally well the same strictness and frequency in testing. Mr. William Denny, of Dumbarton, whose firm has been building ships very largely in steel since 1876, says that in one small steamer they are now building of iron they have had more failures than in their whole consumption of about 7,000 tons of steel. In the case of a number of light-draught steamers of iron which he at one time sent out to India in pieces, they were invariably annoyed more or less by corners of plates coming off, angle irons cracking, and so on, during shipment and transhipment. Last year he built and shipped in the same way six paddle-steamers entirely of steel, without losing by breakages anything whatever. Another well-known mechanical engineer, who uses both steel and iron on a very large scale, tells me that he hardly ever has to return less than 15 per cent. of his best Yorkshire iron, on account of defects in working, while he absolutely never has any failure with steel. It would be easy to multiply testimony of this kind.

(*To be continued.*)

ARCHITECTURAL ASSOCIATION.

THE fortnightly meeting of the Association was held on Friday evening, the president, Mr. S. F. Clarkson, in the chair. Messrs. E. Taylor, E. Watson, P. J. Popplewell, W. H. Read, G. E. Lidiard James, and W. A. Burr were elected as members.

Mr. E. Ingress Bell read the following paper, entitled

UNREST.

The lecturer said: I shall introduce for discussion the tendency observable in contemporary architecture to bestow too much care on the accessories and too little on the general design, inducing a quality which cannot better be described in a single word than by the title chosen for my paper. There is, beyond question, much in the architecture of the day which is of admitted excellence, and upon which we may reasonably congratulate ourselves. We shall, however, gain but little by dwelling complacently on our strong points; and if, this evening, I invite your attention to what I conceive to be a weak one, it is that we may not relax our energies, but, adopting the cry of Swedish Charles, "think nothing gained while aught remains to win." My contention then, is, Firstly, that in too much of the work of the present day an altogether disproportionate amount of attention is given to mere "details," using the word in the sense in which a painter uses the word "finish." Secondly, that our buildings are, as a consequence, characterised by a fussiness and disquiet destructive of the nobler qualities of architecture. Thirdly, that the redundant and obtrusive details are mostly, though of course not necessarily, of a very impure type. Fourthly, that detail, even when excellent in itself, does not appeal to the ordinary mind, which is, nevertheless, amenable to other influences within the compass of our art; that whilst the kind of beauty attainable in the minuter portions of a building and its decorations, though, no doubt, a very desirable quality, is equally at the service of the sculptor, the painter, and others, the power and impressiveness of a fine architectural composition, the qualities which distinguish it, as creative from merely imitative art, are attributes all its own. Fifthly, that by relinquishing, or by not developing to its utmost limit, our hold over this source of effect, we deny ourselves our distinctive means, as architects, of appealing to the imagination. It is one of the difficulties of my subject that I cannot cite, in defence of my main position, the individual works of living architects, and for confirmation of my views I can only appeal to the experience of you all. I may, perhaps, however, be allowed to put in evidence the new Queen Victoria-street, as a whole, compared with Cannon-street, as a whole, as one illustration of my meaning. Many of those present will probably agree with me in thinking that, in some important respects, the new work is not an advance upon the old—that it lacks a certain appropriateness and dignified reticence, so to speak, which the earlier work possesses. There is, no doubt, a great amount of variety, and variety, as we have been taught from our youth, is charming. There is some skilful designing of portions, plenty of excellent detail, carving, and surface decoration; and occasionally we meet with a really effective composition, boldly and broadly treated. But in reviewing it as a whole, one cannot but feel the absence of any guiding principle of design—that the architects, like Byron's middle-aged hero, "knew not rightly what they would be at." The eye wanders over its long array of costly façades, seeking rest and finding none, and the result is more or less of a jumble. To take another illustration, the copious and admirable illustrations which, from week to week, appear in the various professional journals will, I submit, bear out my view as to the undue attention given to details of every kind, to the exclusion of weightier considerations. By the aid of that press we are enabled, without quitting our study chair, to pass in review the contemporary architecture of almost the whole English-speaking race, and we cannot but be struck by the strong family likeness, in minor points, between many of the buildings so illustrated. Special forms of detail apparently become occasionally epidemic. The preceding R.A. exhibition has, perhaps, given marked prominence to some design of exceptional merit, and it is in due course popularised by one or other of the professional journals. So soon as its distinguishing characteristics have had time to sink into the architectural mind and germinate, we get quite a crop of designs repeating, more or less exactly, the admired original, but with this peculiarity: the admirers of the supposed design fasten only upon its accidents—queer excrescences of all sorts, funny little pediments and panels, dodgy chimney-stacks and caps, curious forms of windows and their glazing, of metal-work, bargeboards, balusters—attenuated or gouty as the mode may be—great sunflower finials, "details," in short. Designs from every corner of the kingdom are for awhile troubled with these "thick-coming fancies," but with this lamentable result, that the power of the original which inspired all this emulation is not attained. It was great in other ways, and in spite of all these oddities, and the really excellent qualities in it were not apprehended or were not reproducible by less able hands. That its smaller characteristics only, or mainly, have been fastened upon for reproduction shows the present bent of our minds. Our sketch and note books, the records of our holiday trips, all testify to the fact that we are too prone to seize upon the odds-and-ends, the tit-bits of the buildings that strike our fancy, and the resulting facility we acquire in employing such in our own work, leads to an extravagant and irrational use of them, and imparts to it a character of unrest. A noticeable instance of this feeling is provided by the recently-published autobiography of the late Sir Gilbert Scott. When one of the great Government competitions was imminent, he, with characteristic energy, prepared himself at once for the conflict by sedulously collecting and arranging such items of his design as cornices, parapets, windows, and their dressings, and all the minor elements of his composition. Now this is most instructive, as showing us the side upon which a distinguished architect attacked a problem of unusual magnitude. To some results of his method, I shall refer later on; at present I only note the fact as an illustration of a principle of design which appears to me radically faulty. As a consequence of our method, few of even the most considerable modern buildings do much to help the general attractiveness of our large towns. We are, in this respect, far behind the architects of the 16th and 17th centuries; the beauty of most of our buildings, such as they possess, is mainly of a microscopic order, and has to be searched for in petty details. We have of late years witnessed the removal of buildings of no great antiquity, nor of any special architectural excellence, yet possessing a picturesqueness which appealed to and was appreciated by all—cupolas, lanterns, and similar features, which diversified the sky-line agreeably and furnished pleasant resting-places for the eye-wearied and jaded by this wilderness of bricks and mortar. The sites of these buildings have been covered with others conspicuously deficient in the qualities and attractions of the old. The energies of their builders appear to have been given to surface decorations in low relief, pilasters, panels, carving, strings, and the like, ineffective under our cloudy skies, and all soon to be reduced by soot and dust to one grimy obscurity. The sky-line is a monotonous row of chimneys, and we may think ourselves lucky if these are not soon ravelled out into a ragged fringe of cowls and tallboys. The effect of the composition as a whole, does not appear to have engaged a moment's thought. An example of a similar inability to grasp the whole of a problem is provided by the fashion now prevalent of painting the outsides of our London buildings in "art colour," while the roofs and chimney stacks are left unreformed and hideous. The public does not apparently feel the incongruity, and it is not therefore surprising that the *ensemble* of our public works receives less attention than it deserves, or that of many of the more prominent buildings of the metropolis we are constrained to say—as the immortal Mr. Mantalini said of the dowagers and duchesses whom he refused to marry — that they have either positively *no* outline or their outline is a *dem'd* outline. The causes for this defective system of design are, I submit, three-fold; and for the first of them we must go back to the days of the Gothic revival. It was discovered very early in the movement that in order to secure a satisfactory resemblance to ancient work accuracy of detail was of the first importance. Accordingly for a time all the energy of the leaders of the revival was directed to a patient and unsparing investigation into the minutæ of Mediæval buildings. The result was a thorough knowledge of every item in their composition, its chronology and development, and this knowledge was duly catalogued, illustrated, and recorded in text-books and glossaries. But having with infinite labour completed our analysis, it was found that a corresponding synthesis was a quite different

matter. The training and knowledge, though indispensable to us as antiquarians and archeologists, proved rather a hindrance to us as artists, and we have found it as impossible to reproduce the spirit and excellence of the Mediæval works from our scraps and details, as it would be to reconstruct deal boards from sawdust. As a second cause of our present manner, and connected with the Gothic movement, we may adduce a certain purism, which adopted and carried out too rigorously Pugin's celebrated dictum about ornamenting construction. We have been frightened by the utilitarian and his "obstinate questionings," and have tacitly admitted the propriety of his eternal query: What is its use? In endeavouring to find sufficient *raison d'être* for every element of effect in our designs we have been led, one by one, to abandon them almost all. It is curious to see how furtively (except in the case of a church) an architect introduces a tower into his designs. He does occasionally summon the courage to propose such a feature, and even domes have been built (upon paper). But such flights generally succumb before the old question, *Cui bono?* The tower is sometimes allowed on the plea of a clock and bells. A clock is notoriously difficult of treatment architecturally, and moreover in these days, when everyone carries a watch, is not needed. The bells are rarely hung, and still more rarely rung. The last defence is that it is a place for records—a most weak reason, for the thick walls leave but little internal floor-space even in a large tower, and the piling-up of records tier upon tier cannot be a safe or economical disposition of them. Is it to be supposed that a peal of bells was designed for each of the three towers of our cathedrals? The plain reason is that for artistic purposes towers, domes, cupolas, and the like, are necessary. Their use is beauty, but we have not the courage to avow the fact, and to defend their introduction on artistic grounds. We have consequently in our despair turned to surface decoration, and to what Sir Christopher Wren called "crinkum-crankum work," as the only field in which our ingenuity could expatiate. The third, and perhaps the most potent cause of the system I deprecate, is the teaching and influence of a very remarkable man. There is no one who feels a more unfeigned admiration for Mr. Ruskin's genius than myself, and if I venture to controvert any of his dicta on matters pertaining to our art, it is with reluctance and not, I hope, without a becoming diffidence. The fact that it is impossible to treat nowadays upon art in any of its manifestations without some reference, implied or direct, to Mr. Ruskin and his work, shows conclusively how largely the current of art-life has been influenced by him, and is in itself a tribute to his commanding ability. Still, I feel that in the publication of his views upon architecture he unwittingly dealt a blow at architectural progress, from the effect of which we have not yet recovered. About the general drift of his teaching there can be no room for doubt. Mr. Ruskin is above all the apostle of small things—of details in short, and his views may be not unfairly summarised in the following extract, in which he describes his growth in art knowledge and his maturer convictions respecting the art of architecture:—"The *only* admiration," he says, "worth having attaches itself *wholly* [the italics are his] WHOLLY to the meaning of the sculpture and colour on the building, very regardless of general form and size, but intensely observant of the statuary and floral mouldings, mosaics, and other decorations. Little by little it gradually became manifest to me that the sculpture and the painting were, in fact, the *all in all of the thing to be done*—that these, which I had long been in the careless habit of thinking *subordinate* to the architecture, were, in fact, the *entire masters of the architecture*, and that the architect who was not a sculptor or a painter was nothing better than a *frame-maker on a large scale*." It is clear from this typical passage that the new departure which he inaugurated was an excursion in quest of newer varieties and greater excellence of detail, sculpture, floral mouldings, and the rest. He not only deprecates the ascription of any artistic merit to architecture proper, but he dubs it contemptuously as "frame-making on a large scale." The world was carried away on the flood of his matchless rhetoric, and the more ardent of our young men hastened to work upon the hints he threw out. No movement of the kind was perhaps ever attended by the expenditure of so much earnest labour or furthered by the devotion of so much conspicuous ability. The new doctrine enunciated the principle that if you look well after the architectural pence, the pounds will look after themselves. I do not believe that this is the principle upon which the great mediæval builders worked, and so far as it has been adopted in our time, it may be said to have been quite barren of great results. We have now nothing to show for it but a few shabby, parti-coloured structures, grimy and forlorn. The master's teaching is quite discredited, and the architectural world is veering steadily round to that Renaissance which he so vehemently reprobated. But we have still to emancipate ourselves from the governing idea of Revivalism and Ruskinism. The race is even now mainly after details, and ever newer forms of detail. The sculpture and floral mouldings of Venetian Gothic have simply made way for the uncultured eccentricities of the Jacobean era, or the tame monotony of the Classical egg-and-tongue. Now, the point I would submit is, that it is to this despised and neglected "frame-making on a large scale" that we ought mainly to address ourselves, to cultivate with assiduous care and make our peculiar study, as in that direction lies our special source of strength; that Mr. Ruskin's first idea was the right one, and that the sculpture and floral mouldings are, in fact, and should be in design, subordinate to, and not the masters of, the architecture; that they may be, and often are, omitted altogether without detriment; and that when they become objects of absorbing interest they tend to rob our work of all its breadth and of nearly all its value. To put the main theory, which I am combating, to a practical test, let us apply it to those glorious Cistercian abbeys whose ruins adorn our land. The rule of their founders, as you know, forbade the introduction of ornament; and that carving and allusive imagery, which, Mr. Ruskin says, is the "all in all," was conspicuous by its absence; nor were those precious marbles used which, he says, are the only allowable substitute. Yet successive generations have borne testimony to the beauty and impressiveness of those exquisite works. It is idle to dispute about mere words: whether this be architecture, as we understand it, or "frame-making," it is the quality we desire to emulate. What is it that impresses us on entering the nave of Canterbury, or of Durham, or of Chichester, or of Southwell Minster? Not the cushioned capitals, more or less rude or ornate; nor the ruder attempts at surface ornament on the tympana of the triforium arches. Before we have had time to peer into these, be they never so lovely, the power and majesty of the old work falls upon us like a spell, and awes us into reverence. Something, no doubt, is due to mere age, something to religious and historical associations. We are, nevertheless, by no means regardless of its general size of form. The frame-making on a large scale has done its work as nothing in the world beside could have done it, and the human mind is more amenable to its divine silence than to the eloquence of all the carving in the world. There is no doubt that architecture may claim the triple gift "to charm, to strengthen, and to teach," but we have, nowadays, as the early builders had not, other teachers, multitudes of channels in which the streams of learning flow, endless appeals to our intellect and to our heart. But amongst all the resources for the elevation of the human mind, and amongst all the appeals to our imagination, there is still none so potent as that afforded by grand and noble architecture. To this grandeur and nobility mere excellence of detail contributes only in a secondary manner, and in restricting our attention to it we run in danger of missing ends of immeasurably greater importance. May I adduce in illustration of my general position a modern instance which combines great wealth of detail with masterly grouping and general arrangement, and endeavour to assess the part played by each element in the general result. I refer to the Houses of Parliament. I have always admired that building, and still think that in spite of the hostile criticism with which it has been assailed, that the new Palace at Westminster is, on the whole, the most satisfactory secular building which the Gothic revival produced. Yet one can never pass it without wishing that its great architect had left us some spaces of repose on its enriched fronts, some quiet pauses in the restless pageantry of its façades. Who, for instance, would not wish away from the clock-tower all that gilding and frippery which vulgarise its summit, reduce its apparent height, and compromise its dignity by destroying its simplicity? Would not the whole structure benefit by the removal of half the cresting and brattishing, the wearisome iteration of panelled surface, and the multitude of small prettinesses which crowd every part of it from base to summit? The value of the details diminishes every day, but the artistic skill evident in the general arrangement of the building, as a whole, forms an element of permanent value, and as long as the river flows, will appeal to the imagination with a force which the fluctuating fashions of the day cannot disturb or diminish. We are charmed, in spite of the critics, by its varied skyline, by its "crown of towers," by the play of light and shade, the heightened *chiaroscuro* which the opacity of a London atmosphere imparts to a building so picturesquely varied in outline and mass, and of such considerable extent. The atmosphere of great towns, where alone works on the largest scale are likely to be built, although fatal to our details, statues, and floral mouldings is, nevertheless, our strongest ally in the distinctively effective character of our work. Half the charm of an English landscape is due to the silvery mist in which it is shrouded; to the changing light and shades of our fitful Northern skies. A grey picture, painters will tell you, is always a favourite picture. The element of mystery is at once introduced. The varying opacity of the atmospheric veil gives to our large buildings, in like manner, a pictorial charm, attainable by no other means. I plead, therefore, for a more careful attention to a system of study, which shall take advantage of these facts, and that, in the phrase of the moment, the development of our architectural styles should be determined by its environment. I may, therefore, be excused, perhaps, for reminding you of certain broad principles of art laid down by Sir Joshua Reynolds in his excellent Discourses, especially in the 11th, where the analogy between the "finish," to which he refers, and the "details" I have spoken of, is complete. "The highest finishing is but labour in vain, unless, at the same time, there be preserved a breadth of light and shadow." And again, he says "I have observed that an extreme labour in the detail has, nine times in ten, been pernicious to the general effect, even when it has been the labour of great masters." And, yet again: "It is in vain to finish ever so minutely the parts if the masses are not observed, or the whole is not well put together." The same formula, variously expressed, runs through all Reynolds' work, and the lesson which he is never weary of enforcing is that you must design, or compose, on broad lines to achieve satisfactory results, that you must work down from large to small; and must not be distracted from your main purpose by undue solicitude about subordinate parts. As you walk across the Horse Guards' parade from the Duke of York's column, you will see an evidence of the kind of skill referred to, and of the absence of it in the two public buildings before you. In the Horse Guards, designed by a painter-architect, there may be said to be scarcely any detail and positively no ornament. The building follows almost exactly the lines and contour of the earlier Chas. II. structure, the wooden turret having been translated into stone, and the eccentricities of the Stuart details having been toned down to the Palladian standard of propriety. I do not cite the building as a brilliant example; it is insignificant in size, and the style is one with which at the present moment we have but an imperfect sympathy. But it is an evidence of the application of a definite principle of design of a certain art of grouping and arranging a building as a whole, relying not at all for its success upon minor details. The effect is gained by mass, proportion, and light and shade. If you turn now to its newer rival, you will see much the reverse of all these. There is much excellent detail—statues, floral mouldings, and the rest. Some of the ornament is of a quite Grecian purity and beauty. But the general effect of the enormous mass is disappointing and unsatisfactory to a degree. There are few things in every way uglier than that great tower, with the chimney-pots dodging behind its parapets. The art of grouping, of composition, of "putting the whole well together" is nowhere visible. We saw,

at an earlier stage, the author's method of work, and here we see one of the results, and cannot say it is encouraging. It is useful, however, in showing that mere mass will not alone answer our ends. The works of the civil engineers are generally on a large, sometimes even on a colossal scale; but their lack of artistic value is proverbial, because the "frame-making" is at fault, and the whole is not in an artistic sense well put together. I ought, in passing, to pay a tribute to the endeavour which has of late years been made in our Board Schools to give a dignified architectural effect by proportion, grouping, and colour, not without some satisfactory results, and it would be a mere injustice not to point to the noble structure at South Kensington, the completion of which is now unfortunately delayed, in which its accomplished architect has combined with consummate ability the highest skill in grouping and arrangement, with the nicest care for the excellent but duly subordinate details. I may also allude to the works of some other of our more successful architects, which are characterised by an extreme, almost austere, simplicity and breadth of treatment, in which ornament scarcely finds a place, and where the whole effect is due to the other causes above alluded to. These are, however, exceptions to the general current of architectural design, and stand out in lonely isolation from the mass of unintelligent, unrestful work everywhere only too rife. Now, I fear that what commenced as a modest suggest for discussion has turned out very like a sermon; but I hope I have made my position clear. I believe that our habit of working in pen and ink, with the point rather than with the brush, has much to answer for, and that the soener we modify the practice the better. In any case, we should keep well before us the advice of Sir Joshua Reynolds, and the examples of the successful works of our ancestors. In conclusion, I am happy in being able to quote a stray passage from the most distinguished art-critic and brilliant writer of the day. You will recognise the incomparable style, and will, I hope, endorse the sentiment embodied. "While it is not to be supposed," he says, "that mere size will ennoble a mean design, yet every increase of magnitude will bestow upon it a certain degree of nobleness. So that it is well to determine at first whether the building is to be markedly beautiful, or markedly sublime, and if the latter, not to be withheld by respect for smaller parts from reaching largeness of scale. Let the architect who has not large resources (and I should be tempted to add, let him who has), choose his point of attack, and if he choose size, let him abandon decoration; for unless they are concentrated, and numerous enough to make their concentration conspicuous, all his ornaments together will not be worth one large stone. And the choice must be a decided one, and without compromise. It must be no question whether his capitals would not look better with a little carving, let him leave them huge blocks—or whether his arches should not have richer architraves, let him throw them a foot higher. A yard more across the nave will be worth more than a tesselated pavement, and another fathom of outer wall than an army of pinnacles."

The President thought the over-attention to detail which turned out to be the "Unrest" indicated by Mr. Bell's enigmatical title, was a fault in street-architecture of the present day which most observers recognised, and many regretted. The subject had not been so definitely treated before, and he was not without hope that the trains of thought suggested in the paper would have a marked effect on the architecture of the next ten years.

Mr. H. L. Florence considered that London architecture would be endurable, but for its detail and ornaments. The unrest Mr. Bell justly objected to was not always the fault of the architect, as he was often instructed by his client to make as great a show as he could on a very limited site.

Mr. H. W. Pratt seconded the vote of thanks, remarking that Mr. Bell had taken a broader view of the subject than the title had led him to anticipate. It had been said that the architectural fashion had changed so as to restrain detail, but he saw vagaries more practised than ever. Although in general terms he agreed with the lecturer, he did not follow him with regard to surface decoration of the façade. Given a limited frontage, unless at a corner or facing an open space, an architect could do little unless allowed to introduce much detail; indeed, any broad treatment would be considered by his client to be meagre and inadequate. The only mode of overcoming the difficulty was by the introduction of colour in place of detail, and the result would, he believed, have a satisfactory effect upon our street architecture, and would reduce the pettiness complained of. It was to be regretted that no examples were referred to by name. Mr. Bell had, however, indicated the Natural History Museum at Kensington as a satisfactory building; but surely this was a work covered with ornament and carving, and only absolved from the charge of unrest by a large scale, good proportions, and careful grouping of parts. The only hope he had that Mr. Bell's views as to breadth and massiveness of treatment could be carried out, was where architects had the planning, as a rule, of an estate or of streets, and in such a case his ideas could be usefully adopted.

In acknowledging the vote of thanks, which was heartily accorded,

Mr. Ingress Bell said with reference to the remark that an architect was hampered by the frontage to which he was obliged to conform, that he had still the sky to build up to, and that it was the modern sky-line that was to the lecturer the cause of the greatest dismay and despair. He entirely agreed with the gentleman who thought it would have been better if he had given specific instances of successful and unsuccessful treatment. He begged to refer to the works of the late Mr. James Pennethorne, as combining the most refined and delicate treatment of detail, with an artistic treatment of the whole. With reference to the other class of structures, he could not commit the impertinence of holding up to public censure the individual works of brother architects, but was compelled to fall back upon the example of that artful theological student who, when pressed by his examiner for the *names* of the major and minor prophets, answered that he "really could not bring himself to draw any such invidious distinctions."

THE INSTITUTE OF ART.

SINCE our last visit to this exhibition, several new productions have been added to the collection, to which we may draw the attention of those who have an interest in the cultivation of art-work among ladies, as well as others who are purchasers. In the class of painting in oil and water-colours, we see some really artistic work. For instance, we notice two powerful pictures of marine subjects, one called a "Timber Ship off Ryde," and the other the "Eurydice in a Calm," by an artist of unquestionable ability, Mr. O. D. Scullarde, who has managed by a dexterous manipulation of the pallet-knife, to impart an appearance of atmosphere worthy of a Turner. There is a remarkable softness and haze about the last-named picture. A small picture of a Cow, by Mr. Emms, and a study of a Fisherman at his Child's Grave, by Harry Moore, are clever; and, passing to water-colours, we have seldom seen any sketches so effectually hit off by a few touches of the pencil as those representing old Houghton Hall, and studies of foliage and flood near Nottingham, exhibited by Mrs. Barton. The artist has, by a precision of handling, without apparent effort, and in two or three tints, given all the effect of finished sketches. A sketch of Old Oak, at Pandymill, by Miss H. Tatham, is a masterly bit of foliage, and Mrs. E. F. Jackson's "Bowl of Roses," for which hon. mention has been given, is captivating, no less for its richness than for the depth of contrast in the colouring. Near it Miss G. Ball Hughes contributes a fine copy of one of Landseer's pictures, "The Humble Friend," a small terrier, which is shown seated by the side of a reposing mastiff. Mrs. Guerin's "White Azaleas," is a charming study, and Mr. C. S. Mattram's "Restless Sea," a light and airy sketch of breaking waves on a sea-shore. Miss B. Meyer's "Communists of the First French Revolution," and Miss Abbott's "Brown Study," are both clever.

In the gallery devoted to ladies' design and workmanship in woven fabrics, we notice Mrs. Earnshaw's well-conceived design for a three-panel screen, in which water-plants and birds are introduced, also a prettily-executed pianoforte back. Miss Dalton contributes some good crewel flower-work on claret-coloured cloth; and Mrs. Branston's painting on black satin, for a screen, may be noticed rather for its work than its design. Miss J. E. Hogg sends a painted figure of "Urania" on black silk, and the decorative artist will find the panels painted on wood, representing roses and honeysuckles on a gold ground, treated in a free and natural manner though in a decorative spirit. The painted "China Plaques," by Miss F. Voss, show a spirited treatment of apple blossom in blue. We notice a new process of reproducing pictures on glass, lately introduced by Messrs. Morris and Lowe, called "Technemacy." The pictures are apparently reproduced by photography, and in some of the more subdued shades of colour, we think it might be successfully employed.

A painted curtain, by Miss Shoesmith, of foliage on a golden satin cloth, and a few panels by the same lady, call for notice; also a few exceedingly clever specimens of crewel-work, and embroidery, Venetian point lace, old needle-work and china. We observe in looking over the rules of the Institute, one or two desirable alterations have been made; we find, for example, that societies, though they may receive certificates of honourable mention, are not eligible for prizes as a body; and that ladies and gentlemen are eligible as members who pay a subscription of 15s. annually, or 10s. for the summer and 6s. for the winter exhibition, which entitle them to free admission, and to the display of four works of art at each exhibition. We believe the Institute of Art is doing good work in promoting an art taste among lady and other workers, and in placing before the appreciative section of the public artistic productions at low prices.

GEMS OF ARCHITECTURE.

MR. J. P. SEDDON delivered a second lecture under this title, on Thursday evening, at St. Paul's Chapter-house, before the members of St. Paul's Ecclesiological Society. The lecture consisted of a running commentary upon photographs, thrown by the oxyhydrogen light upon a sheet, of the principal Gothic buildings in Europe, followed in each case by similar reproductions, but, of course, on a magnified scale, of the details of sculpture or carving to be found in the collection of casts at the Royal Architectural Museum, Tufton-street. Mr. Seddon warmly advocated the claims of the museum, which he remarked was an institution of very great value to the student of architecture, the archæologist, and artist, but although open free of charge throughout the week was not so well known as it ought to be, and was greatly in need of assistance. Of Venice, the lecturer showed views of St. Mark's, explaining the portions of the façade intended to be rebuilt, under the superintendence of Signor Meduna, and also exhibited a panel of St. George and the Dragon, a cast given the museum by Mr. Ruskin. From the Doge's Palace were shown many of the varied capitals sculptured with birds' heads, the lion, and flowers in a free style of treatment, and also some detail from the upper tier of arcading, which was spoken of as the finest development of Southern Gothic. From the rich Romanesque and Lombardic façade of Lucca Cathedral a number of details were given, as well as a general view, and to this followed the principal of the Scaligera tombs at Verona, with its exquisite grille of wrought iron, from which many panels were shown having Christian subjects sculptured in very low relief upon a delicate background of foliage and intertwined branches. A series of illustrations of the French cathedrals followed. From Notre Dame, at Paris, were selected the panels from the back of the stalls, illustrating the Assumption, Death and Burial of the Virgin, treated with the dignified pose, good grouping, and artistic carving of the best work of the thirteenth century; the hinge and scroll-work of one of the west doors, an elaborate and broadly-treated work in wrought iron, which has been illustrated in our pages; and some of the peculiarly Byzantine foliage caps from the nave of the unsymmetrical cathedral of Chartres, which Mr. Birch recently described to the members of the S.P.E.S. as a Bible in carving. The Architectural Museum was shown to have several bas-relievos illustrative of the months, and Amiens—than which no building, not even excepting Beauvais, was more impressive in height, scale, and proportion—furnished many subjects for the lantern: the west front,

marred to English eyes by its horizontality and want of correspondence in parts; the west rose window, a maze of Flamboyant tracery; the imposing choir, with its elaborate stallwork, columns, and vaulted roof, and many panels, grotesque carvings, and other details, all being laid under contribution. The west front of Rouen Cathedral, a strange contrast of lace-like Flamboyant carving built upon and flanked by massive Romanesque architecture, followed many panels of great richness of detail from the north transept and the choir; the series of French buildings being terminated by the picturesque courtyard of the Palais de Justice in the same city, an edifice once the Westminster Hall of Normandy. Coming next to England, several illustrations of the carvings in Lincoln Cathedral were given, including some of those which have been reproduced from R. A. M. Club in our columns; capitals and carvings from Westminster Abbey, the Temple Church, Salisbury and Canterbury and Wells Cathedrals, arranged so as to form a chronological table of Gothic architecture. At the close a vote of thanks was accorded to Mr. Seddon, on the proposition of the chairman, the Rev. H. C. Shuttleworth, M.A., who referred to the free introduction of humorous subjects into the carvings of the Earlier Mediæval churches and cathedrals; and alluded to Charles Kingsley's query whether a sense of the humorous existed in the mind of the Almighty. He should, for himself, be disposed to regard this inquiry—which, however daring, was not irreverent—as answered in the affirmative by the many examples of grotesquerie to be found in Nature.

COMPETITIONS.

Dublin.—The Dublin Corporation considered on Monday the question whether they should remodel Green-street Court-house, at a cost of about £6,000, or rebuild it at a probable cost of between £18,000 and £20,000, the present building being stated to be a discredit to the city. After much discussion, the matter was referred to the general purposes committee, to confer with the county grand jury on the subject, and should rebuilding be necessary, the committee was empowered to offer the munificent sum of £30 for the best plan and design for a new court-house,—a premium equal, on the lowest estimate of outlay, to *one-sixth per cent.!*

ARCHÆOLOGICAL.

A Roman Basilica in Buckinghamshire.—There still exists in the Vale of Aylesbury, beneath the chancel of Wing Church, a crypt which dates from the early Saxon times, and has all the characteristics of a Roman Basilica. This crypt had been closed for many centuries, but was discovered accidentally by the late Sir Gilbert Scott, and has now been opened at the instance and under the supervision of his son, Mr. George Gilbert Scott, F.S.A., who, having long been engaged in the study of our pre-Norman antiquities, has been permitted by the authorities to lay it open. The crypt, when opened last week, was found to be filled to the extent of two-thirds of its height with earth and human remains. It consists of a central portion, in plan a sort of truncated trapezium, about 13ft. in length from east to west, and about 6ft. in breadth from north to south. At its western extremity are the remains of a small window, or "squint," which originally opened upon the nave of the church. This central chamber is surrounded by an aisle or passage, about 4ft. in width, sommunicating with it by arches opening upon its north, south, and east sides, and lighted by windows corresponding with those arches. The clear internal width of the crypt is nearly 18ft. either way. The lateral aisles, however, so to speak, extend beyond the crypt itself for some distance westward towards the nave, with the aisles of which they originally communicated by ascents of steps on the north and the south. The crypt is vaulted throughout in turfa, and has been plastered; the ancient plaster still exists in many places. The plan of this small and almost rude monument of remote antiquity is apparently identical in principle with the crypt of the ancient Church of St. Peter's at Rome, and with many of the earliest examples of the Basilica.

A new Baptist chapel, Italian in style, and erected at a cost of £3,000, has just been opened at Harlingden, Middlesex.

Building Intelligence.

Bournemouth.—St. Ambrose' Mission Church, Westbourne, Bournemouth, of which the eastern part only is being first built, and now near completion, is intended to meet the wants of a rapidly-growing district some mile or so west of Bournemouth, and if seated, as proposed, with chairs, would accommodate a congregation of about 700 persons. The principal dimensions are as follow:—Internal length from east to west, 110ft. 6in.; internal length of transept from north to south, 75ft.; internal width of nave and chancel, 30ft.; internal width of transepts, 23ft.; internal height of nave and chancel, 37ft. 6in.; internal height of transepts, 31ft.; external height of east gable to top of cross, 47ft. 6in.; external height of turret to top of finial cap, 61ft. 6in. Messrs. Cole-Adams and Horner are the architects. The contractor is Mr. Richard Pike, of Springbourne, Bournemouth.

Burnley.—On Thursday, the 8th of April, the new Church of St. John the Baptist, Gannow, Burnley, the gift of the Rev. W. Thursby, of Ormerod House, and Lady Scarlet, was consecrated. The plan of the church consists of a broad nave (all the benches are placed within the arcades, the aisles being used as passages only), north and south aisles, and chancel. There is a south chapel to the chancel and a south transept to the nave. On the north side is a vestry and organ-chamber with robing-passage. A tower to the west and two bays of the nave have still to be added. The style adopted is that of the 13th century. The exterior of the church is faced with parpoints, with Noggarth-stone dressings, Bath stone being used in the interior. The woodwork in roofs, benches, &c., is of pitch-pine, and the building is slated with Westmoreland green slate. The chancel furniture (including choir-benches, north and south screens, altars, credence, and case for organ) are in Dantzic oak. The pulpit and chancel parapet are in alabaster. The chancel is covered with antique tiles, and the steps are in dark red and grey marbles. The lectern is executed in Dantzic oak, and contains a figure of the patron saint. The church is heated by means of hot water on the low-pressure principle. The lighting in the nave is effected by two rows of coronæ. The chancel is lighted by brass standards over the choir-screens, and large brackets in the sacrarium. The church, when completed, will seat over 600 persons, 500 seats being provided at present. The cost, including organ and laying out the grounds, will be be £8,000. The architects are Messrs. Wm. Waddington and Son, of Burnley and Manchester.

Chiswick.—The new church of SS. Michael and All Angels, which has been built from the designs and under the superintendence of Mr. R. Norman Shaw, R.A., at Bedford Park, Chiswick, was on Saturday last consecrated. The main part of the church is now erected, leaving only the north aisle for future extension. The church consists of nave, with aisles on either side, and of a large and well-elevated chancel. A rood-screen, painted a sort of peacock greenish-blue, divides the two parts of the building. The altar is constructed of oak, from the architect's designs, and has a super-frontal worked by the Vicar's wife from the drawings of Mr. Cutts. The altar-rail is of regular 17th-century type, consisting of a turned balustrade painted white. The seating accommodation at present is chiefly furnished by chairs, but eight of the permanent benches have been already executed. The dado panelling to the aisle and choir has yet to be done, and so has that to the vestry. Mr. Richmond, the Slade Professor at Oxford, has promised to paint a fresco picture at the west end of the church. Messrs. Goddard and Sons, of Farnham, were the builders, and their foreman is Mr. Weir. We have very fully illustrated the church from working drawings. Photographs can also be obtained from Messrs. Bedford Lemere, and Co.

Craiglockhart.—The hydropathic buildings which have been erected at Craiglockhart, near Edinburgh, were opened on Tuesday. Its frontage, facing westwards, measures 280ft., of which space 60ft. is occupied by two wings, which at each end are thrown back from the main line. The principal part of the elevation is carried up to a height of three stories; but on the wings there is an additional story, and a tower, which is introduced in the centre of the building, rises in the form of a belvidere to six stories, the uppermost of which is 85ft. above the ground. The exterior, treated in a bold though simple style, possesses an effective character without having the aid of any purely ornamental work. The building, which has been erected from designs by Messrs. Kinnear and Peddie, architects, has cost £45,000.

East Dereham.—The foundation-stone of a new Wesleyan chapel was laid on Wednesday week in Theatre-street. The new chapel will be 57ft. long and 35ft. wide; 400 persons will be accommodated, including 80 in end gallery. The pews will be open, and be made with sloping seats and backs. An apse will contain a raised rostrum. The roof will be open-timbered and boarded, with carved braces and octagonal columns, and, like nearly all the woodwork, will be in pitch-pine varnished. Provision has been made for heating both schools and chapel with hot air. Ventilation will be by means of flaps and pulleys to the upper inclosed portion of the roof, and the admission of cold air at the floor-line from the exterior of the building. The windows will be glazed with cathedral glass, with stained glass introduced in geometric patterns. The school-rooms have class-rooms, scullery, and out-offices attached. The new chapel, &c., will be in the Early English style of Gothic architecture, and the walls will have Bath-stone dressings and will be faced with Kentish rag-stone. Mr. Larner, of Dereham, has undertaken the contract, which amounts to £2090, under the superintendence of Mr. Edward Boardman, architect, of Norwich.

Hammerwood.—The new church of St. Stephen, on the Hammerwood estate, near East Grinstead, Sussex, erected by Mr. Oswald A. Smith at a cost of £5,000, was recently consecrated. The church is built on high ground on the borders of Sussex, Kent, and Surrey, and will seat about 300 people. The building consists of nave, chancel, south aisle, two porches, tower spire, and vestry. The extreme dimensions are 80ft. by 41ft. The materials are local ashlar sandstone and flints, with Broseley tiles. At the north-east angle is a tower containing five bells, and surmounted by a spire of Bath stone, in all 104ft. high. The internal facings of chancel, columns, carved corbels, and traceried and panelled font are of Bath stone. The pulpit and benches are of solid oak. The passages are laid with red and blue tiles, the rest being floored; gas and heating apparatus are provided. The entrance to the church, which stands in about an acre of ground, enclosed by a stone wall and laid out with gravelled walks and shrubs, is by a lichgate of stone, solid oak, and Broseley red and blue tiles, by which also the church itself is covered. Mr. E. P. Loftus Brock, F.S.A., of Bloomsbury, W.C., is the architect, and Messrs. Nightingale Brothers, of Redhill, are the builders.

Llanrhaiadr.—On Tuesday week the fine old parish-church of St. Ddyfrog, Llanrhaiadr, in the Vale of Clwyd, was reopened after complete restoration at a cost of nearly £3,000, the contractor being Mr. Williams, St. Asaph, and the architect Mr. Arthur Baker, London. The original church existed so far back as the 13th century, and the eastern window, which has now been restored, was erected in the 14th century, the present edifice, with its fine Perpendicular windows and magnificently-carved oak roof (all of which have been restored), having been the work of the 15th century.

South Lambeth.—The interior of the new church of All Saints, Devonshire-road, South Lambeth, has just been enriched by the erection of a reredos, erected by Messrs. Doulton and Co. of Lambeth, at a nominal charge. It is of terra-cotta, ornamented with Doulton ware and Lambeth faïence tiles. The size of the reredos is about 6ft. square, and it consists of three pointed arches supported upon four columns, of Doulton ware of rich blue colour, with moulded vases, and collars and modelled caps. The cornice is relieved by semi-spheres in Doulton ware, and bosses of the same material are placed in the spandrels to arches. The panels are filled with painted tiles of conventional flowers, upon a pale blue background, surrounded with a border in which brown is the prevailing colour. The space between the altar-table and the reredos is occupied by a terra-cotta string and capping, the whole harmonising with the plain brickwork of the church walls.

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ILLUSTRATIONS.

ARTISTS' HOMES: NO. 2. MR. MARCUS STONE'S HOUSE AT KENSINGTON.—CONGREGATIONAL CHURCH, &C., AT BROMLEY.—DESIGN FOR A WARDROBE.—NEW PREMISES, 57, JERMYN-STREET.

OUR LITHOGRAPHIC ILLUSTRATIONS.

ARTISTS' HOMES.—NO. 2: MR. MARCUS STONE'S HOUSE, KENSINGTON.

For description of this illustration and for portrait of Mr. Marcus Stone, see p. 527.

CONGREGATIONAL CHAPEL AND SCHOOLS, BROMLEY, KENT.

The site being in the centre of the town, a somewhat lofty building is a necessity, and the church has therefore been planned as a rather long and narrow parallelogram, with small and shallow transepts containing galleries. Altogether, with an end gallery, the building seats about 680 persons. The architect depends for acoustic success upon the preservation and continuation of sound by the unbroken side-walls. Behind the church are various vestries, and a completely arranged Sunday-school, consisting of a central area with 15 class-rooms around the same, divided by sliding partitions. The superintendents'-room and library are both within the main building, but the infants' room is quite separated, and accessible only by the entrance-lobby. The materials employed throughout the building are Dunton Green red bricks for external walling with Box Ground Bath-stone dressings, and grey slates for the roofing. Internally, a large amount of wooden framing and boarding is employed in the church, to aid acoustics; but in the other buildings the facings are of cement, or plaster mixed with earth colours, so as to avoid the usual white-washing and colouring or painting. The school-buildings are now nearly completed. The church is to be commenced forthwith, but the minister's house will have to be deferred until the lease of the existing house on the site expires. Mr. John Sulman, A.R.I.B.A., is the architect, and the perspective of exterior of church is hung in the Academy Exhibition.

"BUILDING NEWS" DESIGNING CLUB.—A WARDROBE.

"Alfred" is again the author of a selected design, the subject on this occasion being a pitch-pine wardrobe, which we illustrate to-day by perspective sketch, geometrical elevation, with plan and details. We reviewed the designs received in the competition on the 12th inst. (p. 412), when we remarked of the selected one that "it is conceived in right spirit, if it fails a little in the quality of refinement."

57, JERMYN-STREET.

The illustration we this week publish of business premises known as No. 57, Jermyn-street, shows buildings now in course of erection, which will occupy the entire site of three old houses, and which, when completed, will be occupied by Mr. W. G. Skinner, the well-known army tailor. The elevation is of Portland stone, and designed in the style that from experience is found not only to be most suitable to the streets of the Metropolis, but is also most readily adapted to the wants of the practical business man. The basement and ground-floor will be used for business purposes, whilst workshops are arranged on the rear of the first story. Above the ground-floor, and quite distinct from the business portion of the premises, are suites of chambers specially designed to meet the requirements of the neighbourhood. The contractors for the whole of the works are Messrs. Bywaters, of King-street, Regent-street. The external carving is being executed by Mr. Kruner. Mr. Freeman is carrying out the gas-fitting and electric bells, whilst Messrs Gray, of Dora-street, Limehouse, are the sub-contractors for the heating and hot-water works. Mr. John House, for many years employed by the late Mr. E. M. Barry, is the clerk of works, and the whole building is being carried out under the personal direction of the architects, Messrs. Archer and Green.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

The Anthropological Institute.—At the meeting on Tuesday evening, of this society, a paper entitled "Further Notes on the Romano-British Cemetery at Seaford, Sussex," by Mr. F. G. Hilton Price, and Mr. John E. Price, was read. It was a continuation of one read before the Institute by the same authors in November, 1876. During the summer of 1879, these gentlemen again visited Seaford, and made further excavations in the Roman Cemetery upon the Downs, in which they discovered several urns, a drinking-cup of Durobrivian pottery, Samian pateræ, flint celts of the neolithic type, and many flint flakes. In one particular interment a large urn full of charred human bones was discovered, having a Samian cup in its mouth, for the purpose of keeping out the earth; another cup of elegant form of Durobrivian ware was found on its left side, and a food-vessel and patera of Upchurch pottery on the right side. In close proximity to this interment was a similar one; the urn was much crushed, but beneath a patera of Samian ware a coin of Faustina Junior, the daughter of Antoninus Pius and wife of Marcus Aurelius, was found. This was most important, as giving an approximate date to the interments; they could not be earlier than between A.D. 161-180. In another part of the Downs, in a place called the Little Burys, black patches were of frequent occurrence in the sand, which were composed of charcoal, fragments of burnt bone, a flint flake or two, and frequently iron nails. In one particular spot a batch of over 90 iron studs were found, mixed up with bone-ashes and charcoal. The authors considered that the patches of charcoal without an urn indicated pauper burials, or the burials of soldiers, as this place was a military station.

The British Archæological Association.—At the meeting of the above society, held on Wednesday, the secretary reported that some interesting excavations, which were being carried on at Brading, in the Isle of Wight, had resulted in the discovery of five specimens of Roman pavement in good preservation. He also announced that the next summer congress would be held in Wiltshire, when Stonehenge, Amesbury, Avebury, and Salisbury would be visited. Two papers were read: the one (by the Rev. Dr. Ridding, of Winchester, and the Rev. C. Collier, of Andover) on some recent discoveries of old towers, guard-rooms, and other chambers in Wolvesey Castle or Palace, Winchester; and the other (by the chairman) on the *Martels-de-fer*. Of these he exhibited several specimens, one from Saddleworth, in Lancashire, another from Wolvesey Castle, and another, probably of the 12th century, which was found in the Thames near Baynard's Castle, at Blackfriars, about 35 years ago. Dr. Earle, of Winchester, explained in detail some excavations lately made at the eastern entrance to Winchester, including three arches of a stone bridge, probably of Saxon workmanship; at the same time exhibiting sundry spurs, battle-axe heads, and coins of the Roman Emperors, mostly found *in situ*. Mr. W. de Gray Birch next exhibited and commented on two leaden plates, found at Malta, bearing inscriptions in Latin, clearly of the time of the Roman Republic. Mr. G. Adams exhibited a small but beautifully-carved head of one of the early Roman Emperors, which the chairman was inclined to think was probably Heliogabalus. Mr. W. G. Smith exhibited several specimens of British pottery, Saxon spear-heads, &c., found lately near Acton and Hanwell; and Dr. Earle, a large collection of miscellaneous relics of antiquity which had been turned up in the neighbourhood of Winchester.

The Society of Antiquaries.—On Friday last, the Fellows of the Society of Antiquaries held their special annual meeting at their rooms in Burlington-house, according to the provisions of their charter of incorporation, to elect a president, council, and other officers for the ensuing year. Lord Carnarvon, who presided on the occasion, took the chair for the first time after a long absence through illness. The noble earl alluded in his address to the services of Mr. A. W. Franks, who was retiring from the office of director of the society, expressing his warm approval of his labours in the antiquarian cause. He then adverted to the subject chiefly mentioned in his last year's address—namely, the publication of records and other ancient documents which did not fall within the scope of the volumes now in course of publication under the auspices of the Master of the Rolls, and especially the Pipe Rolls. He also alluded to Sir John Lubbock's Bill for the preservation of ancient monuments. Lastly, he advocated the necessity of taking in hand an Archæological Survey of the United Kingdom, and discussed the mode in which he thought it should be carried out. A vote of thanks to Lord Carnarvon was moved by Mr. Henry Reeve, and second by Mr. Walpole, M.P. A special resolution of thanks to Mr. A. W. Franks for his services was moved by Mr. Octavius Morgan, and seconded by Mr. F. Ouvry, V.P. These were both passed by acclamation. Lord Carnarvon was again chosen president. Mr. Charles Knight Watson was re-elected to the Secretaryship of the Society for the ensuing year.

CHIPS.

A new hall, capable of seating between 500 and 600 persons, erected opposite the Salisbury Infirmary, in Fisherton, Salisbury, was opened on Tuesday. It is in the 16th-century style of architecture, and is intended for Evangelical purposes, being dedicated to John Maundrel, a Wiltshire Martyr. Its dimensions are 80ft. by 40ft., and it has been erected by voluntary subscriptions at a cost of £1,006, the architect being Mr. F. Bath, and the builders Messrs. E. Young and Son, of Salisbury.

We noticed recently that the Trustees of the Honiton Charities had undertaken the expense of restoring the grand old rood-screen in the ancient parish-church of St. Michael's, Honiton. The Trust contemplate extending the work of renovation still further; and, with this view, Mr. Edward Ashworth, their architect, has prepared designs for the complete renovation of the chancel. This very necessary work is to be proceeded with at once. The remaining two old parclose-screens are to be restored, the chancel-floors are to be laid with Minton's encaustic tiles, carved oak stalls are to be placed *in situ* in the chancel, open benches in the chancel aisles, and all essential repairs requisite for making the chancel seemly are ordered to be done. Mr. Harry Hems, of Exeter, is to carry out the additional works contemplated.

The consecration of St. John's Church, Mold, took place on Tuesday. The church is built of stone, the roofing being red tiles, and will seat about 300 persons. The architect is Mr. John Douglas, of Chester, and the contractor Mr. Charles Holland, of the same city. The total cost is about £3,000. We illustrated the building a short time since.

The Bishop of Exeter consecrated a new church at Dartington, near Totnes, on Tuesday, the building being by Mr. J. L. Pearson, A.R.A., the architect of the new Truro Cathedral. The church is in the Perpendicular style, and will cost £12,000.

Sir Peter Coats has promised to enlarge the Free Public Museum at Paisley. The necessary designs have been prepared by Mr. Honeyman, the architect of the building.

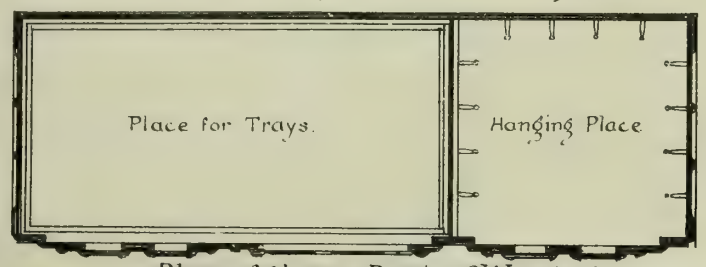
The Madeley (Salop) Local Board have, out of 21 candidates, elected Mr. Geo. Stevenson to be their surveyor.

LIBRARY

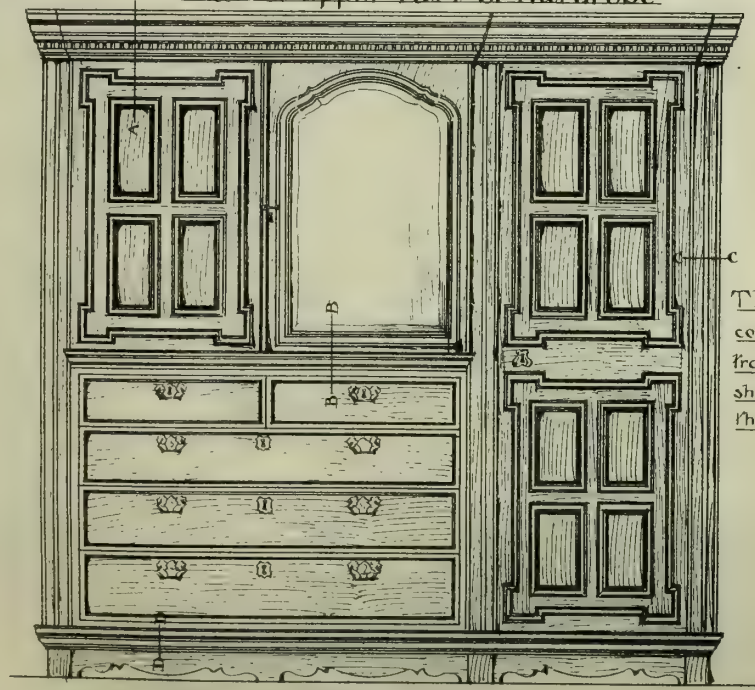
"Building News" Designing Club

SELECTED

Design for a Wardrobe, to be executed in Pitch-pine "Alfred"



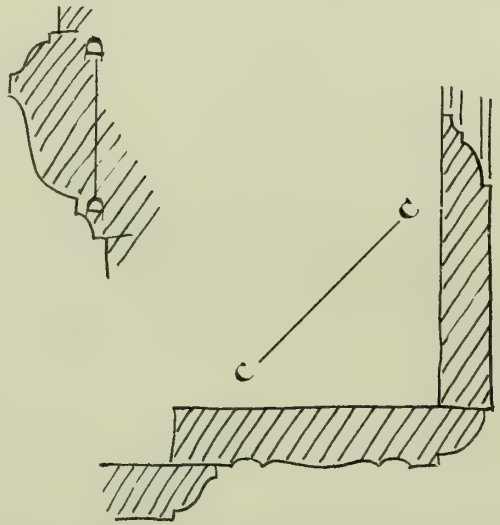
Plan of Upper Part of Wardrobe

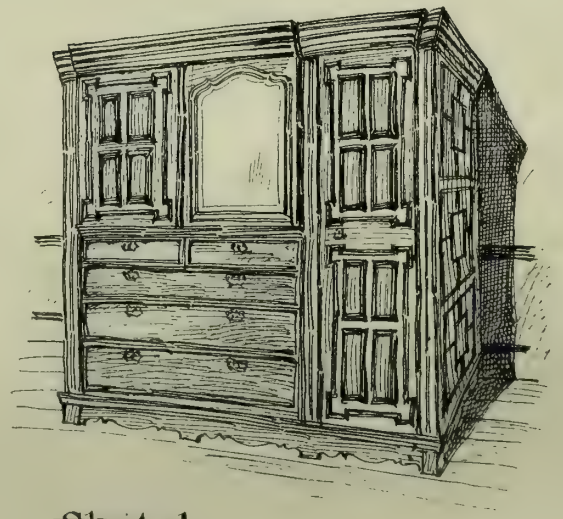


The wood to be coloured a quiet transparent green shewing the grain through

Front Elevation

Scale of Inches 0 1 2 3 4 5 6 7 Feet.





Sketch

Scale for Details

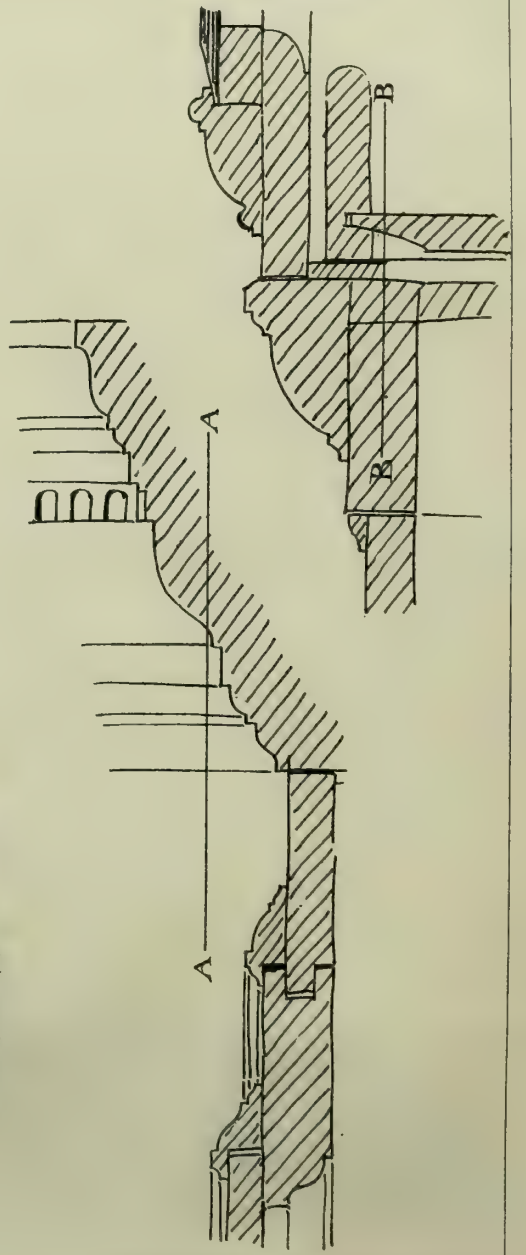
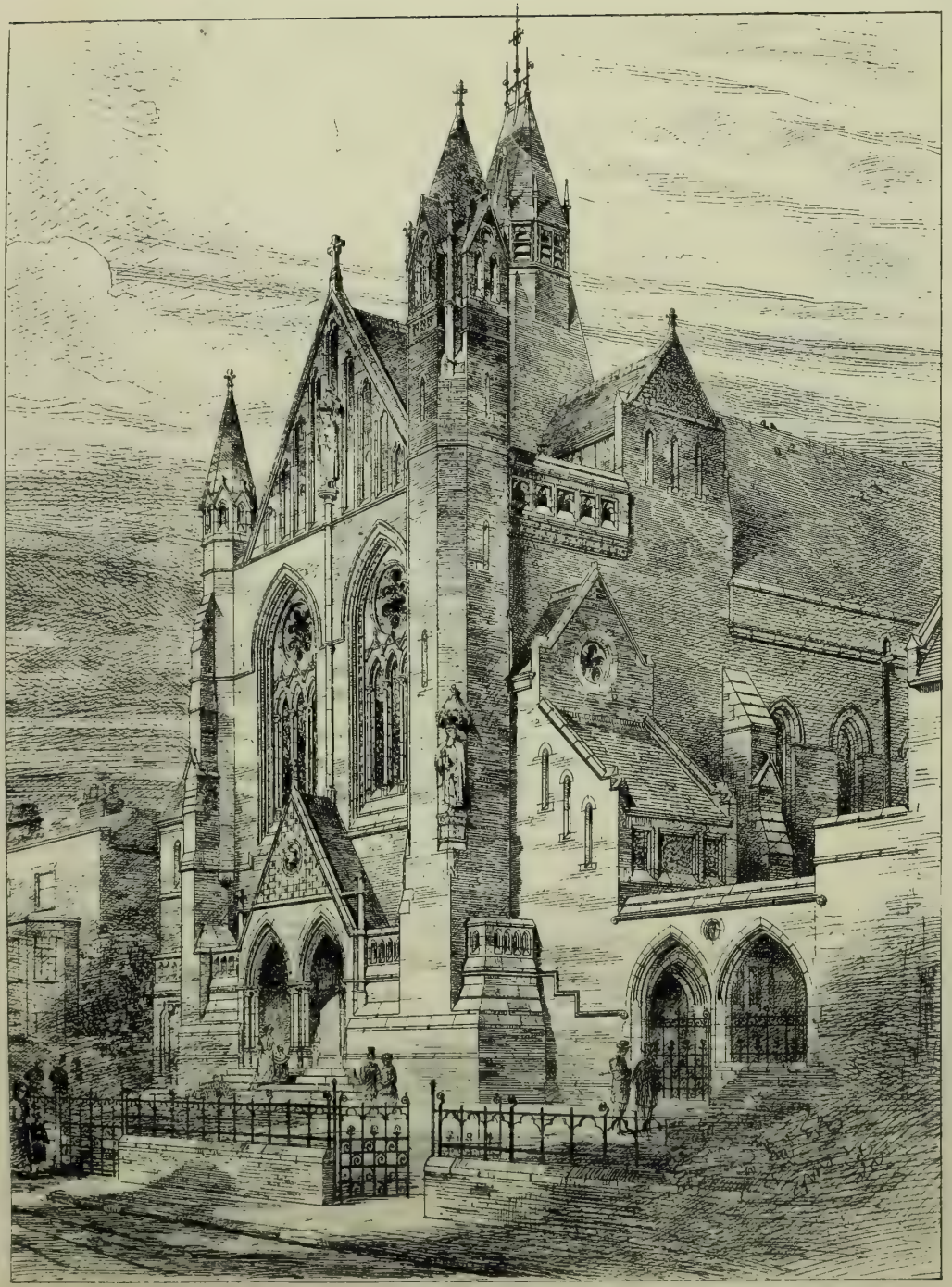
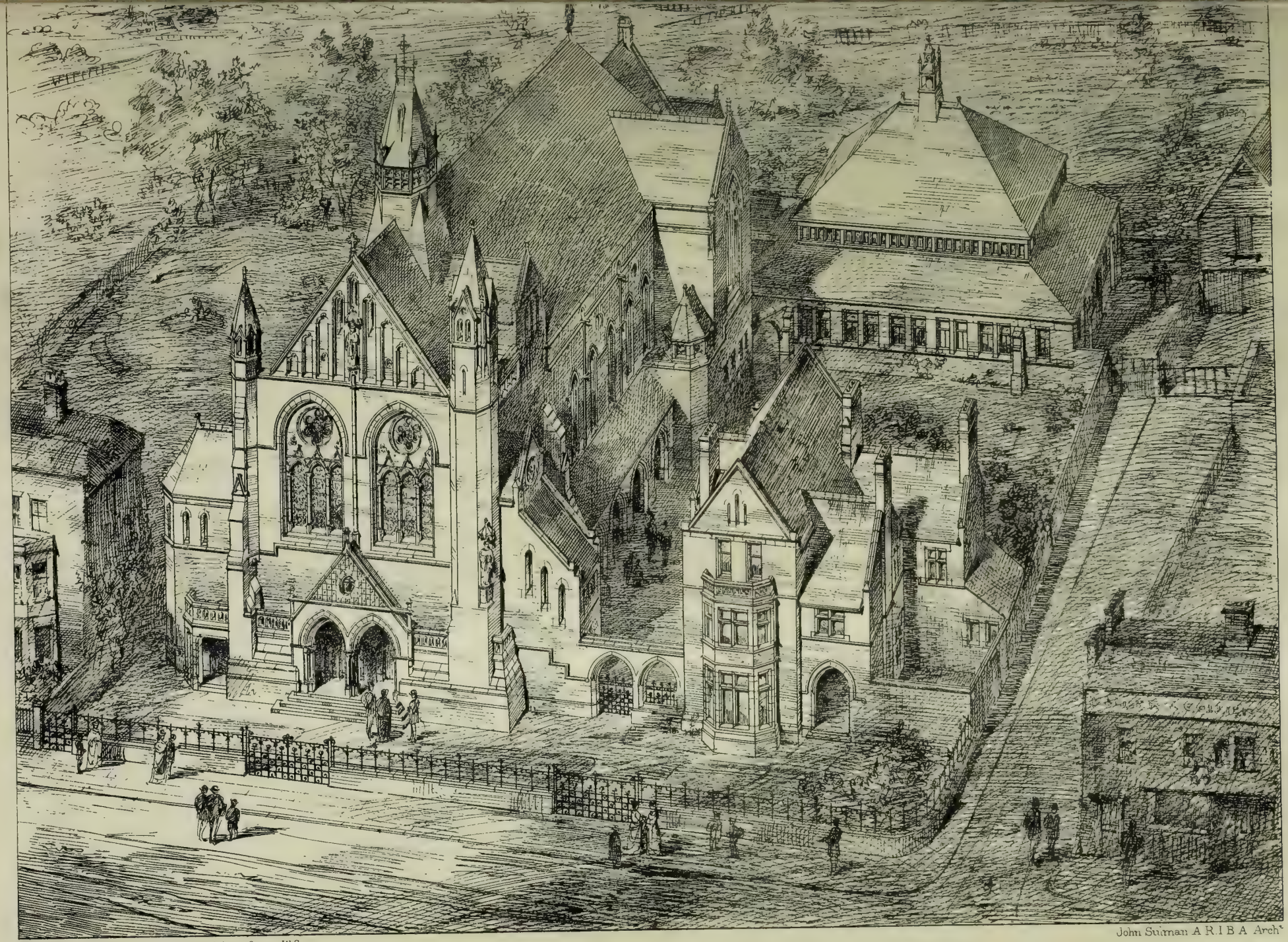


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.







John Suiman A.R.I.B.A. Arch.t

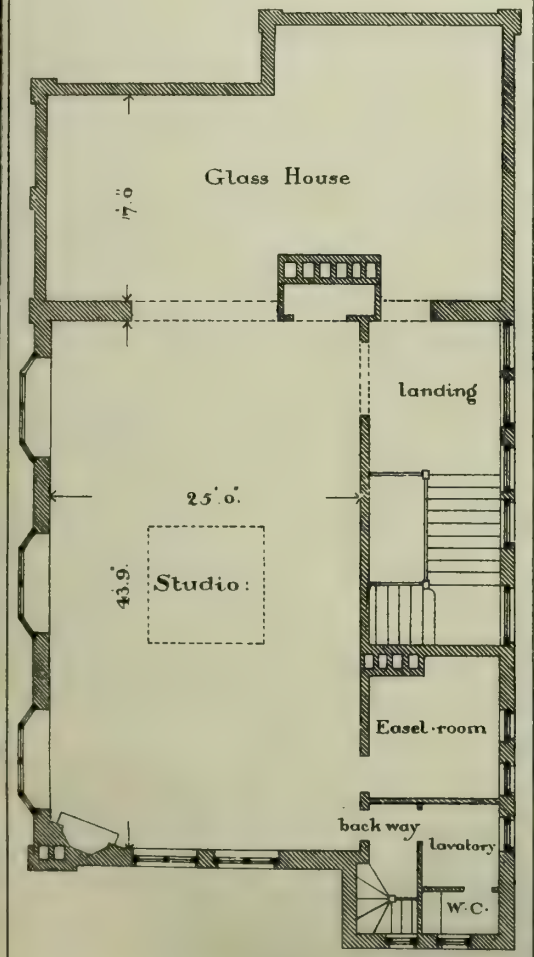
Photo Lithographed & Printed by James Akerman, 6, Queen Square W.C.

CONG.L: CH: SCHOOL: & : MINISTERS . HOUSE · BROMLEY: KENT:

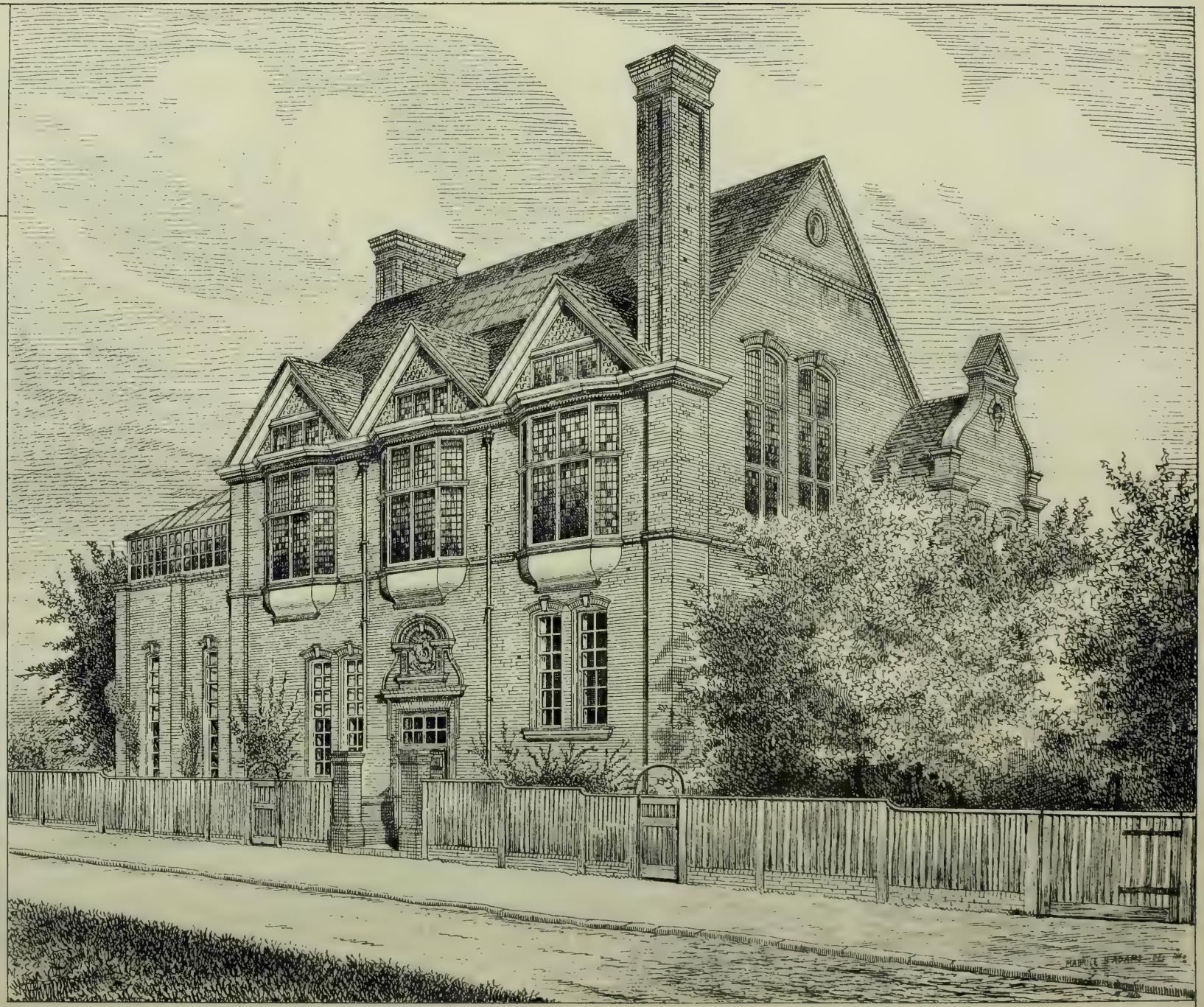
ARTISTS' HOMES N°2

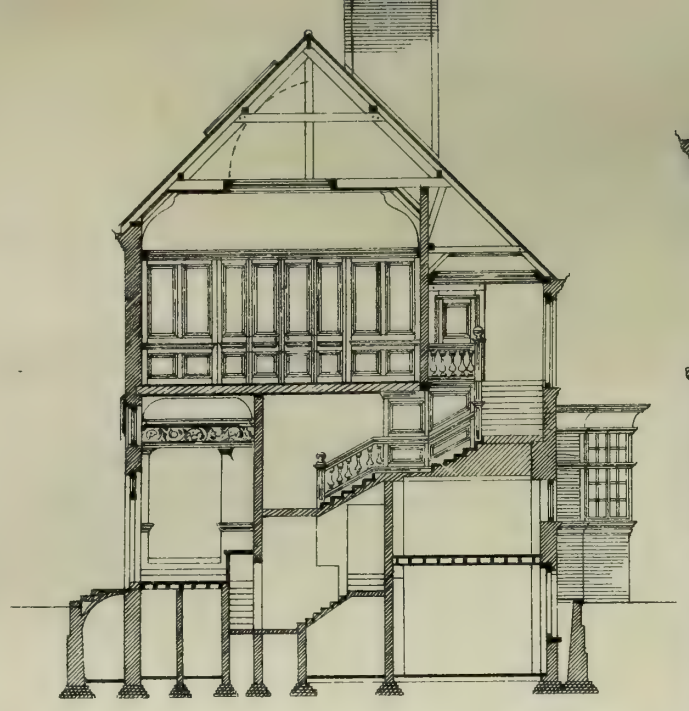
Mr MARCUS STONE'S HOUSE
KENSINGTON

R. NORMAN SHAW R.A.
ARCHITECT

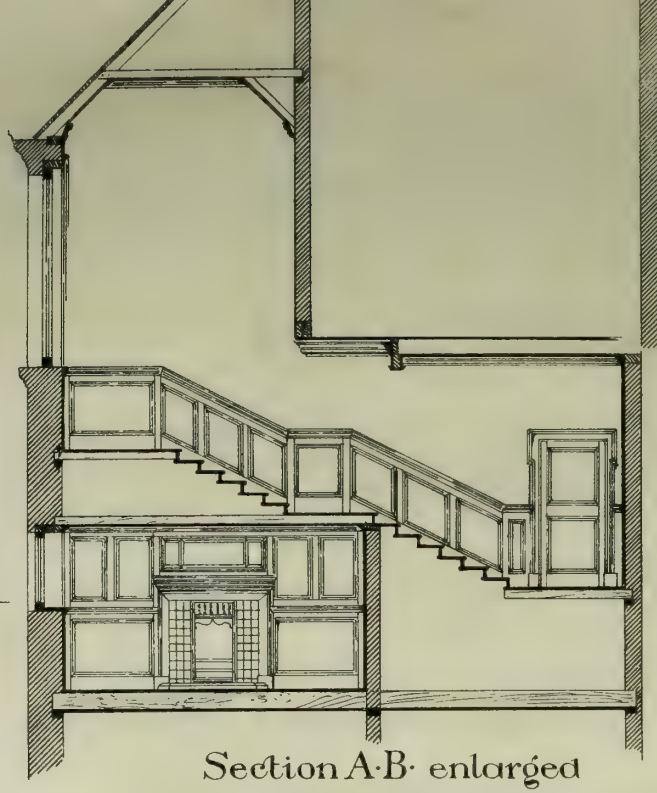


Upper-floor

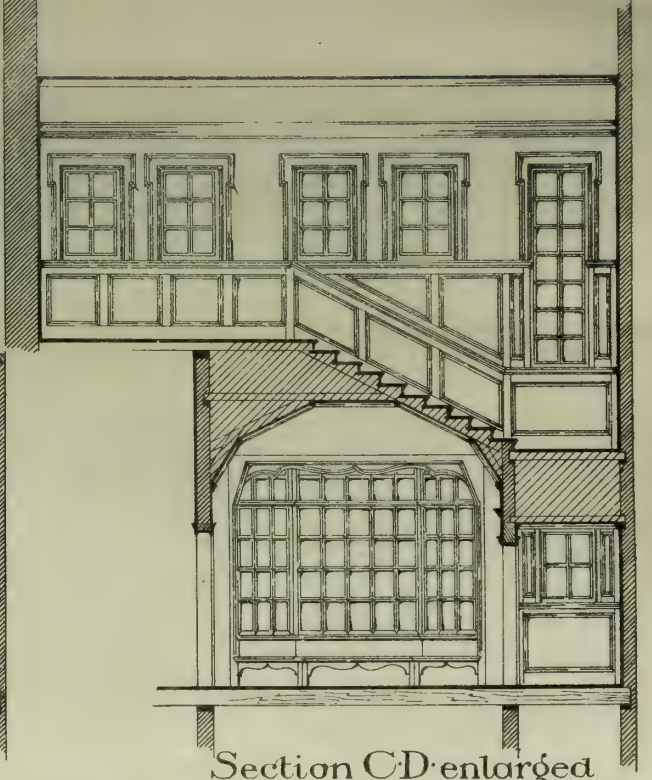




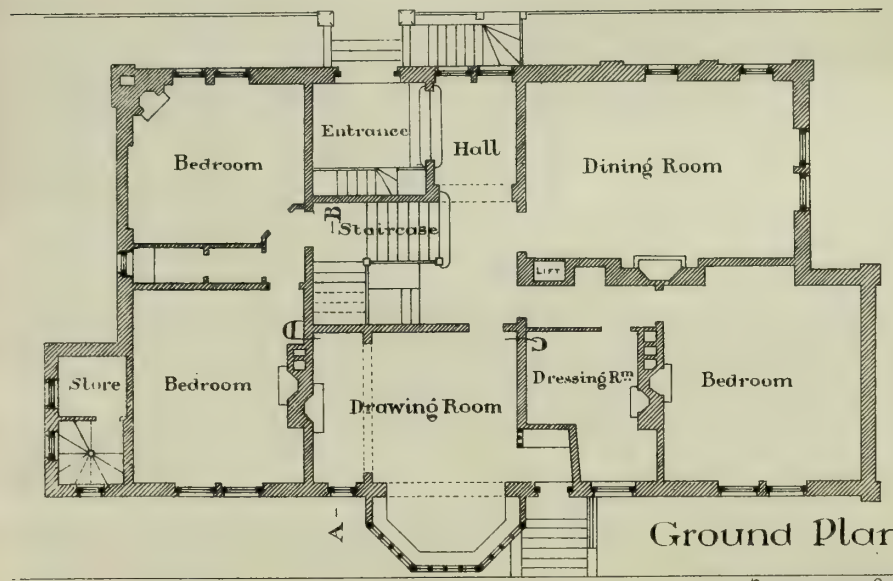
Cross Section thro' Studio:



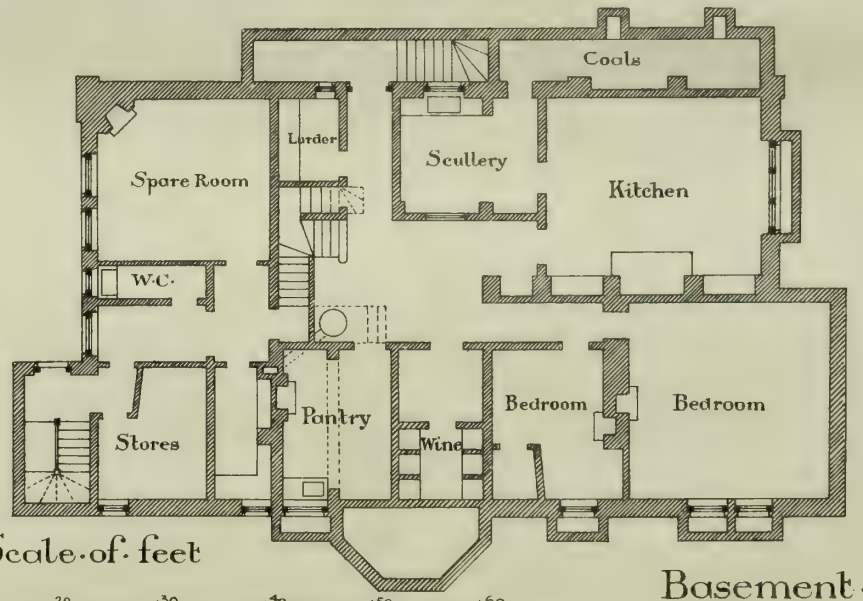
Section A·B· enlarged



Section C·D· enlarged



Ground Plan



Basement.

Scale of feet

10 0 10 20 30 40 50 60

MAURICE B ADAMS DEL^T 1880

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W C


LVII
LVII
MAURICE B. ADAMS DEL. 1880

ARTISTS' HOMES.—II

MR. MARCUS STONE'S HOUSE, KENSINGTON.

IF it be true (and few will be bold enough to dispute the proposition) that an Englishman's house is, or should be, his castle, it by no means follows that the structural home itself should be built in the form of a machicolated stronghold, with lattices suggesting rather the necessities of defence than the prospect of hospitable welcome which should be the distinguishing characteristic of every free-born citizen of the 19th century. Last week we illustrated the exterior appearance, and described, with the aid of a ground-plan, the 13th-century house in Melbury-road, Kensington, which Mr. William Burges has built for himself, and to-day we have taken our subject from over the way in the same road at Holland Park, and herewith illustrate the Queen Anne residence, with studio, erected by Mr. Norman Shaw for Mr. Marcus Stone, A.R.A. It would be difficult, perhaps, to find two buildings more unlike than these two, both in spirit and conception, unless it be the contrast which everyone sees between Mr. Luke Fildes' house and its immediate neighbour, Mr. Burges' villa, just alluded to. Of Mr. Fildes' house, we may have an early occasion on which to remark more at length, and so to-day content ourselves by merely describing, in a few words, the subject of the sketches before us. The building, from basement to roof, is clearly illustrated by the plans and sections which the accompanying plate includes. From these it will be observed that the studio governs the planning of the house almost entirely, besides having determined, in a most emphatic way, its exterior architectural treatment, which, to all intents and purposes, is the outcome of the practical objects of the building. Entering, from the street, a spacious lobby, reached by the servants through a quaintly-screened stair, the visitor cannot fail to be struck by the quiet and homely character of everything around him, though, at the same time, the proportions of the rooms, and especially of the staircase, are of a sufficiently-dignified size and extensive character as to impart an air of roominess, so very necessary, even in a, strictly-speaking, moderately-sized house. The drawing-room, being entered first, may be first described; and, indeed, the quaint arrangement of its recessed fireplace and barrel-vaulted ceiling, with the picturesque location of the garden-door through a curtained lobby, seem to give this room a primary interest. The low-pitched alcove for the fireplace is obtained, as will be seen, by sections A B and C D, under the principal stairs and half-space landings, and its effect in the room is thoroughly in keeping with the spirit of an Old English home; and really this is the feeling which pervades everything more or less throughout the house. The walls of the drawing-room are hung with a very pretty, stone-coloured, small-patterned paper, the woodwork and hangings being of a similar shade. The mantelpiece has been altered in execution from the detail shown by section A B, but the same idea has been observed. A low-proportioned gilt-framed looking-glass over the mantel thoroughly agrees with Mr. Shaw's fireplace, the general effect of the whole being materially augmented by an admirable selection of Chippendale furniture and delicately-tinted clayware, in the form of vases and plates, which the distinguished owner has brought together from time to time. The sanctity of the large bay is preserved from that constant intrusion which must necessarily occur when such a feature is merely treated as a lobby to the garden-door, by the side-entrance just now alluded to. The ceiling is enriched by Japanese stamped wall-paper, in gold and brown, and a massive brass, old-shaped candelabrum is suspended from the centre. The dining-room is a bright apartment, though the aspect is that of N. and E. The bright effect is largely due to the general tone of the walls, which is a pleasing salmon-red, obtained really by a common lining-paper, but with the most effective results. The ceiling is divided by beams into plain coffers, the cornices being richly moulded with boldly-carved egg-and-tongue enrichments. The fireplace is a faithful reproduction, in carton pierre, by Jackson and Sons, of an old Adams mantel, with admirable tiles in blue, set within marble jambs and frieze. A lift is provided from the kitchen below, where are arranged the servants' hall, pantry, store, scullery and maids' bedrooms, in a sort of sub-basement. Mr. Stone's bedroom is shut off, by a lobby next his dressing-room, from the ground-floor, and the spare bedrooms are reached from the half-space landing of the principal staircase. The walls of the staircase form a well-lighted gallery of old engravings and Japanese hangings, while the series of windows on a symmetrically-shaped landing above affords many opportunities for ultimate decorative effects. Our plan at this point shows a returning handrail, but this is hardly correct, as no such well-hole exists; but the landing is continued in its stead, and a useful set of presses forms a feature on this balustraded sort of gallery. The studio thus reached is unquestionably a splendid apartment of about 44ft. by 27ft., beyond which a large glass-house, for out-door lights and effects, is obtained. This, like the studio, is heated by a series of hot-water pipes, an open fireplace being obtained in the upper angle for the sake of that company which to a silent and solitary worker a cheering fire alone affords. The main lighting is from the three large oriel bays seen in our view, the two end-lights being simply—in short—shams; not intentional shams, however, as we believe they were blocked up as being unnecessary, if not objectionable, for the practical purposes of painting. The oriels, it will be remembered, were designed by Mr. Shaw for execution in wood; but the district surveyor objecting, on the strength of the M. B. Act, Mr. Lascelles, the builder of the house, offered to make the windows in concrete with the same mouldings and scantlings as before. This was agreed upon and executed; but we cannot say it has proved anything like a success, as the process of the crumbling away of the mullions is already assuming the form of a serious difficulty, which little short of reconstruction will probably overcome. Whether this is due to an imperfect mode of mixing the concrete, or to a too-early application of oil-colour before the concrete was thoroughly dry, must be difficult to determine now; but, the way in which the joinery has shrunk and cast does not do the builder credit, and seems to suggest that, to a similar want of care the failure of the concrete may be due. A top-light is obtained by skylights, and, when not required, is shut off by means of balance-hung flaps, as seen by our cross-section through the studio. The woodwork of the studio is finished in white, any other colour being, in the opinion of Mr. Stone, more than likely to influence the painter in the tone of his colourings in an injurious degree, while the brilliant bits of colour obtained here and there, in the old tapestry hangings with which the studio is surrounded, afford ample relief to the eye, and furnish a constantly changing series of effects for the mind to dwell upon.



An easel-room adjoins the studio, having a high door for the taller easels to wheel in and out, and a back staircase is provided for the use of models, with a lavatory and w.c. Of the distinguished owner of this house we need say nothing, as our object is rather to describe the artist's home than the artist himself. The character and habits of the man being always, more or less, to be gathered from the style of his house, it is, no doubt, difficult to exclude the one inquiry from the other. We are enabled, by the permission of Messrs. Cassell, Petter, and Galpin, the publishers of the *Magazine of Art*, to give a recent portrait of Mr. Stone herewith, and we have to remark that Messrs. Bedford Lemere have a good photograph of this building.

The foundation-stone of a new U. P. church was laid, in the Square, Branderburgh, near Lossiemouth, N. B., on Tuesday. The church will be Decorated Gothic in character, with traceried windows, and having an octagonal turret on the front to the square, 84ft. high. Internally, there are to be galleries on three sides, a pulpit platform, and the ceiling will be of plaster, coved and panelled. The facings are of local freestone, the dressings of Hopeman stone, while the chief front will be of 6in. ashlar. The architects are Messrs. Matthews and Mackenzies, of Elgin and Aberdeen, and the cost is estimated at about £2,000.

THE DECORATION AND FURNITURE OF TOWN HOUSES.—IV.

SOME practical suggestions for the treatment of the entrance hall, staircase, dining-room, and library formed the subject-matter of the fourth Cantor lecture, by Mr. R. W. Edis, F.S.A., delivered at the Society of Arts on Monday evening. The planning, arrangement, and heights of the various rooms must first be considered, the lecturer pointed out, before any opinion could be given as to the proper proportionate division of the wall-spaces. As a rule, however, it was desirable to break the wall-surfaces by divisional lines into dadoes and friezes for useful and decorative purposes, and for distinctness he should refer to the portion between these demarcations under the name of the "general wall-surface." In making these divisions not only the general proportion and height, but the practical requirements of a room, must be borne in mind; thus while a dado moulding or chair-rail was suitable in a dining-room to protect the painted or papered surface from being damaged by chair-backs, in the drawing-room, where the lower portion of walls was often cut up by cabinets, bookcases, and couches, a low dado would materially interfere with the lines of furniture. A frieze was useful in every apartment—in reception-rooms for general decorative treatment, and in bedrooms for plain surfaces of distemper colouring. A dado might be a simple moulded deal rail, about 3in. or 4in. wide, projecting sufficiently to stop chair-backs, and fixed to the wall about 2ft. 9in. from the floor. The frieze should be divided from the central space by another flat rail, which need not be moulded, as it formed a picture rod. Either of these rails could be put up at the cost of a few pence per foot run, and both were useful as well as ornamental. Having referred to the tasteless character, both without and within, of many town-houses, and deprecated the ostentation which induced people to hang their walls with valuable paintings, while all the surroundings remained commonplace and inharmonious, the author proceeded to give some general hints as to the proper cost of paint, paper, and distemper work. English papers differed from French by being made 21in. instead of 18in. in width; so that a piece of English paper of 12 yards in length would cover 7 square yards of wall-surface as against 6 square yards of French. The cost of hanging ordinary papers varied from 1s. to 1s. 6d. per piece, increasing to 2s. and 2s. 6d. per piece for better-class papers, in which there was much gold, to 4s. and 5s. per piece for flock papers, all of which last papers had to be trimmed with a knife instead of with scissors, and so required more care and time. Lining papers for walls and ceilings cost from 2s. to 2s. 6d. per piece hung complete; they were only necessary where the wall-surface was very rough and uneven; and where it was intended to paint or distemper the whole surface; and in ceilings where the plaster was bad or defective, or too much cracked. The cost of "washing and stopping," which meant cleaning off the old distemper and cutting out, filling in, and rubbing down all cracks in old ceilings, ought, in ordinary cases, including sizing and distempering, not to exceed from 3d. to 6d. per yard; but extra expenditure beyond this would be necessary for any stencil decoration and pricking-in of cornices with colours. The cost of plain painting to walls, and bringing them up to a good surface in three or four coats, varied from 1s. 9d. to 2s. 3d. per yard, with an extra 1s. per yard for varnishing. Few old walls would stand being varnished, the finishing of the plaster-work not being sufficiently smooth or level. The cost of stopping and plain painting in three or four coats for the margin or general surfaces of floors varied from 1s. 6d. to 2s. a yard, finished complete; while the cost of the cheapest Brussels carpet, $\frac{3}{4}$ yard wide, was at least 5s. 6d. per yard run, or practically nearly 7s. per square yard, exclusive of laying. Thus, painted borders were not only more healthy and artistic, but were, as a matter of fact, infinitely less expensive. Japanning or lacquer painting, in which varnish formed the vehicle for mixing the colour, could be applied to all kinds of furniture of cheap woods with good effect, at about one-third extra cost over plain painting. This varnish-paint was also used for enamelling woodwork; but the surface needed to be carefully rubbed down after each coat, so that the process, which resembled that used for coach-painting, was necessarily expensive, and the result was not always satisfactory. The treatment depended greatly on the nature and appearance of the work to be painted: delicate tints required colourless oil for their vehicle, while surfaces "finished in flat" must have no oil at all. Paint mixed with turpentine was not nearly so lasting as that mixed with oil, but a little turps was necessary in all exposed work. The silicate paints now made, which for their bases had pure calcined silica, were said to stand any fair amount of heat without blistering, and, weight for weight, to cover at least a third more wall-space than ordinary oil-paints; both valuable recommendations for their more extensive adoption for everyday use.

Having thus indicated the comparative cost of wall-decoration, he would deal with the hall, the ante-chamber of the house. Here the walls should be painted with some serviceable colour, not so light as to show finger-marks, to two-thirds of height, with some simple pattern stencilled over the surface, perhaps dividing it into panels. Unless figure-work were well done by an artist, it was better not to attempt anything more than conventional flowers. A plain wood moulding might divide off a high narrow shelf, for light pieces of Majolica or other ware; drawings hung on the walls of a hall were generally in the way. The space under the cornice, and divided by the shelf, might usefully be distempered, and in the frieze distemper could be adopted for panels of birds and figures, but panels of figure-tiles looked as well, and would last for ever. Stencilwork in distemper was very inexpensive, when once the patterns were cut out, and a good decorative frieze in two colours could be stencilled on distemper for 2s. 6d. to 3s. 6d. per yard run, and the patterns kept to renew the work another year. The ceiling should be lightly tinted in a vellum, grey, or pink tone, and the cornice distempered in very light shades. At a little extra cost, plain deal or canvas plaster ribs might be laid on the existing plaster-work, and the panels thus formed could be filled in with flock papers, or the whole surface might be covered with canvas plaster in a delicate pattern of naturalistic or conventional leaf-ornament, cast in low relief. A more expensive mode of treating the outer hall would be by panelling the walls 6ft. or 7ft. high in plain deal, painted in red or blue lacquer colour, and with a flock-paper frieze, painted light golden yellow, flecked with reddish, or brighter golden touches to afford relief; in all work of this kind great care must be taken to prevent a spotty appearance. Marble mosaic tiles might be used in the outer hall walls with satisfactory effect, at a cost varying from 12s. to 20s. per square yard, and were easily kept clean. The woodwork should be painted throughout in two plain colours, with the mouldings strengthened in darker tones, and the whole varnished; and, in passing, he would recommend that all woodwork, such as doors, windows, and shutters, which were subject to the wear of not always clean hands, should be varnished throughout. Where an inner screen was kept shut, to make the inner hall more private, it should be glazed with leaded or jewelled glass, into which small designs in colour could be introduced at a cost of from 2s. to 6s. per square foot. A shelf was almost useless in a London hall, and it was well, therefore, to discard it altogether, and to frame the grate with a border of tiles, kept in by a slight wood moulding. The floor of a hall was usually of stone, and this could have a plain marble or mosaic border, while in the middle a bright Persian or Indian rug might be laid. A good Kurd mat or rug, about 6ft. by 3ft. 6in., could be obtained for from 10s. to 15s. The doormat should be sunk flat with the floor, and be of large size. "Mischiata," or marble mosaic, although more expensive, was preferable to pattern-tile floors, which had been imitated, *ad nauseam*, in oilcloth. One or two high-backed chairs, plain oak, and a long deal settle, with plain back and elbows, might be placed in the hall; and incorporated with the settle could be a small stand for wet umbrellas. A specimen of a rush-bottomed chair, lent by Messrs. Morris, was exhibited, Mr. Edis remarking that it cost 35s. complete, and was quite good enough for the purpose. In the inner hall should be a simple cupboard, with sliding doors, with shelves for coats, a sliding rack for hats, and a few hooks and pegs for umbrellas and sticks, while the top of this cupboard, if made of hard wood, would act as a serving-table. On the landings might be placed a plain stuffed seat, over which could be thrown a piece of coloured stuff or silk, and would be found convenient on occasions when guests were received; while at each end might be arranged receptacles for plants and flowers.

Not much could be done to improve the ordinary London staircase; a painted and varnished dado, with a wooden moulding raking with the handrail, or plain deal painted panelling, would be an improvement. The generally wretched ironwork might be painted in a bright colour, but should on no account be picked out with gold, and the handrail might be ebonised as a contrast. Above the dado either distemper or paper in some warm and cheerful colour, keeping the whole to one general tone. As an example of what might be done, Messrs. Jeffery had lent a wall-paper designed by Mr. Walter Crane, which was clever and quaint in treatment and suitable for its purpose, although somewhat expensive. The general woodwork could be painted black where there was not too much of it, or in two shades of red or brown. A deep frieze of boldly-designed ornament would assist much in breaking-up the staircase wall, while panels could be made by lines of paint or distemper, in which pictures and photographs might be hung. A bright drugget might nearly cover the treadway, and on the landings and half-spaces a small Persian or Indian rug or frieze carpet could be laid. Japanese paper or silk blinds and fans, which could be bought for a few shillings, formed admirable pieces of colour decoration to hang on the walls of hall or staircase, or framed in small panels round the frieze. It was a great mistake, but one often made by professional decorators, to lay down one set rule for the decoration of the principal rooms of a house, so that the general effect was stiff and formal, and, however artistic, was far from being home-like. The division of rooms into small panels was faulty, as it afforded numerous ledges and corners for the accumulation of dust and dirt, and, *à propos* to this, he wondered how long Londoners would be content to accept gas, which from its marvellous impurity and want of lighting power was a disgrace to any civilised country, and why we should not consume the smoke of our fires, and so economise fuel and reduce the impurities of the atmosphere.

Dining-rooms should be made as pleasant as possible, care being taken not to hang the walls with tapestry, silk, or other stuffs which retained the smell of food. Instead of hanging pictures by unsightly cords and wires, a small moulding should be affixed to the wall under the frieze in which screws could be fastened, or an ordinary iron gas-pipe could form the bottom rail of this moulding. If the wall formed a background for pictures, the most effective colour was a warm brown or chocolate, and the surface should not be varnished, although the doors and windows might well be so treated. As an example of what might be done in stencil-work, the lecturer exhibited a design by Mr. George Howe, of Forest Hill, who was, he said, educating a certain number of lads and young men under him, to treat this kind of work more as art than as mere mechanical decoration, or slavish reproduction of cut stencil-plates. In the screen shown, instead of plain flat treatment of the stencil pattern, Mr. Howe had produced a varied tone in the different leaves and fruit forming the pattern, either by working the stencil-brush very slightly over a portion of the leaf, and increasing the strength of touch and amount of colour in the lower portion, or by the use of two or more colours in the same leaf, carefully blended at the moment, and worked off into delicately-shaped surfaces. The general decorative effect was still as it should be quite flat, but artistic character was given to the work by the care taken to avoid formal repetition. With a little extra teaching and study of good examples, the men who did the work shown would, the lecturer observed, avoid the anachronism and errors manifest in its design and treatment, and would not strive so ardently after the imitation of Japanese ornament without the knowledge of *motif* and power of drawing and grouping so evident in the artists of that nation. This kind of work could be produced, including the three or four coats of colour necessary for the groundwork, at from 4s. 6d. to 5s. 6d. per square yard. Thus a frieze of 2ft. deep in a room of 24ft. by 16ft. could, after deducting for window openings, be done for £5 or £6, about the cost of good flock paper, and

when done would last for ten or even fifteen years. In papering dining-room and library walls it was desirable on every account to make a dado a basis, and to end with a wide frieze next the ceiling, and Messrs. Jeffery had arranged some combinations of papers on the walls from his suggestions. In these arrangements, the dado was formed in stamped papers of dark colour, the general wall-surface being treated in papers of green, brown, red, or blue grounds of various shades, well adapted for backgrounds to pictures or engravings, and the frieze was shown in various-coloured flock papers, ranging in cost from 1s. to 6s. per yard. Ceiling papers in one tone of yellow or other colour diaper cost from 2s. 6d. to 3s. 6d. per piece. Before making a final choice it was desirable to select three or four patterns, and put them up on the walls intended to be covered, and examine them carefully by day and gas and candle-light, so as to estimate the effect under various circumstances. Other examples of wall papers, by Messrs. Morris, were shown, and Messrs. Gillow and Messrs. Campbell and Smith lent various hangings for window-curtains of different stuffs and materials, which could be put at a cost of from 15s. to as many guineas a window complete. Some of the cheaper kind of cretonne, jute, and cotton-waste hangings, were artistic and extremely moderate in cost; so that there need be no difficulty in providing good curtains for from 25s. to 60s. a set complete. Kidderminster rugs, two yards by one yard, were quite good enough for ordinary room or staircase landings; wore well, and could be bought for about 18s. each. It was unfortunate that there was not common honesty amongst a certain class of manufacturers, and that they lowered themselves by stealing the designs of others in the same trade, or by boldly adopting, without leave and without payment, artistic designs, which had been made to illustrate Christmas books, or for other outside purposes. This conduct was not only grossly unfair, but was in the highest degree discouraging to artists, whose brains and skill of design and drawing were their living, and who naturally hesitated to design work of any kind if it was likely to be stolen and mutilated for other purposes without fee or recognition. Such practices were indeed as dishonourable as appropriating any other kind of goods from another man's premises, or forging his hand to a cheque, and obtaining payment of cash as change.

In the dining-room, all furniture should be as comfortable and convenient as possible, designed for use, not show. The chairs should be broad seated and backed, and strong in make, the seats and backs stuffed and covered with serviceable leather or morocco. Good plain chairs of unpolished wainscot or American walnut were better than any highly polished surfaces, which showed the least scratch, while deal chairs of solid design painted and decorated in low colours would answer equally well and be cheaper. Although they might be thought archaic, rush bottoms were as comfortable as any leather, and, if made with various colours, were pleasant to look at. In addition to ordinary chairs there should be two comfortable arm-chairs of sufficient size to afford freedom in carving, and perhaps one or two lounge chairs for drawing round the fire after dinner. The tables should not have projecting legs to torture the people placed near the angles. Nothing was better in ordinary rooms than a round table 4ft. 8in. to 5ft. in diameter on one massive central support, the top made to expand by a simple contrivance, so as to form when open an elongated oval of any required size. For showing off flowers and silver the top could be ebonised and left open in the centre during dinner by linen slips. Instead of the ordinary sideboard he would suggest a solidly handsome, although plain, buffet, arranged for the reception of plate and glass or for good pieces of china, the lower portion fitted as a cellaret on one side and a cupboard on the other, and the upper part provided with drawers for plate. All solid portions of the buffet should be brought right down to the floor, with a slight plinth, so as not to afford space for dust and dirt to accumulate. The general furniture of the dining-room should be *en suite*, essentially useful and free from anachronisms. The author said he saw no reason why pitch-pine or deal should not be more used for dining-rooms for buffets and panelling, either simply treated as lacquer-work or worked out in elaboration of colour and design. If the money now expended on cuttings and turnings and costly carvings were devoted to artistic panel decoration on flat surfaces, as was often done in the 14th and 15th centuries, our rooms would look much more cheerful, and many of our leading artists would gladly devote attention to the painting of panels. Deal panelling painted some warm colour, if free from elaborate mouldings and carvings, was almost as inexpensive as some of the gorgeous pattern flock-papers painted in several tints, and was much more pleasing in effect. For lighting he would suggest a central hanging lamp, with good shade of subdued or warm-tinted glass, throwing a pleasant, soft light upon the table; whereas nothing tended to make a dinner so miserable and enervating as the heat and stuffiness engendered by London gas. The practice of covering the whole dining-room floor with carpets served no purpose but to increase the upholsterer's bill, and to collect dust between the cleaning times each six months. Better far was it to paint 2ft. or so all round the room with some good wearing colour, and put the money saved from carpeting into an Indian or Persian carpet, warm to the feet and grateful to the eye. Although we had not quite got rid of the atrocious floral and other sprawling patterns of our fathers' time, there were now innumerable simple designs with no distinct patterns, quiet in colouring and moderately inexpensive, from which a choice could be made. Carpets should be darker in tone than the general wall-decoration, so as to form a good background to the furniture. Turkey carpets, because of their patterning, were not generally satisfactory, and were also, for the same elaboration of design, expensive. For curtain-rods, a plain brass pole, or piece of 1¼in. gaspiping, painted, was ample.

The library of the house should be as comfortable as possible, with broad, easy chairs, low centre-table for books and periodicals, and a pedestal-desk with circular revolving top, to shut up papers and keep them free from dust. This table should have plenty of drawers and pigeon-holes, made for the special objects to be placed in them. The room should be surrounded with bookcases, the lower portion to take large volumes, and with some part covered in with cupboard-fronts with shelving suitable to file periodicals and papers. The shelf thus formed could be used for the display of ornaments, busts, or other personal things. Above this, other shelving could be carried to nearly the top of room for books and china. All this woodwork might be of plain deal, stained and polished. The floor should be painted all over, so as to be easily cleansed and dusted, a few cheap rugs being laid down where necessary. In the lower part of the bookcase should be arranged drawers—but not carried down to the floor so as to be inconvenient—for photographs and sketches. The library should, in fine, be eminently home-like, and the wall-space fitted up as conveniently as possible, every pains being taken, by thoughtful arrangement, to make it a pleasant room to live in.

CHIPS.

The returns already received for the Technological Examinations of the City and Guilds Institute show that over 1,100 candidates will present themselves for examination at 80 centres. This is a very large increase on last year, when only 202 were examined. The examinations are to be held on the evening of the 12th May, concurrently with the examination of Science and Art Department on that evening.

The first portion of the new convent, at Stanbrook, near Worcester, has just been completed, and a new wing commenced. The architects are Messrs. Pugin, of Westminster. Messsrs. Wood and Sons, of Worcester, are the contractors.

The Rev. F. W. Pullur, vicar of St. Margaret's Church, Cardiff, being about to leave that parish, having lately joined the Cowley Fathers, steps have been taken to erect a church at a cost of £10,000, on the site at present occupied by the iron church of St. German's, as a memorial of the good and useful work of Mr. Pullur. Several handsome offers have already been promised, and there is no doubt of the desired project being carried into execution within a short period.

Messrs. E. P. and W. Baldwin, tin-plate manufacturers, of Wilden Ironworks, Stourport, have been awarded a gold medal at the Sydney Exhibition.

A large church is now being built for the Monks of the Order of St. Francis, in Cumberland-street, Glasgow, from the designs of Messrs. Pugin. Mr. John Devlin, of Glasgow, is the contractor.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. Passmore Edwards.

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Ap Adam. (A very good curve or entasis may be given to a spire by using a thin flexible lath or ruler, and applying it to the side of a large working drawing of the spire. The amount of curvature should be sufficient to give a slight fulness to the sides, or the method used to draw the entasis of columns may be employed.)—A. T. C. (Gelatine is a superior kind of glue obtained from bones, ivory dust, sinews, tendons, and selected clippings of animal skins. Sweet oil is best. If bichromate of potash is added to the solution, the gelatine becomes insoluble after exposure to light.)

"BUILDING NEWS" DESIGNING CLUB.

Ap Adam. (The tower may be placed at either corner or in the centre of west end of church.)—Wasp. (By "shingle" spire we of course intended oak tiles or cleft oak as the covering.)

Drawings Received.—R. J. J., J. S., T. R. S., J. S. and T., Ed. V.

Correspondence.

SIDE-ENTRANCES TO MAIN SEWERS, MANHOLE AND LAMPHOLE COVERS.

To the Editor of the Building News.

Sir,—A few words about side-entrances, manhole and lamphole covers may probably be useful.

Side-entrances to main sewers will, as a rule, open in the footway; the cover may, therefore, be a lid of iron, as no traffic goes over it but that of foot-passengers.

Manholes and lampholes are necessarily placed directly over the sewers, and they are usually along the roadway, and consequently, are liable to be driven over. This being so, plate-covers of iron should not be

used, as they are liable to rattle beneath carriage-wheels and the feet of horses, which, with young or timid horses, may lead to accidents. Manhole and lamphole covers should, on plan, be circular; they should have a skeleton frame of cast iron, not less in depth than seven inches, and be fitted with blocks of wood to represent wood paving. The covers should fit into a frame of cast iron in such manner as, when in place, to be free from vibration, to be secure when in place, and yet to be easily removable. Sewer-ventilation should be through side-chambers on the manholes and lampholes, and not directly through the covers. Flat covers of cast iron at the surface of a street are a source of nuisance, and are also dangerous. R. Rawlinson.

London, April 23.

EXETER HIGH SCHOOL COMPETITION.

Sir,—It is to be regretted that the report of the referee (Mr. Robson) is considered by the governors of a private nature; its publication, or a copy of it sent to each competitor, might have shown Mr. Robson's reasons for rejecting designs of very considerable merit, and selecting those which many competent professional gentlemen consider *not the best*. Also competitors might have learnt his opinion as to cost of the premiated designs. If Mr. Robson has a bias in favour of a particular style of architecture, his affection for it in this case appears to have led to the rejection of better designs than those selected. The first premiated one is a fairly good production, but the second cannot claim a place in architectural art, and if rumour be correct that the successful competitors (Messrs. Hayward and Son) personally visited some of Mr. Robson's schools prior to submitting their designs, the peculiarity of the award may be accounted for. It appears to me that much dissatisfaction could be avoided if competitors had a voice in the selection of the professional referee. Prior to the award, tickets were granted by Messrs. Law and Sons (clerks to the Governors) permitting competitors to examine the designs, but since the award, all appears to be private. While agreeing with your correspondent of last week generally, I think it improbable Messrs. Law and Son meant to be uncivil to the profession. Their letter is simply a business sort of one. We are asked to send for our drawings, the same as we might ask a railway company to send for "empties."—I am, &c.,

No. 2, "Never no More."

ARCHITECTURAL EXAMINATIONS.

Sir,—While quite agreeing with many of the remarks of your correspondents on the above subject, I will venture to prove that what they most seem to wish for, viz., a closed profession for architects, is simply impossible. Take an example. Supposing the various regulations and examinations of architects were finally settled. A student has worked for, say, five or six years, and then thinks he would be able to pass. He gets his papers, and answers them according to his own ideas. Now, who is to judge of those papers, and say if they be correct or not? We have no absolute laws as to what is correct Gothic and Queen Anne, and how one thing and another thing should be constructed. As a proof of this, note the everlasting discussions among the best architects on every question raised. I feel sure that no two architects in England think the same on, say, any ten questions. And how is one man or ten men to decide who is right? With lawyers they have the law, absolute, laid down; they cannot alter it: they have no various ways of twisting it this way and that; of working in Gothic or Classic, or using iron or wood. Flaws in the law would upset the whole community, whereas a badly-constructed building in the main only affects the owner and the reputation of the architect who put it up, for while the local surveyors are so sharp on every little matter, it is nearly impossible to smuggle in anything injurious to the public. And as regards the convenience of planning, ornamentation, or construction, it is certainly the fault of the owner if he go to an incapable architect. A man that has good capabilities in him will soon be known as well as a poor one, and then let the public make their choice.

One correspondent mentions bad church-work. Now take some of the London architects that would be considered above suspicion—are all of their designs and details good? Does your correspondent remember the church designed by Mr. Norman Shaw, and lately illustrated in the Building News, and many other similar productions from (what are considered among many) crack men? Then how many plans, designs, and details got out and illustrated by our crack men are often utterly wanting in good construction!

Now, if these examinations become compulsory, how would the architects already in practice manage? Would they have to read up German, &c., and make a trial, or would it be only the young blood who would have to sweat most of their life away in learning the mostly unnecessary things expounded by a few dictators, to the benefit of the few dictators? I suggest that, for the purpose of improving the rising generation of architects as well as those now in practice, that the Institute and all architectural associations have such classes and lectures that all may learn something of well-known principles of planning, designing, construction, decoration, &c., and a free criticism, and that all doubtful points be solved with the opinion of the law. And as members of the Institute are known to have passed a voluntary examination and to be generally capable of carrying out work, let this be thoroughly understood among the public, and all architects be invited and encouraged to pass. Couple with these a better desire on the part of architects to instruct their pupils, and more to teach than to make profit out of them. Then the rising generation will have a firm sound basis to work on, and the desire to uphold a united and harmonious profession.—I am, &c.,

Birmingham, April 27. F. W. H.

ARCHITECTURAL CHARGES.

Sir,—The late affair between Mr. Ellison and Messrs. Bleakley and Murray is but one out of many which are occurring every day, only we do not hear of them. The root of the whole matter is the disinclination of the Institute, or rather of the council, to publicly explain their own Professional Practice Paper. The fact that you have received an equal number of letters on one side as on the other, is only an additional argument in favour of a definite and official explanation.

You are doubtless aware that for several years I have done my best to get certain questions referring to professional practice and etiquette authoritatively settled by the council; but in vain. It is true that some, and not very satisfactory, answers have been sent me; but as I was not allowed to make them public, they were by no means particularly useful to the profession, nor available for general discussion. The question of five per cent. was not among these questions, because I thought it sufficiently clear; but, from the letters you received, it appears that a considerable number of my professional brethren must be of a contrary opinion.

Some time back, I had the pleasure of meeting an elder member of the Institute, who distinctly assured me that he did not consider the Institute was bound to explain its own laws. I need scarcely say that I was exceedingly surprised, inasmuch as I had always believed that one of the great objects for which the Institute was founded,—and for which the fellows are content to pay a rather heavy subscription—was the regulation of the professional practice and etiquette.

If the Institute is afraid to pronounce definitely, by means of its council, why not do as the Irish institute has lately done, and take the individual views of each member upon certain questions in the first instance? The affair could then pass through a congress, and finally and authoritatively be settled by the council.

I venture to write to you on the present occasion, as the general meeting of the Institute takes place next Monday, and it may be found a good opportunity for some enterprising members to ventilate the subject.

At all events, I shall certainly do so at the next Congress.—I am, &c., W. Burges.

P.S.—As I believe you did not publish the answers by the members of the Irish Institute, I venture to inclose them, should you think fit to give them to your readers.

To the said questions might well be added (1) What is the proper division of the five per cent? (2) When an architect is consulted about a work upon which he has reason to believe another architect has been engaged, is it not his moral and professional duty to write or call upon that architect and ascertain whether all professional fees have been paid, and whether the way is quite clear before him? (3) Does the declaration that "the usual remuneration for an architect's services is a commission of 5 per cent." debar the profession from making special bargains, as in the case of Messrs. Bleakley and Murray? (4) May an architect hold shares or be on the direction of a company for the production of building materials, say slate or terra-cotta, provided he takes care not to employ such materials on his own works?

Royal Institute of the Architects of Ireland.
212, Great Brunswick-street, Dublin.
January 10th, 1879.

The attention of Council having been called to the queries addressed by Mr. W. Burges to the British Institute, they are anxious to learn the individual feelings and practice of our members on these points, so as to be in a position to give a decision of utility when occasion requires.

The questions are appended below. The blanks you will kindly fill in and return the paper, so as to reach me before the 1st February.

The case of professional practice brought before last Council Meeting has been referred back for further inquiry.

G. C. Henderson, Hon. Sec.

Q.—Is the architect to supply the clerk of works, or the tradesman, with the set of tracings referred to in the professional practice paper of the Institute?—*A.* Majority in favour of *Clerk of Works* in the proportion of 100 to 67.

Q.—If he supply both the clerk of works and tradesman, an extra set will be required. Who is to pay for this extra set—the client or the tradesman?—*A.* Majority for client at 100 to 30.

Q.—Could the difficulty be solved by inserting a condition in the contract that the tradesman shall make his own tracings, to be afterwards inspected and signed by the architect?—*A.* Negatived in proportion of 100 to 62.

Q.—Should not the clerk of works and the tradesman, after the work is finished and paid for, be obliged in all cases to return not only the drawings and tracings furnished, but also any copies of the same which they have made for their own convenience?—*A.* Affirmed unanimously.

Q.—Should orders of the architect to the tradesman go through the clerks of works only?—*A.* Affirmed, proportion 100 to 36.

Q.—Is it consistent with the position of an architect for him to advertise directly or indirectly in the public journals?—*A.* Negatived, proportion 100 to 21.

Q.—Is it consistent with the position of an architect for him to apply for work, or to offer his services to people not his personal friends?—*A.* Negatived, proportion 100 to 30.

Q.—Is it consistent with the position of an architect for him to be connected with any trading firm in the profits of which he participates, although his name does not appear, or to hold shares in any company formed for the purpose of building, or for supplying building materials?—*A.* Negatived unanimously, taking a "building company" to mean contracting or operative builders as distinguished from a company making loans for building purposes.

Sir,—Alluding to the County-court case in your last, where an action is brought for recovery of fees for quantities, I think it is full time that proper steps should be taken to define more clearly the duties and responsibilities of architects to their "employers" (as Sir E. Beckett dislikes the term "clients"). Could not the solicitors to the R.I.B.A. be of some use to our profession in this matter? It is to be hoped that County-court law is not taken to regulate the common or customary law. I remember, a few years since, that it was laid down from the County-court Bench that a builder was not entitled to charge a profit on his workmen's time, he could only legally charge the exact sum he paid his men, and I never heard this decision challenged.

Lord Ellenborough's dictum is well known, that an architect could not legally charge a commission on cost, as he would be interested in increasing the expense to his client. It could, no doubt, be demonstrated in an equally satisfactory manner, that he was not entitled to any payment at all. On the other hand, one or two of our judges have taken what I may call a more merciful view of an architect's position. The late Mr. Justice Erle stated in a case in point that an architect's duties and responsibilities seemed so multifarious and undefined, that he might, for aught that he (the judge) knew, be called on to make a pair of "boots" for his employer, and similarly we were told from the bench lately that an architect could in no sense be looked upon as a mere financial agent or caster-up of accounts, and such duties could not be expected of him. It seems, however, from the late case that I alluded to, that not only are such calculating duties expected of the architect, but he is supposed to do them for nothing.

It is much to be desired that some men of "light and leading" would show the public and the profession a way out of such an absurd position as I have indicated.—I am, &c.,

April 20. B.

IRON ROOF CONSTRUCTION.

Sir,—Would Mr. F. W. Hartley, C.E., kindly explain, for the benefit of those who cannot write the magic letters after names, what are the strains on the members of the hipped ends of the roof designed by him (he does not say whether he has tried to erect from such a design) and illustrated by you last week.

Turning to the detail showing junction of tie-bars of main, two hip and half rafters, I find five tension bars in a plane whose directions are contained within 180°. How they can balance one another I do not know; and indeed, I may safely affirm, no more does he. The result seems to me to be that there is an unopposed force tending to thrust out the springings of the end of roof, and to drag the tension bars of the first main principal sideways, tending to cripple it, which crippling will be accelerated by the unopposed thrust from the upper ends of the hip and half rafters on its apex, if we exclude, as I think we safely may, the support it receives from the light angle-iron purlins secured by only 5-16in. bolts.

Again, if the principal is strong enough to take the extra load due to the hipped ends, it must be too strong for all the intermediate principals.

Why were the ends of tie-bars made forked, and the bolts lengthened unnecessarily at both apex and foot of main strut, when it would have been cheaper to use solid ends and place them between the joint-plates?

B. E.

BLISTERING OF PAINT AND VARNISH.

Sir,—This evil (referred to in your last number) might be guarded against if not altogether removed by the exercise of proper caution in executing work. This matter has engaged my attention for many years, and where a customer will allow me, I have felt an especial interest in his work, and have been invariably successful in preventing blistering. I will give you the benefit of my experience, and take a front door for an example. I am not a scientist, therefore I will explain myself in a practical manner. The grand secret is to allow each coat of paint to thoroughly harden before applying the succeeding one, and to abstain from using "patent" dryers. Three days at least should intervene between each coat. Red-lead, white-lead, and good old linseed oil should be used as a "priming" or first coat. Venetian red should be avoided, as also "stainers" of inferior quality. The succeeding coats should consist of an increasing quantity of turpentine, with a corresponding diminution of oil at each application. The varnish I have found most successful is Best Elastic Carriage. When the work requires to be redone, remove the varnish with pumice, then repaint with as much turpentine in the mixture as may be found practicable. Cheapness and speed are fatal to durability.—I am, &c., John Algar.

BRICK FLOORS.

Sir,—The further details of Mr. Hyatt's experiments clearly indicate that the strength of the short brick beams is due to the iron blades, 2in. by $\frac{1}{8}$in. thick, introduced into the lower half of the beam, a result which might have been anticipated with beams only 5ft. long. If Mr. Hyatt will formulate his results, he will perceive the advantages which he obtains from beams too short to be of any practical use in floor construction, become less and less as the lengths used for floors is approached. This arises from the difference which exists between the bending moments of iron and brick in cement, and from bending taking place as the cube of the length. Thus in a beam 20ft. long, the angle of rupture of the brick will have been reached long before the iron blades will have bent through such an angle as to give any efficient resistance against the bending of the bricks in cement. In fact, the differences between the bending moments in the 20ft. beam have become magnified 64 times, so that it is no wonder the differences which were of no account in the short beam become of immense importance in beams of greater length. Again, if Mr. Hyatt will formulate his results for a beam fixed at the two ends, he will notice the neutral axis is changed from the lower quarter at the centre of the beam to the upper quarter at the two fixed ends, and as there is no iron in the upper quarter of the beam, the advantage of using iron is lost even for short beams, and thus the formula of fixing the end of a homogeneous beam will not apply. Again, if Mr. Hyatt will formulate his results for a square floor resting upon four walls, he will notice that as the iron blades only run in one parallel direction the formula for a homogeneous plate supported on four walls will not apply, and if the edges of the floor are fixed, the formula will be still further removed from that of a homogeneous square plate fixed at the four edges. As this last method is the one usually adopted in practice, it is only necessary to say that the usual opinion as to the strength of such a plate is as much as five times that of the same plate supported like a beam with the ends free. It is from these considerations those skilled in fire-proof floor-construction aim in the first place to obtain a homogeneous plate securely fixed into four walls. If, however, iron is to be used, then the iron ought to be made of sufficient strength to resist the stresses independently of any apparent stiffness derived from bedding the iron in cement; otherwise there is the very greatest danger of the iron being sheared at the walls. If Mr. Hyatt's construction were applied to floors 20ft. span the iron would inevitably be sheared from the walls, unless the bricks in cement were of sufficient strength to resist the stresses quite independently of the iron blades.—I am, &c., A. C. P.

Stretton, Parkstone, Dorset, April 19.

Intercommunication.

QUESTIONS.

[6105.]—**Book on Specifications.**—I am desirous of obtaining a practical work on this subject, dealing principally with house-building. Can any of your readers kindly inform me whose is the best work on the subject?—H.

[6106.]—**Casements.**—Can any of your practical readers skilled in ironwork construction favour me with their opinion as to the best and most water-tight form of iron or brass casements to fix in stone mullions, and to carry plate-glass squares? The casements would require to be about 4ft. × 1ft. 9in.—Anon.

[6107.]—**Tar Paths.**—Will some reader kindly give his experience of the best way of making tar paths, what materials are used in the making up, in what quantities, and how mixed, so that a perfectly smooth surface can be obtained, and the work not become soft by the action of the sun?—J. L. A.

[6108.]—**Theodolite.**—Will any gentleman say what is the best work on the theodolite, giving a full description of the construction and the use of the different glasses? Also what is the best field-book for town surveying?—Theodolite.

[6109.]—**Sunlights in Chapels.**—Will some kind reader inform an old subscriber where he can see a chapel (or chapels) which is lighted and ventilated by a sunlight or sunlights?—B. P.

[6110.]—**Self-Opening Park Gate.**—Can any of your readers describe, through your columns, the self-opening park gate exhibited at the Kilburn Show last year, that worked by means of water? Would any one who has had experience in this invention kindly say whether it works well or no?—F. B. W., 54, Sloane-street, S.W.

[6111.]—**Architects' Charges.**—I prepare and complete general drawings, take out quantities, write specification, supply all necessary detail drawings, and examine builder's accounts for an architect. Would any of your readers kindly inform me what commission to charge as a fair remuneration?—J. W. C.

[6112.]—**Stains in Light Wood.**—Can any of your readers tell me of a way to remove the stain or mark made on light wood, such as pitch-pine, by plaster or lime splashings that always arise in plastering? It shows very disagreeably after varnishing. If no easy remedy, do such stains disappear after a lapse of time? I have seen many instances of wood in most perfect condition, and can scarcely fancy it has altogether escaped the inevitable carelessness of workmen.—B.

[6113.]—**Surveyors' Pensions.**—On p. 455 I read among the "Chips" as follows:—"At the Cardigan Quarter Sessions on Tuesday week a pension of £100 a year was awarded to Mr. Vaughan, late surveyor of county roads." Will some one tell me the statute under which this has been given?—A Constant Subscriber.

[6114.]—**Quantities.**—Will Banister Fletcher or any other correspondent oblige by informing me the correct method to measure an Ionic stone cornice, having modillions (not carved) and the soffit of corona panelled?—T. K.

[6115.]—**Concrete in Iron Columns.**—Will some correspondent oblige by informing me if the plan of filling cast iron columns with concrete can be recommended as one likely to add to their strength and fire-resisting qualities? Which is best to use for the purpose, cement or B. Lias lime, and what precautions are necessary to take against the expansion of the concrete? Size of columns, say, 12in. internal dia., and $1\frac{1}{2}$in. metal.—C. H.

REPLIES.

[6093.]—**School Accommodation.**—In reply to William Strong, he should apply to the Secretary, Education Department, Whitehall, S.W., who will supply him with their paper of instructions to architects. I have a copy a few years old, but as alterations are sometimes made, it is as well to have the latest rules before designing a school.—Wm. Thos. Simmonds.

[6101.]—**Valuation of Property.**—"Young on Prices," and "Hurst on Prices," Spon, 46, Charing-cross. These two books are sufficient for many purposes, and no doubt would suit your inquirer's wants. "Inwood's Tables," Weale (or successors) publishers, and "Willich's Tables," Longmans, publisher, are more voluminous, and generally used by the profession.—Bloomsbury.

[6101.]—**Valuing Property.**—The differences in the valuations made by the independent surveyors appear large, but are not remarkable. Valuers adopt different modes of arriving at the net annual value, which is the basis of the valuation. Of course, in the valuation of buildings the valuer is often called upon to form his own opinion as to a fair rental, which may differ considerably under certain circumstances. But the most fruitful source of difference is the percentage which house-property is thought to pay on the purchase money. Many think it ought to pay from 5 to 10 per cent. If the purchaser is content with 5 per cent. interest instead of 8, the difference in the value of property is of course the difference between $12\frac{1}{2}$ years purchase and 20 years purchase. Again, surveyors make deductions very differently. The present value of all incidental costs and losses by bad tenants and repairs should be deducted, but some only deduct the outgoing taxes and rates. I can recommend Tarbuck's treatise on "House Property" as a useful guide, and W. D. Biden's "Rules and Tables" for the valuation of estates.—G. H. G.

[6104.]—**Architects' Charges.**—If an architect is engaged to carry out work for a percentage, and to facilitate the letting of the work, undertakes to supply quantities at so much per cent., I maintain that if the successful contractor has made use of them and understands beforehand what he has to pay, of course it is an arrangement between the parties, which is quite proper, being advantageous to the contractor. On the other hand, if the contractor is qualified to take off his own quantities he can do so, and I should say he is not then bound to pay the architect.—Contractor.

[6104.]—**Architects' Charges.**—No architect should dream of making money in an underhand way. If the School Board require the quantities taken out their architect might do it, or a recognised quantity surveyor be employed; but before either the one or the other do so, there should be distinct instructions from the Board. The Newcastle-upon-Tyne School Board, in their first school, allowed $1\frac{1}{2}$ per cent. over and above the 5 per cent. commission to their architect, for supplying bill of quantities. This charge was to include lithography, and it was found to be sufficient for the purpose.—F. R. I. B. A.

[6104.]—**Architects' Charges.**—To "School Board Clerk's" query, it may be replied that it is the universal and fully recognised custom to prepare the schedule of quantities for guidance of intending contractors. In some cases it is done by the architect himself, in others by an expert or building surveyor, and the payment is by commission in the manner stated; only $2\frac{1}{2}$ per cent. is, I think, an extreme charge. "School Board Clerk" puts the query a little invidiously when he states that nothing was mentioned to the "Board." It does not follow that any concealment was practised, and it is not usual or necessary to go into matters of professional remuneration at the outset. The custom is well understood in all countries, and the preparation of quantities is now a "sine qua non"; no contractors will tender without them. The arrangement named, viz., that the builders might tender without using the architect's schedule, and could prepare their own, is a curious one. It is not easy to see, in the latter case, how the architect is to be paid for his labour—possibly, as times go, not a matter of much consequence.—B.

CHIPS.

The memorial to the late Dr. Musgrave, for forty-eight years vicar of Halifax, was last week erected in the chancel of the parish-church of that town. The figure of the archdeacon consists of a recumbent figure, life size, arrayed in surplice and stole, and carved out of pure white Carrara marble. It is the work of Mr. W. Day Keyworth, jun., of London and Hull. This figure is placed upon a richly panelled altar-tomb 3ft. in height, which was designed by Messrs. Jackson and Fox, of Halifax, and has been worked out in Northowram stone by Mr. Cordingley, of the same town.

A new cemetery has just been completed at Staines, and will be consecrated in May. Mr. Low was the architect and surveyor, and Mr. John Powell was the contractor.

Mr. John Sim, architect, of Montrose, was on Monday presented with the bronze medal of the Royal Humane Society, for saving two men from drowning in the Tay in August last.

We regret to announce the death of Mr. William Hall—one of the oldest members of the Royal Birmingham Society of Artists, and Curator of the Corporation Art Gallery—who expired on Saturday afternoon, at his residence, Valentine-road, King's Heath.

At a General Assembly of the Royal Academy held last Friday, Mr. Charles B. Birch, sculptor, was elected an Associate, and Mr. Frederick Stacpoole an Associate Engraver.

Our Office Table.

At the ordinary meeting of the Edinburgh Royal Society on Monday Professor Geikie read a paper on "Rock-Weathering, as illustrated in Edinburgh Churchyards." Dealing first with the calcareous tombstones, Professor Geikie remarked that those in the Edinburgh graveyards were, with rare exceptions, constructed of ordinary white saccharoid Italian marble. The process of weathering in the case of this marble presented three phases, sometimes to be observed in the same slab—solution, disintegration, and curvature with fracture. Having discussed these three phases of weathering and their causes, the lecturer remarked that the results of his observations in the Edinburgh burial-grounds showed that, save in exceptionally sheltered situations, marble tombstones exposed to the weather in such a climate and atmosphere were entirely destroyed in less than a century. Speaking of sandstones, he said that a good example of their power of resisting the weather was supplied by Alexander Henderson's tomb in Greyfriars' Churchyard. Two hundred years had effected hardly any change upon the stone, and the incised lettering remained quite sharp. In reference to granite, Professor Geikie remarked that it had been employed for too short a time as a monumental stone in our cemeteries to afford any ready means of measuring its rate of weathering. In conclusion, he observed that even the most durable granite would probably be far surpassed in permanence by the best of our siliceous sandstones; but as yet the data did not exist for making any satisfactory comparison between them.

A company has recently been formed for the purpose of developing a new sea-side estate, at Hampton-on-sea, on the Kentish coast. The site selected is the nearest watering-place to London, on the London Chatham and Dover Railway, and having the additional advantage of being but eight miles from Canterbury. It is proposed to erect a Salon similar to that at Trouville, with reading, smoking, and other rooms, and a large centre hall for musical and other entertainments. Several acres of land have been set apart for recreation grounds, which are now being laid out. About one hundred plots of land have already been taken by experienced builders, who are erecting semi-detached two-story villas, without basements, in the Old English Domestic style of architecture, with convenient accommodation. Sea-water swimming-baths, for use at all states of tide and weather, will be constructed, besides dressing-closets for open sea bathing. A pier nearly 1,000ft. long is already in existence, which, with the esplanade, forms a pleasant promenade. Mr. F. Nesbitt Kemp, of 22, Chancery-lane, London, has been appointed architect and surveyor to the estate.

Following in the wake of the "Tabard," another, and the oldest, of the taverns for which Southwark was so famous—viz., the "Bricklayers' Arms"—a part of the freehold held by the Bridge House Estates for the Corporation of the City of London—will soon disappear. In the reign of Edward III. Philip de Comines records that the Burgundian lords who came over after the battle of Cressy to issue a general challenge to the English knights in a tournament to be held at Smithfield, lodged at this house, which he describes as a "vaste hotel on the olde rode from Kent into Southwarke, about two-thirds of a league from the bridge acrosse the Thames." He adds, "the Burgundians were mightillie overthrown." A century later Warwick, the great King-maker, on his journey to France to demand the French King's sister's hand for Edward IV., waited here for his horses and retinue. Here Anne of Cleves waited while her portrait was forwarded to her future husband, Henry VIII. In later times, Drake, after his victory over Van Tromp, Sir Cloudesley Shovel, Duncan (Lord Camperdown), Lord Hood, after his victory over the French fleet, and Sir Horatio Nelson, after the battle of the Nile, all made this house their headquarters. In the later part of the last century the house fell into the hands of one Townsend, who modernised it.

Mr. George Godwin, presiding, on Tuesday, at the annual meeting of the Art Union of London Institution, expressed a very laudable hope that the Government would shortly be able to turn its attention to domestic subjects, one of the principal of which was the promotion of art studies. The past six years has been a barren period indeed, so far as any encouragement to enterprise of any kind, at home, has been concerned. Scarcely any great public work, either of engineering or architecture, has been projected; more than one scheme to which the nation stood pledged has been abandoned, and the continuation of such works as were actually in hand has been marked by a niggardliness and bad economy which contrasted unfavourably and disadvantageously with the amount of public money spent in war-material.

The Reformed Episcopalians—or, at any rate, a section of them—have evidently iconoclastic tendencies. A building at Yeovil was recently opened as a Reformed Episcopal Church, and a report of the proceedings sent to Dr. Gregg, who is, we believe, the Bishop of the sect. He discovered that amongst the items of furniture described as being in the chancel were "six carved figures of saints and sinners," and consequently, as he felt that his name was identified in the public mind with the ecclesiastical body to which the new church belonged, he intimates very plainly that that body "canonically forbids in its churches the introduction or use of 'images' of any kind, 'molten, painted, or graven'; and, therefore, that the church at Yeovil with its 'carved figures' cannot be, and is not in any way connected with the 'Reformed Episcopal Church.'" He adds that it would afford him much greater pleasure to hear of graven images being pulled down and pulverised, than to learn that they are being set up as appendages to reformed worship.

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Holloway's Ointment and Pills afford comfort, security, and ofttimes recovery to the most tortured sufferers. This Ointment, when properly used, will cure all descriptions of sores, wounds, and bad legs, sprains, erysipelas, rheumatism, gout, and skin diseases. The Pills are infallible in biliary and digestive derangements, sick head-ache, and constipation.

CHIPS.

Mrs. Hamilton, widow of the late Dean of Salisbury, has just announced her intention to restore the north porch of the Cathedral, the complete restoration of which, at an entire cost of £60,000 or £70,000, will thus soon be accomplished. The work in question has long been contemplated, but has lagged from want of funds. The porch is admired as a fine specimen of the Early English style of church architecture. Mr. G. E. Street, R.A., is to be intrusted with the work.

The vestry of Chelsea resolved at their last meeting to increase the salary of the surveyor by £100 a year, in recognition of the increase of duties, and the mode in which he had carried out works of wood-paving in the district.

Mr. James Worth, who has for about three years occupied the position of assistant surveyor and nuisance inspector in the borough of Gravesend, has received an appointment as assistant-surveyor in the parish of St. George, Hanover-square, London.

A new Presbytery is in course of erection at Ormskirk. It is being carried out from the designs of Messrs. Pugin. Mr. Thomas Riding, of Ormskirk, is the contractor.

The Vestry of Bermondsey have approved of plans for the erection of a Town Hall, to be raised on a freehold site situate at Neckinger-road, near Spa-road Railway Station. The building, which it is estimated will cost just under £10,000, will consist of a council-chamber for vestry meetings, administrative offices, and a large public hall—the latter will supply a want long felt in the district—and a plot of land is reserved for a public reading-room and library, the expense of which the ratepayers will be asked to sanction at an early date. Messrs. Elkington and Sons, of Cannon-street, are the architects.

A new hall, to seat about 600 persons, is about to be built on the fair-ground at Hounslow, for the Prince Albert Lodge of Oddfellows. Messrs. Cooper, Son, and Millar, Reading, have been appointed architects.

The appointment of surveyor and inspector to the Windsor rural sanitary authority took place on the 27th, when Mr. P. J. Byrne, architect and surveyor, Windsor, was unanimously reappointed by the Board for a further term of three years, at a salary of £175. There were a number of local applicants for the appointment, as the office does not restrict private practice.

The *London Gazette*, of Tuesday, announces that Colonel Charles Pasley, R.E. director of engineering and architectural works under the Admiralty, has been appointed a C.B.

The Royal Hibernian Academy has commenced to open its exhibition of pictures in the Abbey-street Galleries, Dublin, to the public every evening for two hours at the nominal charge of one penny. At the last general meeting of this Academy Mr. James Farrell was elected an Associate.

The old church at Sheepwash, Devon, having become dilapidated beyond repair, a new edifice is about to be erected on the site; and, of this building, the foundation-stone was laid on Tuesday week. The church will be several feet longer than the old one, and will have a vestry in addition. The architect is Mr. J. F. Gould, of Barnstaple; the contractor is Mr. Jas. Stratford, of Oakhampton, and Mr. Oatway, of Barnstaple, is clerk of works.

The *Catholic Times* states that the Pope has the intention of opening an international competition for the erection of a monument to the memory of Pio Nono, in St. Peter's, at Rome.

A new Congregational chapel has been opened at Stratford-on-Avon. Mr. H. J. Paull, of Montague-street, London, W., was the architect, and Messrs. Roberts and Son, of Stratford-on-Avon, were the contractors. The style of the building is Decorated Gothic, and the cost has been £5,000.

Alterations and additions, including a new court, are about to be made to the Guildhall at Doncaster from the designs of Messrs. Parry and Walker. The cost will be about £4,300, and Mr. Arnold, of Doncaster, has taken the contract.

An inquiry was held at the Town-hall, Hull, on Friday, before Mr. Robert Morgan, C.E., Local Government Board inspector, respecting an application from the corporation seeking the repeal of the provisional order of 1872, to obtain, in view thereof, a new provisional order, and to borrow £20,000, for the carrying out of the Ferry-boat Dock scheme. The plans were explained, and evidence given in support of the new scheme by Mr. J. Fox Sharp, the borough engineer of Hull.

A mission church, dedicated to St. Withburgh, was opened in Norwich-road, East Dereham, last week. Mr. Larner, of the same town, was the contractor for the building, which seats 150 people.

The Falcon Bridge over the Waveney, at Bungay, is about to be rebuilt in iron and brickwork, from the designs of the county surveyors for Suffolk and Norfolk.

Mr. Hawkesley, C.E., the engineer of the Bridgwater Waterworks, visited that town on Monday, and gave a final certificate for the completion of the works, the cost of which has been about £40,000. The supply has been laid on, and many of the houses are being connected with it.

A new clock in the tower of the parish-church of Aylsham, Norfolk, was publicly started on Monday week. The face is a 5ft. skeleton dial, with gilt hands and numerals. The contractor was Mr. H. Sainsbury, of Curtain-road, London.

On Wednesday the Bishop of Oxford re-opened the ancient parish-church of Hampstead Norris, near Newbury, after restoration by Mr. Silver, of Maidenhead. The architect was Mr. Baker, Adelphi-street, London.

The Mile End Old Town vestry, at their meeting on Wednesday week, received a report from Mr. Knight, their surveyor, as to the death of Mr. Carter, the roads foreman, who had for 67 years been in the service of the parochial authorities, and was a walking encyclopædia of streets and drains. The surveyor's statement was ordered to be recorded on the minutes.

At the meeting of the Civil and Mechanical Engineers' Society, held on Thursday in last week, Mr. Charles H. Rew, of Westminster, read a paper on "The Roof Construction of the Middle Ages," in which he described the roof as the most important feature of a mediæval building, and described the various forms which it assumed, and the problems sought to be solved thereby.

A vestry-hall is about to be built for the parish of Wandsworth from the designs of Mr. George Patrick, A.R.I.B.A. The tender of Mr. Parsons, the lowest of eleven received by the vestry, has just been accepted, at £8,497, for the execution of the work.

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THE BUILDING NEWS.

LONDON, FRIDAY, MAY 7, 1880.

THE ROYAL ACADEMY.

ALL those who are not afflicted with the "nil admirari" epidemic, usually so prevalent at this season, will be delighted by the many fine pictures in all branches of the art which hang upon the walls of Burlington House. First, we congratulate the President and Council upon the admirable selection they have made for the Chantrey bequest. It cannot often fall to their lot to have the opportunity of securing such pictures as A. J. Poynter's "Visit to Æsculapius," W. Q. Orchardson's "*Bellerophon* leaving France on July 23rd, 1815," and John Brett's "Britannia's Realm." The first of these (No. 250) is by far the best painting by this artist that has appeared at the Academy for many years. The subject is the visit of Venus, accompanied by the Graces, to Æsculapius, to get him to cure her of a wound the bramble had given her as she followed "Diana's chase." The wounded goddess, not much used to pain, supported by one of the graces, lifts up her beautiful foot for the sage to examine. He, half-smiling at the character of the wound, and scarcely daring to lift his eyes toward the dazzling scene, orders such remedies as will immediately set all right. Venus and her attendants are, of course, undressed; those of Æsculapius, one fetching the valuable remedies and the other fresh water from a bright fountain playing in the enclosure, are simply dressed in bright-coloured robes. The drawing throughout is exceedingly good, the attitudes are charming, and every part is perfectly balanced. All this takes place in a courtyard surrounded on two sides by fine architectural adornments, not so correctly chosen as we might expect in so scholarly an artist, or as Alma Tadema and some others usually do. At the back are masses of fir-trees, with their dark heavy foliage, forming a severe but fine background to the scene; while some pigeons and sparrows are happily flying about with much contentment. Every detail is worked out in the most conscientious manner; the care and success with which the plumage of the birds are executed could scarcely have been surpassed by Albert Dürer himself; the fruit also on the table to the left is truly and richly painted. No. 262, Mr. Orchardson's great picture, is in much grander style than we have been used to previously. Napoleon stands on the quarterdeck of the *Bellerophon*, with his back to the officers who accompany him, "casting," as Maitland's narrative gives it, "many a melancholy look on the coast of France." No attempt is made to represent more than a small part of the half quarterdeck, a full sail shutting out the view of the rest of the ship and the sea (pictorial license being taken even with the little that is shown). The sad and unpleasant position of the officers waiting, hardly knowing what to do, as the ex-Emperor thus stood for the greater part of the morning, is characteristically described. The principal interest is concentrated, as it should be, on the chief figure. The whole is simple, and true to the accounts we have of what really took place. Mr. Brett's blue sea, with its finely-painted shipping and boats, laughs from the canvas. It gives joy and light to the whole room. His wonderful eyesight, quick ready hand, and fine memory, enable him to transfer faithfully the subtle changes of light glancing on the surfaces, and the innumerable movements of the waves, in a manner that no other artist, ancient or modern, has ever hitherto achieved. We think that the Council were even more fortunate in possessing this most characteristic and admirable example of Mr. Brett's genius than if they had chosen No. 669, though either would have been a great acquisition to our national art-wealth. In the latter we have "Sandy Shallows of the Sea Shore," the sun lighting up the castle-capped cliffs in gorgeous floods of light; the sand is veritable sand, so truly given, and yet apparently with such facility as to astonish us.

Seldom, in the very best seasons, has anything so perfectly lovely been exhibited as Sir F. Leighton's "Sister's Kiss" (No. 142). The President of the Academy has made the superlativeness of refinement so entirely his own, as to be unsurpassed at least, if not actually unsurpassable. Never was there so absolutely pure and happy a subject, or so exquisitely performed. A very beautiful young woman stands with her back to a stone parapet, on which her hands are pressed, as a sweet little sister holds back her head, and kisses her tiny mouth in the ecstatic kiss of young love, while the heaven in the elder girl's eye tells of a love as good as heaven itself. The dainty painting of the feet and hands perfect the delicious picture—harmonious in colour, faultless in all respects. As usual, we have several other beautiful pictures by this artist,—in fact five altogether. No. 204, "Iostephane," a sweet, golden-haired beauty, is just unclasping the coral studs of her light golden-gauze dress, as she is about to step into the grey marble bath. One simple thin chain of gold encircles her neck, and a crown of fresh violet flowers surrounds her golden hair, all blending sweetly together in faultless harmony. No. 256, equally well painted, is scarcely so satisfactory; it is called "The Light of the Harem." A tired, languid, Eastern wife is just putting the finishing touch to her elaborate toilet, a little girl holding the glass for her to see that all is right. No. 14 is a fine study of a lady sitting on the sea-shore, with her back to the spectators; and No. 655, "Crenaia," is a half-draped figure just come from the bath, very pretty, and charmingly painted. All the four pictures sent by P. H. Calderon are masterly in their way, though of unequal interest. No. 211, "Captives of his Spear and Bow," is the most important; but, though finely drawn and coloured, it is hardly altogether satisfactory. The captives, especially beautiful creatures such as are here drawn, would scarcely be so little moved in the presence of an Assyrian conqueror. Real true life, such as he has really seen, better suits this artist's brush, such as Nos. 16 and 25, "The Olive" and "The Vine," both studies of colour suggested by the subjects, each represented by as fine a specimen of female beauty as poet could imagine—all health, vigour, and comeliness. Mr. Calderon's portrait of Mrs. Brocklehurst is as good as these. J. E. Millais only shows portraits this time, all of them painted with unusual care. No. 315, "Cuckoo," is an inspiration, rivalling some of Sir Joshua Reynolds' most original portraits of children. Two young girls, seated on a flowery bank spread with last autumn leaves, through which the blue-bells and primroses have made their way, are listening to the cuckoo's song, and just catch sight of him too. The different expression of the two children is very cleverly given. Nothing can be finer than the painting of the eyes of the younger sister. His own portrait, No. 218, painted by invitation, for the collection of portraits of artists by themselves in the Uffizzii Gallery at Florence, will grace and do honour even to that august assemblage. Before it leaves this country, so noble a work should, as doubtless it will, be engraved, for the benefit of the artist's own countrymen. The modelling of the face is as fine as possible. G. F. Watts has also had the same request made to him, and so we see the two great portrait-painters of our day in close proximity portrayed by themselves, each doubtless having exerted his best powers. The comparison is full of interest; a better chance of judging the different means employed by two such masters in this branch of art, to produce almost equally valuable results will not often occur again. Most persons will give the palm to Mr. Millais, whose facile genius seems without effort to effect all that the most scholarly elaboration can accomplish. No. 322, the Right Hon. John Bright, M.P., is less striking than the likeness of Mr. Gladstone last year, only because the subject itself is less striking. All that Mr. Bright is—all his character and power—are fully shown in this admirable portrait. No. 430, Miss Hermione Schenley, is a remarkable example of Mr. Millais' power of representing the various textures of elaborate dress. The face is less powerfully expressed than the others we have mentioned, but nothing could be better than the costume. Very inferior in every way to the fine autographic portrait of himself is G. F. Watts's "The Dean's Daughter," No. 4. We should have scarcely recognised the fair face of Mrs. Langtry in this profile. The dingy, or rather dirty, green of the dress, and the violent green background, seem unnecessarily severe, and by no means pleasant. There is, too, almost an affectation of displaying the *modus operandi* exactly the contrary to the procedure of such a painter as Ostade, for example. The effect is fluffy. We would rather not see so exactly how the effect intended was produced. In the same room Frank Dicksee's "House-builders" stand out as a most skilful example of fancy portrait-painting. Sir W. E. and the Hon. Lady Welby Gregory appear to be consulting over the model of a fine house, to be erected. The position of Sir William is capital. The whole is a fine piece of colour. There is an absence of the stageyness and unreality so often shown in such compositions. Mr. Frith has no very attractive picture this year. He only shows two, each of small size, painted with his ordinary smoothness and careful finish, but neither of very high art value. They are both Tenby fishwomen; perhaps No. 58 is rather the better of the two, but it is very hard and over-laboured. J. C. Hook has four pictures, all good. "King Baby" (59), is excellent. The young gentleman is being dragged in a rough little cart through the loose, white sand of Iona. He has a fine time of it, tyrannising over two strapping wenches, his sisters, and his big brother, along the shore of the fresh bright sea. No. 66 is a good companion. G. H. Boughton is singularly happy in his "Sweet Evangeline" (139)—

> "When in the harvest heat she bore to the reapers at noon-tide,
> Flagons of home-brewed ale, all fair, in sooth, was the maiden."

Everything is toned down in subordination to the simple sweet beauty of the fair young girl, as she goes quietly on her kindly task, her attention being evidently for the moment arrested, looking, perhaps, for the friend of her heart. No. 338, by the same artist, is full of incident, a delightful village scene. A gentleman on horseback having pulled up in front of the principal house, is in conversation with some young ladies, while the whole village, especially the female element, is greatly excited about the arrival of so important a visitant. A self-asserting pug dog, of a bilious disposition, keeps the threshold against the other dogs, who accompany the stranger.

In the back is a very interesting old village with many quaint and curious old houses. Hilda Montalba exhibits "A Scene in Venice;" a handsome, well-formed boy, capitally drawn, is stepping out of a boat which he is unloading, carrying a great gourd, which he can scarcely lift. There is behind him a long reach of glassy water studded with gondolas. The outline is very sharp, almost too sharp. The clear summer atmosphere of Italy is well rendered. It is always difficult to make a subject like "The Sons of the Brave" (20) interesting. Almost of necessity there is a formality and common-place reality about it. Mr. P. R. Morris has only fairly succeeded. The little band of boy-soldiers is good enough, but the surroundings are unnatural and weak. Alma Tadema's three paintings will be noticed in our next number. No. 328, "Fredegonde," is of unusual size and importance.

THE GROSVENOR GALLERY.

THE Grosvenor Gallery is unusually strong in good pictures this year; grand composition, good colour, and *technique* are present in nearly every one of the three principal galleries. There are pictures by Sir F. Leighton, A. Legros, J. E. Millais, Lepage, Herkomer, Alma Tadema, G. H. Boughton, Carl Haag, G. F. Watts, E. Burne-Jones, E. J. Poynter, W. B. Richmond, and a host of other eminent artists—pictures ranging from pastorals and studies of still life to the grandly historic and imaginative. While at the Royal Academy the searcher after good pictures may wander through nine galleries of works, a large number of which are not worth notice, in the Grosvenor, with its limited extent of wall-space occupied by a younger school of vigorous artists, he may meet with pictures that have been selected for their representative qualities, and which are not sent merely to fill up the accustomed blanks on the favoured level. Another advantage the Grosvenor possesses is that the pictures are not crowded together, but are hung with much discretion and with some eye to grouping and colour. Proceeding to an examination of the principal works in the west gallery, Mr. J. Bastien Lepage is represented by several works, all of merit. His large picture, "Les Foins" (7), shows that M. Lepage is as able a painter of ruralities as he is of polished portraits. There is conspicuously present in this rather square canvas a power of making meaning out of simple incident. The scene is a dreary-looking field under a powerful sun. A man lies on his back, with his hat covering his face to shade him from the glare, while by his side sits his wife, with a somewhat dejected expression on her broad, square-looking face. We are impressed with the stern realism of the subject, and the hardship of a toiling labourer's life is suggested. The colouring is broad and low in tone, but thoroughly in keeping with the hard reality of life depicted. The delicate and refined portrait of Mdlle. Sarah Bernhardt is as exquisite for its finish and execution; while, certainly, for power of conception, we must bestow a higher praise on the same painter's "Annunciation of the Shepherd" (21). The "Portrait of my Grandfather" (86); and especially "My Parents" (141) are admirable as examples of truthful portraiture in a low key of colour, though in a somewhat harder style of execution than we are accustomed to see from our own English portrait-painters. Mr. A. Legros sends six studies, chiefly portraits, in his own vigorous and inimitable style. They are sketched simply on the brown canvas which forms the ground of the portrait. The portrait of Professor Huxley (No. 19), is a particularly good likeness of that distinguished physiologist; "L'Incendie" (67) is a large and powerful picture of a burning house; the figures of the woman and the man with infant are pathetically introduced. Mr. David Carr, in No. 17, sends a boldly-painted subject "Watercress Gatherers," noticeable chiefly for its depth of tone; but one of the grandest pictures in the west gallery is Mr. Cecil Lawson's "August Moon" (20), a large canvas exhibiting an extensive landscape with a winding stream illumined by the moon, which casts a silvery light over the rich valley, and its gleaming riverlet, the latter being well distanced by the massive trees in the foreground. Mr. Lawson has produced a grand scenic effect, vigorous in the handling, but not removed from the natural; it is just such a broad, softly-lighted landscape we may see in any part of England on an autumn night. The same artist paints "The Voice of the Cuckoo" (23); another rural picture, introducing the portraits of two girls in the foreground, We pass on to Mr. W. Hughes's charming panel of "Quinces" (24) treated in a decorative manner, and evincing a sense of refined colour and tone upon a gold ground. In admirable keeping is the blue and grey vase with its delicate reflection of light. Occupying a conspicuous position on the side wall of gallery is Mr. Spencer Stanhope's "Waters of Lethe" (31), an impressive conception in the hard pre-Raphaelite style of the early Italian masters. The subject chosen by Mr. Stanhope is the classical river in the lower world from which souls drank before passing into the Elysian fields beyond, and it was by drinking of the waters of Lethe that they sought to forget all recollection of earthly sorrows. The painter has embodied these cleverly. We see the aged and crippled in the foreground, descending to the brink of the river, one old man carrying his afflicted daughter on his back, others smitten with various sorrows; some are seen plunging into the stream, while, on the other side, figures are shown amid the luxuriant groves of Elysium. Mr. E. J. Poynter, R.A., has, with his customary subtle grace, given us a pleasing little sketch of Venice in his "Door on to the Silent Highway" (33); the lighted fronts of the sea-girt palaces are painted with much tenderness in water-colours; "A Vestal" (41), is another water-colour, quiet in tone and classical; while further on, a finished study for the painter's well-known subject, "Nausicaä and her Maidens," will not be found to suffer from comparison with the larger picture. Even the recent "*Graphic* Competition" among eminent artists, for ideal faces of beauty, fails beside Mr. V. C. Prinsep's portrait, "An Unprofessional Beauty" (34), in which the artist exhibits his idea of a brunette. Mr. G. F. Watts, R.A., is represented by several pictures, in all of which we discover the grand repose and quiet colouring of a master. The first we come to is No. 38, a portrait of a girl in green dress, with hair cut over the forehead, striking rather for its pleasing harmony of tint; but as we pass on towards the middle of gallery we pause before a group of six pictures (42—47) of masterly performance. Of these, two tall upright canvases particularly call for notice. One represents "Daphne," according to classical story, a river goddess, who was pursued by Apollo for her beauty, but as she was nearly overtaken by him, she prayed for help, and was turned into a laurel-tree. Mr. Watts has apparently taken his idea from this transformation; she is shown as a nude figure, partially and gracefully concealed in a thicket of laurel. The figure of Daphne is well modelled, and graceful in outline, and the colouring is subdued and thoroughly in keeping. "Psyche" is another fine study of the nude: a standing figure with saddened expression, representative of the classical fiction, and, according to the legend, her beauty excited the envy of Venus. The artist has not shown her as conventionally represented, with butterfly's wings, but he has cleverly given her the spirituality of expression with which the classic myth invests the human soul purified by misfortune. "Watchman, What of the Night?"—a youth, in light hair, clad in armour, against a black ground—conveys a tenderness of sentiment and a power of light and shadow equal to any thing we have seen in portraiture from Mr. Watts. Painted in the hard pre-Raphaelite manner of the Italian school is Mr. Strudwick's "Marsyas and Apollo." The artist has depicted, if we imagine rightly, the musical contest recorded in the story where Marsyas challenges Apollo, and where the muses decided in favour of the latter.

> "As he sang
> I saw the Nine with lovely pitying eyes,
> Sign, He has conquer'd. Yet I felt no pang
> Of fear, only deep joy that I had heard."

We pass on to notice three beautiful little classical pictures by Mr. Alma Tadema, R.A. (51—53), painted with the usual scholarly finish and exquisite colour of this master. We have seen the one entitled "A Question" before, where a dark, lazy youth, lies stretched on a marble seat by the side of an Italian flower-girl. "The Garden God" is a pretty and sparkling reminiscence of classical interest; and "A Pastoral" is unique in the drawing and colour of the oxen-harnessed cart, with the distant Doric temple and its coloured pediment in the background. Mr. J. E. Millais, R.A., sends two portraits, one of Mrs. L. Jopling—a graceful study in black dress—and the other of Mrs. Caird, a finely-painted three-quarter figure, with a certain degree of stateliness, in a light blue dress. These, with the characteristic portraits of M. Lepage, and those of Legros already mentioned, make up as excellent a collection of portraits as we have seen for some time. A striking historical picture, of large size, is shown by Mr. J. D. Linton, one of a series, we are informed, illustrating incidents in the life of a soldier in the 16th century. The accessories are well-painted, and the painter has exhibited considerable dramatic power in his figures. Near Mr. John O'Connor contributes a pleasing sketch of Waterloo Bridge (59); and Miss Pickering's "Mater Dolorosa" is cleverly executed, though rather too ascetic and realistic in aim to please us. At the corner of gallery, Mr. Walter Crane gives us a quiet study of a well at Sorrento (64), while, at the end of gallery, Sir F. Leighton's "Rubinella" must be noticed for its fine study of colour; a lovely face suggested by the title, in an apple-green dress. As seascapes, Mr. H. Moore's grey-toned pictures (72 and 76) demand attention; and Mr. A. Parson's "Last Gleanings," for breadth of handling, is rather suggestive of French work. Praise must be bestowed also upon Mr. J. R. Weguelin's ruddy-faced laughing girls, in "The Vintage" (73) with their ankles steeped in the ruby vats of Luna; nor can the visitor well get away from the corner of the gallery without giving a glance at the bright dancing figures in green and blue, in Mr. W. E. Britten's animated study, "Dancing" (77). Mr. Macbeth has two or three clever pictures, one "Landing Sardines at Low Tide" (78); "Welcome as the Flowers in May" (79); both bright and touching; while a third, "Expectation," a girl seated on a shaded seat, is particularly rich in depth and tone of colour. Before leaving this gallery, we may note Mr. Ernest Lintz's "Waiting," a broadly-treated study in grey, and a portrait by R. de Egusquiza (88). The east gallery, though smaller, is hardly less conspicuous for its pictures. We may begin by noticing the pretty decorative studies of Mr. A. Moore, "Jasmine" (95) and "Rose Leaves" (105),

remarkable chiefly for the soft glow of bright delicate tints in light pink and red. "Jasmine" is a girl lying on a couch asleep, covered with gauzy drapery, of the poetic colour; while "Rose Leaves" is shown by a maiden reclining on a seat, wrapped in the same transparent fabric, revealing the figure, and against a delicate background of a chintz pattern. Mr. Keeley Halswelle paints a grand piece, "Tug and Timber Barge" (108), where the storm-clouds and sea and struggling light are depicted with much vigour and power. Singularly hard and realistic is Mr. Walter Crane's poetic composition, "Truth and the Traveller" (111). We hardly know how to estimate fairly the dejected figure, ill-drawn, nude, and haggard, seated on the curb of the well, and representing Truth, though the picture is not wanting in other qualities for an allegorical conception. In the centre of the end of gallery, Mr. E. Burne-Jones contributes a fine poetical composition in his usual low key of colour, "The Golden Stairs" (120). The scene represents a procession of maidens descending, in rhythmic order, a circular flight of unbalustered stairs, carrying musical instruments. They are drawn with angelic countenances, the figures and draperies, barely concealing the limbs, are more Classical than Mediæval in drawing, and all bear a singular likeness. We do not remember any allusion that might have suggested the inspiration, and the conception and treatment must be looked upon as original as it is powerful, though scarcely, perhaps, so intelligible as the author's "Pygmalion" and "Annunciation" last year. Mr. Burne-Jones' work has always a poetic subtlety, and this one suggests a fine symphony both of idea and colour. It is a poetic abstraction on canvas. Mr. Macbeth's "Flood in the Fens" (131) is a wonderfully touching picture; and above it Mrs. Anderson has painted, with much mellowness of tone, "The Bathers" (32). The largest picture in the gallery is Mr. W. B. Richmond's, entitled "The Song of Miriam" (136), an imposing historical composition, crowded with figures, half-finished, but indicating considerable power in grouping and figure drawing. Much skill is shown in avoiding the confusion between the hosts of trumpeters on the left, and the women of Miriam with their timbrels and dances on the right. It is hardly fair to say anything of the colouring in an unfinished picture, but there is a harmony pervading the work. Mr. P. R. Morris's "Cradled in His Calling" (142) is a highly-pleasing picture. Two fishermen, with net thrown over their shoulders, are carrying a merry urchin in the folds of the net; the hay-field, grouping, and colour are all excellent. The same artist's "Corner Stone" is suggestive; while Miss Clara Montalba sends a picture of some power and originality in "Santa Chiara, Venice," though not equal to her water-colours. "Topaz" is a graceful and decorative idea, by Mr. A. Moore; and before we leave this room we must just draw attention to two charming studies by Mr. W. T. Muckley, "May" and "Fruit and Flowers" (98 and 103), deep in tone and bright; "A Quiet Corner," by Mrs. Florence Sherard-Kennedy, delicate and French-like in execution; a fine portrait by H. Herkomer, A.R.A., in his forcible style; "Evening," by Sir Coutts Lindsay, inspired from a line in Milton's "Paradise Lost"; and a few grandly-painted portraits by Mr. W. B. Richmond, Nos. 40 and 129. In the vestibule, Mr. Napier Hemy's "Saved" (171) is a powerful picture of the sea; Mr. Clausen's "La Pensée" is equally pathetic and telling in the anxious face of the lady in sable garments; Mr. Corbett's decorative panel (178) is not low enough in scale of tone for a study of this sort, despite its good composition. We must also note a picture by S. Pepys Cockerell (187), "Jael and Sisera," refined in drawing and colour; and the sandy shore, with its gleam of sunshine, in Mr. Clem Lambert's "Little Hampton, Sussex" (179). The water-colour drawings are rather better than usual, and the visitor will be rewarded by a few striking studies. As architectural sketches, we may mention Mr. J. C. Harris's masterly doorway of the "Old Church at Pierrefonds" (217), and Mr. Phené Spiers's clever and bright-looking sketch of an Old House in Brittany—St. Pol de Leon—where the artist has mainly relied for effect upon breadth of light and shade and a corbelled tower which rises behind. Their plainness is redeemed by an interesting label and the crocketed coping which fringes the summit of the gable. Both are charmingly transparent. Mr. J. M. Donne's view of "The Schinglehorn and Glacier" (220) is a fine study of atmospheric effect; and Mr. J. M. Jopling's "Spring" (223) conveys a pretty sentiment in the fur-clad girl dressed in the sombre brown, with the peering primrose in her bosom. Mr. F. Saloman's Venice (224) is a lovely bit of drawing and colour; and Mr. Charteris, in his sketch in the "Isle of Skye," has been happy in his modulated tone and sponge effect of air and light. Miss Watson's "Far Away" and Lady Jane Blunt's "Effect of Mirage" are worth a glance. Remarkable for warmth of tone is Mr. Nicholson's "Fishing Boats" (229), and the curious legend of the "Battle of the Elves and Frogs," has been made the subject of an interesting study by Mr. R. Doyle, by which the prehistoric story has been ably told. Two broadly-tinted landscapes are contributed by Mr. Walter Crane (242, 243), and Lady Lindsay also sends a few sketches of merit, conspicuous among which is her "Idle Tears (262), a pleasing and pretty composition. Rocks and coast scenery have been depicted by two able exponents. Mr. W. T. Richard's view in North Cornwall (273) and Mr. C. Earle's "Land's End" (267) are cleverly drawn; but possibly the general visitor will find more interest in Mrs. Stillman's poetic conception from "Dante" (267), in which the artist has depicted a scene in the Vita Nuova in a manner that promises success in this class of painting; or in Mr. W. Prehn's thrilling scene of "Horses on the Russian Steppes attacked by Wolves" (261). We have no space left to notice other meritorious, clever works, though of the sculpture we cannot pass by the gracefully and classically-modelled figure of "Galatea" (295) admirable for its drapery; two little terra-cotta studies, one "The Spirit of Inquiry" (312)—an amusing incident, told with much humour and satire, between two members of the canine and feline species, by Miss Alice Chaplin; a spirited portrait of Mrs. Alma Tadema by G. B. Amendola (314); and Mr. Tyler's model of "Shadows." Sir Coutts Lindsay's Gallery is full of choice works. There is little that is absolutely bad, dull, or feeble; though the whims and idiosyncrasies of a few artists may shock the taste of those who look for conventional propriety in style above all other qualities of painting. One word of praise is due to the discriminative zeal of its proprietor and director; we find the imaginative and poetic instincts of a rising school of young artists welcomed, and every exhibition bears evidence of a freshness and energy not seen in the older art galleries.

ARCHITECTURE AT THE ROYAL ACADEMY.—II.

THE gallery devoted to architectural drawings at Burlington House, if not remarkable for power, or eccentricities of genius, assumes a tone of consistency and moderation unknown in some previous years. Possibly, there may be critics who think that the lack of fresh and original effort upon the walls presages badly for the art and its professors, or, speaking with more precision, that the art, having been given over to the caprice of the sensational school, is now suffering from a reaction; at any rate, they will find no work of any great vigour or merit, either as regards design or drawing, such as those hung even only a year or two ago. Mr. Herbert Gribble, it is true, exhibits a finely-finished view of the interior of the Church of the Oratory, but the design belongs rather to last year's work, and we have really only one or two other contributions left of sufficient importance to rank as masterpieces; one is Mr. Pearson's admirable design for Truro Cathedral, which is represented by several drawings, and the other is Mr. J. Brooks' view of St. Mary's, Woolwich. As we last week gave a pretty complete list of the contributions, we shall now simply offer a few critical remarks upon the leading works. A batch of three or four drawings near the door catch the eye by their very different handling of a country residence. Let us, for example, contrast the treatment of No. 1086, a design for a Country Mansion, by Mr. Henry Shaw, with the reposeful and pleasing grouping of parts in 1099, "Sandrock, Hastings," by Mr. W. Hay Murray. The former can be hardly said to be quite in keeping: the Renaissance features do not blend very happily with the half-timbered buildings at the distant end of house, and the spacing of windows gives rather an odd effect. The house at Sandrock is particularly quiet and pleasing in its breadth of stone, and there is an avoidance of fussiness in the features; but the difference between these works is partly attributable to the style of drawing and shading. The "Garden Front of a Surrey House" (1091), by Mr. G. Edmund Street, R.A., will hardly be recognised as the work of that gentleman. There is little in the detail to suggest his manner; the gabled half-timbered front is picturesque, and the surroundings happily introduced.

Congregational church-building, in the hands of Mr. John Sulman, is more ambitious than we are accustomed to see it in the traditional work of Nonconformists. His design for a church at Bromley, Kent (1087), is thoroughly ecclesiastical in spirit, as are his two other exhibits, Nos. 1135 and 1158, where a little quieter detail would have added to the effect of the admirable coloured drawings. Messrs. Dunn and Hansom, in their St. Benedict's Monastery, near Canterbury (1089), show a solidly-designed Late Gothic range of buildings, in stone, with tile roofs, quite in keeping with the site, with which our readers are acquainted by the illustration we have given of it; and a work of similar character is shown by Messrs. Carpenter and Ingelow, in their St. Oswald's College, Shropshire (1090), though the perspective in ink of the two blocks of the quadrangle looks somewhat heavier than the actual building might lead one to expect. Mr. W. Penstone (1096) exhibits two unpretending ink designs for Village Schools in Berkshire. We take exception to the rather "cooked" gable-end, with circular window in the upper sketch. In Ecclesiastical Gothic architecture, the work of the year, as far as this Exhibition goes, is sent by Mr. J. L. Pearson, A.R.A., who contributes four drawings of Truro Cathedral, (1105, 1118, 1129, and 1165), three of these being geometrical elevations in ink of the cathedral. Mr. Pearson has selected the Early Pointed or Transitional style for his great work, a style which no architect understands better. Purity of outline and refined detail have been studied with a singleness of aim which redeems any want of vigour in the design. The detail and proportions of the eastern transept, and the grouping of the pinnacles at the bases of

the three spires, are perfect features; but the beauty of the structure is better told in the perspective view, in which the low spire over the crossing forms a grand apex to the bounding outlines of the composition. A majestic severity is insured also by the unbroken buttresses, which rise from the ground upwards, without the fritter of a multiplicity of set-offs. It may be open to question whether so many large geometrical drawings are necessary, even to illustrate such a work as this. The Royal Academy may well be permitted to exclude too large a display of technical drawings, which necessarily occupy valuable space, and force into obscure positions many other drawings. Mr. Pearson is as much a master of Renaissance design as he is of Early Pointed. His small but really scholarly drawings of Westwood House, Sydenham (1120 and 1130), showing the garden and north fronts, exhibit a keen sense of the beauty of the style. The building is of red brick, with tile roofs, and is in the picturesque though dignified style of François I. The garden front is almost as charming in treatment as the well-balanced elevation to the north, with its circular bays and its triple group of conical roofs, and the composition is devoid of that restlessness which is so common to artists of the school. We hardly think the drawings illustrating Messrs. E. l'Anson and Sons' buildings "for the Merchant Taylors' Company" do full justice to the executed work; they are a little finical in manner, and the detail looks meagre, after an examination of the buildings in Cornhill. Although hung high, the view of the Collegiate Church of St. Michael, at St. Quentin, by Mr. Charles H. Rew, is a fine ink drawing of the noble apse, and the artist has managed to give aërial perspective to the transepts by the gradation of tone. Three interior views, by well-known Church architects, offer a fair field for comparison. Messrs. G. F. Bodley and Garner's "Interior of the Church of St. Michael's, Camden Town" (1110), a vigorous line drawing by Mr. W. S. Weatherley, must be noticed for its broad treatment of wall-surface in an Early English style. It has a plain pointed vault, and its effectiveness is due to the simplicity of detail, and the breadth of plain walling. In 1162, Mr. Street shows a vigorous and spirited sketch of the "Interior of St. James's Church, Paddington," in a rich Decorated Gothic, rather Late in some of the features, as, for instance, the flat roof over the aisle. Finer in scale and proportion than either, is Mr. J. Brooks' "Interior of the Church of St. Mary's, Woolwich" (1219), already illustrated by us, and it has the advantage of being shown by a clever drawing. The same architect's south-east view of the same church is a design that must take its place among the best productions of the school; the drawings of it and of the west front are both excellent. Mr. George H. Fellows Prynne exhibits a bold line perspective of a design for rebuilding St. Peter's at Plymouth, with a massive, low-roofed tower at west end (1116); the latter looks oblong, if the perspective is right, and we might say somthing in commendation of the low roof as a more sensible covering than an unfinished tower. Below the last hangs a finely-grouped house, by Mr. T. E. Collcutt, in light India ink, solid, and thoroughly in keeping with the Old English style adopted; but the work suffers from a want of shadow, due to the artist having assumed the sun to be in the meridian. Mr. Collcutt has avoided the fidgetiness and restless spirit of many of his *collaborateurs* in "Queen Anne." He shows no meaningless breaks, and corbellings, half-timbered gables, and quaint devices in brickwork; but instead, a scrupulous rendering of the spirit of the style. His "Council Chamber, Wakefield" (1084), and his "Design for the City of London Schools" (1217), are drawings that worthily fill the places they occupy. Mr. Alfred Waterhouse, A.R.A., is not so strong this year as last. His design for premises at the corner of Old Bond-street and Piccadilly (1119) shows a red-brick and terra-cotta treatment of business premises. The upper stories are sensible if rather hard-looking, but without excess of ornamentation, and this is confined to the bands and panels of terra-cotta; but the ground-story is commonplace, and the pilasters do not appear to belong to the upper part. The corner is canted and gabled. The "Interior of Heythrop Hall, Oxon" (1175), is remarkable alike for its merit as a drawing as for exhibiting a phase of work with which we seldom associate Mr. Waterhouse's name. The water-colour drawing shows an Italian hall, with arcades of stone boldly and artistically tinted. The same architect's "Sketch Design for the New St. Paul's School, Kensington" (1177), is another masterly sketch in colour of a red brick building. The vertical lines of cut brickwork in the gables appear to destroy the breadth of a well-grouped composition, and perhaps the coherency of the building might be improved in one or two parts, but the design is a sketch only, and a clever one. A conspicuous place is occupied by two drawings in line by Mr. R. Norman Shaw, R.A. (1126 and 1127). We have not here the fascinating studies in this artist's favoured style that we had in his "Adcote" last year, and those of previous years, but we look upon this work as another of those happy and natural renderings of Queen Anne for which Mr. Shaw has won a high name. Mr. Charles Barry exhibits a brightly-coloured perspective, in a large frame, of "Clumber, near Worksop, Notts," now being restored with additions from his designs. The old mansion was partly burnt down, and Mr. Barry shows by his plans, which are rather too high for inspection, a rebuilding of the interior and hall, which latter looks like a cortile. Externally the design exhibits a massive Italian building with a centre block carried up, and finished with an open loggia and corner towers, side-wings also terminated by angular towers crowned with terminals. The ground-story is arcaded, and the composition has an imposing, if rather heavy, effect, which the cresting of terminals hardly relieves. The unpleasant reflection of light from the glass of this drawing prevents a careful examination of its merits. In a lower position two charming sketches of Lodge and Cottages, in brown sepia, by Messrs. E. George and Peto, enlist attention (1131, 1132), which, together with the same gentlemen's work, "House at Westgate-on-Sea," in another corner of room 1216, also 1214, are worth study for the thoroughly artistic conception, grouping, light and shade, and detail. Take 1214, a Devonshire house—what a lovely bit of effect in the tile-hung projecting porch and carved gable, or the highly-suggestive 17th-century work in the three gables and windows in the front of No. 1216! The stucco ornament in the gable tympana and the chimney stacks are particularly dainty, and so, too, is the more masterly drawing of new wing to Rawdon House, Herts (1163), where we have a charming picture of an Elizabethan house, most feelingly and decorously dealt with. These drawings are as bright and sketchy as any we have seen in sepia. Want of coherence is a rather prevalent defect in designs in Queen Anne. The School residence, Woburn Park, Weybridge (1140), by Mr. Geo. Sherrin, exhibits this fault in a minor degree; the ornamentation looks a little out of key with the other parts, notably the plain canted window at the end; but the design is generally bold in its parts, despite the absurd device of springing a chimney from a pedimented niche. Rather different in spirit to the last is Mr. J. Birch's Grafton Hall, Cheshire, showing a solid and quiet sixteenth-century house. The drawing has a broad projection of chimney-shaft at side, but we hardly know what is new; the composition is well broken and pleasing. Messrs. Bodley and Garner's addition to Magdalen College, Oxford (1142), is an able drawing of a fine tower entrance and oriel, with florid features in a thoroughly Tudor spirit; the detail is correct, and quite in unison with the feeling of the architecture of the colleges. Mr. John D. Sedding's design for an Elizabethan house (1146) is hung too high; the almost cruciform appearance of the building, with its upper range of windows and aisle-like wings, and the squat tower in the centre, might be mistaken; but there is an energy and piquancy in the detail that is refreshing and spirited by the side of other feeble attempts at Renaissance. Fresh-looking also is the same gentleman's design for Salcombe Church, Devon, with its curious campanile tower. An interesting restoration to the Chateau de la Jouardaye (1148) has an engraving-look about it; but we pass on to Mr. W. Fawcett's Front of Queen's College, Cambridge (1149), where a massively-treated gateway claims notice. One of the most striking water-colour drawings is Mr. H. Gribble's view of the Sanctuary of the New Church of the Oratory (1170). The view is taken to show the dome, and the artist has brought all the resources of his art to bear upon this part. The light and reflections are deftly managed, the colouring is rich but well toned. The blue-veined pilasters of great piers and the margins of the pendentives well neutralise the warmer tints, and the work, despite a little exaggeration of scale, is worthy of Mr. Gribble's power. Mr. John Oldrid Scott sends a conspicuous design for the New Cathedral, Lahore (1172), a clever water-colour perspective. The design is in red brick, and possesses dignified detail; the deeply-recessed and buttressed walls are appropriate features in a building for tropical climate; the western towers, with gabled roofs and flèches, are bold, but the centre flèche looks weak. Town-hall architecture receives an able contribution in Mr. E. Burgess' exhibits; his new Town-hall at Saffron Walden is a masterly water-colour drawing, with a half-timbered gable in Domestic Gothic, supported on a well-designed arcade. The detail is good and rich, and the drawing is one of the most finished and masterly in the room (1173). No notice of the Academy would be complete without a mention of Mr. Arthur W. Blomfield's design for "Sion College Library," as proposed to be built on the Thames Embankment (1152). Mr. Blomfield has been successful in giving a bold front to his building; the porch is a well-proportioned feature in Late Perpendicular, and the large lofty window in the gable of library and angle turret are good features, and suggest the purpose of the structure. The design is dignified and striking, and the architect has refrained from indulging in the more tawdry features of the style which too often tempt to the use of costly detail. Mr. Blomfield's Mission Church, Berkeley-square, is an exceedingly nice and quiet Early English design, with arcaded passage-aisle. Commercial architecture is represented by several good drawings. We notice commendably Mr. Peebles' Milton Buildings, Watling-street (1109); a Warehouse and Granary (1137 and 1138), by Mr. Aston Webb, two artistic water-colour sketches, in which stock and red brick have been introduced with effect. The waterside premises are appropriate, and broadly treated, with red bands and patterns in the gable. Mr. W. West Neve (1205) shows a well-studied range of offices, and Mr. W. A. Boulnois has a coloured drawing of new offices in King William-street, a large, massively-treated corner structure in Italian, the main features being a lofty

order in red granite, with mezzanine supporting the upper stories, which are adorned by the Corinthian order; the corner treatment in the awkward double cant spoils the design. The large coloured view of the great Indian Peninsular Railway Terminus and Administration offices, Bombay (1181), by Mr. Fred. H. Stevens, is a masterly drawing by Mr. A. H. Haigh, and its design in the Italian Gothic style, though elaborate in detail, is in harmony with the climate of India, where the style seems to be a more congenial one than it does in England, and Mr. Stevens has made the most of his opportunities. We can only glance at 1195, by Messrs. Belcher, which looks like an ideal scheme on a grand scale, though hung rather high. Mr. Ingress-Bell very aptly illustrates his recent remarks on "Unrest," by his exceedingly nice and quiet tower and spire in No. 1188, for the church of the Sacred Heart, Caterham, and his church at Guildford, 1107; the broad plain treatment below the belfry of the former, and the well-proportioned broach spire remind us of the Northamptonshire types; they are pleasingly shaded in ink. Mr. H. Saxon Snell's competition design for Vestry Hall and Baths, St. Mary, Rotherhithe (1193) represents a suitable red-brick building, but the angle tower has not a happy connection with the hall. We have no space remaining to say more; a group of designs by followers of the Queen Anne school of sufficiently individuality of character to call for remark, and several drawings exhibiting decorative treatment, we may reserve for another occasion.

THE MANUFACTURE OF PORTLAND CEMENT.

NO. 1.—RAW MATERIALS AND THEIR TREATMENT.

(*Concluded from p.* 506.)

IN reading and studying the now well-authenticated records of Portland cement progress, we are struck at the similarity of many of the new methods with those practised by some of the earliest investigators and experimenters. Both Vicat and Pasley adopted a semi-wet process for amalgamating their materials, and Dupont used, in Paris, a considerable time ago, the wash-mill and horizontal millstones, the same as those now at work in England under Goreham's patent. In corroboration of this, we here give a short extract from "Reid's Science and Art of the Manufacture of Portland Cement," which occurs at chapter VII., page 159, published in 1877.

"2nd. Semi-wet method, which was first adopted and patented by M. Dupont, in France, many years ago, passes the mixed chalk and clay between horizontal mills in a semi-plastic state. . . . This system has recently been introduced into this country, under the style of 'Goreham's Patent Semi-Wet Process.'"

The description we have given of the two English systems of wet and semi-wet preparation of the raw materials does not appear to us the best adapted for a thorough amalgamation of the chalk and clay; and we no longer wonder at the mistakes and blunders of Portland cement-makers in the past, and even at the present time. We are glad that, in some quarters, a better state of things now prevails, and the production of faulty cements is generally the exception, and not the rule. This result—so comforting to the present generation of constructors—has not been reached without difficulty, and we are more particularly indebted to the profession of civil engineers, who fully appreciated the importance of the cementing agent, and insisted upon its improvement by the makers. Under such pressure a marvellous increase of strength has been reached, although we still think further advantageous progress possible; and we will point out what we believe to be the direction in which that amendment leads.

Our description of the amalgamating or washing process indicates that it is performed in a somewhat clumsy fashion, and to show that it is capable of much more rational performance we will describe the practice in vogue by the more advanced German cement-makers, using chalk and clay similar in character to that of the English materials.

The English, or rather the London, makers invariably wash the raw materials at the level of their factories, and afterwards elevate them to the raised drying-ground or floors. In a successful German cement-works the reverse of this practice is followed, under circumstances we will shortly describe. The chalk and clay are, in this case, lying contiguous to each other in the same geological formation, the latter differing from the Medway clays, inasmuch as its latent moisture under ordinary circumstances does not amount to more than 15 or 20 per cent. of its weight. Neither chalk nor clay is as pure as that obtained in the localities of the Thames and Medway deposits, and yet the cement produced is, generally speaking, much better than that obtained from our best English makers.

The chalk and clay are, on being delivered from the quarries, hoisted to a considerable height in a building designed especially for washing purposes, and the proportions accurately weighed and, in the rough state as quarried, reduced to a condition fine enough to pass into a series of small closed troughs, in which revolve a number of paddle-like cutters fixed to a horizontal shaft travelling at the rate of about thirty revolutions per minute. After being cleansed from roots and other accompanying organic impurities, it descends through an oscillating sieve to another trough, and so on until it approaches the shute or conduit leading to the backs. There is an abundance of water used in the operation, and the well-mixed fluid reaches its point of deposit in a thoroughly homogeneous condition. It is not a hurriedly-executed operation, but carefully performed under the most accurate supervision, and the quantities, in their correct proportions, passed at each time into the washing-troughs are not one-fifth part of what is generally tipped out of barrows in England. Such a method insures a more perfect mixture of the two ingredients, and the repeated and progressive washings in the various troughs secures a final product very uniform in quality and texture. It is, we admit, somewhat more costly in character than that under the English system, but it secures what, after all, may be regarded as the most important branch of the whole process—accuracy of proportions, without which none of the other departments of the manufacture can be prosecuted with advantage or profit. Ample back-room is provided, and excellent arrangements for the elimination of the water of combination, when another treatment differing from that practised in England takes place. A portion of the slurry is dried on the coke-oven flues, and this is mixed through a pug-mill with the wet slurry from the backs and formed into bricks of the ordinary building size. These, after being thoroughly dried, are ready for the kiln.

The resulting products thus produced are very different; the German method producing a partially-compressed brick, having clean and smooth surfaces developing little or no dust in handling, whilst the irregular-sized pieces under the English system are in a crumbling condition, and ill-fitted to receive the best influence from the heat of the kiln; the one being a dense substance in which porosity from evaporated water scarcely exists, while the other is honeycombed and pulverulent, producing much dust, which is highly prejudicial, and has a most injurious influence in the combustion of the contents of the kiln and its profitable working. The particles of each mixture of chalk and clay should be in the closest possible contact, otherwise the chemical reaction during the process of calcination is imperfectly performed, resulting in a diminution or excess of lime according to circumstances. An examination of the clinker under such treatment shows, from the products obtained, that the extra cost incurred in washing and forming into bricks has not been made in vain. Pinky or yellow stuff is not to be found in a kiln whose contents have been thus carefully protected against the risks attending its being carelessly loaded with improperly-shaped materials. The slip-shod practice too prevalent in English cement works produces a large amount of waste in the shape of worthless dust and imperfectly calcined clinker.

There is doubtless a great advantage in using the semi-wet process, for by its adoption, the works are more concentrated, and besides the cost of land being lessened, a great saving is effected in handling the materials. By the old-fashioned wet process a large amount of back space is necessary, and the distance at which it is unavoidably placed increases the cost of manufacture to a very considerable extent by the necessity of wheeling or carting the slurry to be dried and burnt in some large works to very considerable distances. The great length also which the liquid material has to travel from the wash-mill to the backs produces a large amount of waste in the immature precipitation of its heavier portions, thus disturbing the equilibrium of the proportions of chalk and clay. Under such a system it is impossible to maintain with the desired accuracy the admixture of the raw materials, as in the course of the profuse application of the water vehicle, considerable derangement must arise, and that, coupled with the porous character of the dried slurry, interferes, and almost precludes the possibility of uniformity in manufacture.

The thorough destruction of the natural structure of both chalk and clay is absolutely necessary, before an amalgamation of the desired accuracy is possible, and water as the diluent appears at first sight the most suitable agent. The smaller the quantities of chalk and clay used at a time, the better is the chance of perfect admixture, provided accurate means are at hand to place the mixed ingredients beyond the possibility of disturbance during the process of final subsidence. The most perfect way to accomplish so desirable a result would be to prolong the agitation of the mixture until the water had been thoroughly eliminated by artificial heat, so that no displacement of the combined particles could take place during their final and permanent arrangement. Under such circumstances, however, the whole of the applied water, as well as the respective latent moistures of the chalk and clay, must be completely eliminated from the slurry before any successful advance in the process of manufacture is possible.

In the details we have given as above, of the process of combining the chalk and clay both under the wet or original, and the semi-wet system, there is much, apparently, of unnecessary and complicated labour. It does appear to be almost, from our point of view, a great waste of time and expense. The object desired is to accurately blend two very manageable materials, and it is hardly necessary, we think, to introduce six or more times their weight of water to effect that object, more especially when the whole moisture must be again removed. Fineness is an indispensable condition in the process, and the same object is surely possible without the introduction of water.

Mechanical means are now quite competent to reduce almost any kind of mineral to a fineness or smoothness suitable for the purposes of Portland cement-making, but before successful results can be reached in that direction, the materials must be first freed from their natural moisture. We hope in the early future to see a gradual approach to such a system, for now, after many years, a step in that direction has been made by the adoption of the semi-wet process. That the difficulty of the copious use of water was apparent to the early cement experimenters and makers is evident, for Pasley, Vicat, Dupont, and others, long ago endeavoured to overcome the inconveniences with which its practice was unavoidably surrounded. Until recently, however, the adoption of a dry system of manufacture was practically impossible in the absence of the required reducing machinery, which is now obtainable of suitable and efficient character.

Many cement manufacturers are at a loss to understand why there should be so much trouble taken to reduce the raw materials to the fineness we have endeavoured to describe. The first treatment of the chalk and clay, as we have already stated, is the most important in the whole process of Portland cement manufacture, and which has, perhaps, the most careless attention bestowed upon it, owing to the want of thoughtful appreciation of its nature and object. There can be no mistake if the reduction of the chalk and clay proceeds too far in the direction of fineness, but great danger arises when the compound is too coarse. In forming alloys of metals, the heat agent produces an effectual combination under, perhaps, the most favourable conditions, and brings about with the utmost nicety the desired chemical results. So also in many of the chemical industries an accuracy of result is secured by the adoption of the most careful calculations and processes. Portland cement making, although strictly speaking a chemical process, is not controlled or regulated by any exact or reliable rules, and therefore it is not surprising that imperfect products are realised when the accuracy of chemical manipulation is disregarded. To combine chalk and clay seems the most easy of tasks, and thus its performance is conducted in a careless and perfunctory manner. Let us examine the conditions of the materials when placed in the cement-maker's hands for conversion. First, the chalk. This material is composed of the aggregated remains of minute organisms, and an examination of a piece of it by a microscope indicates that its structure is a series of circular or spherical parts, of almost indescribable variety and form. When this primary disposition is violently disturbed by the action of the wash-mill, there can only result a further reduction of the spheres or globes, intensified by the triturating action of the liquid wave of the trough, and the separating or cutting process of the knives or harrow-tines. However minute these particles may be reduced they are still spheres, and even by such violent treatment are practically indestructible and insoluble. Second, the clay. The finest of clay—not even excepting kaolin—is only composed of globules, or spheres, and according to its finenesses is its quality measured. Wash as perfectly as we may, in a mechanical direction, we cannot succeed in rendering the finest clay in nature insoluble. Chalk and clay, therefore, are only, even in their combined condition—so many minute globules, liable, on the slightest mischance, to separate from each other, and resume, in a great measure, their original, or natural, form. When imperfectly reduced, and floating about in the water-vehicle of combination, these particles cannot become placed in close or accurate enough contact to receive the beneficial action of the kiln and their subsequent subsidence and desiccation does not improve their desired homogeneity. The great and most important object in the preparation of the raw materials is to maintain the equilibrium of the proportions of carbonate of lime, silica, and alumina. Such a desideratum is practically impossible when the conditions of its attainment are absent. Liquids and fine powders are, generally speaking, capable of easy blending, or mixture, because their state of divisibility secures the means of accurate combination. We have shown that the highly-diluted condition of the chalk and clay under the wet process fails to secure the most reliable results, because, in the unavoidable withdrawal of the vehicle of moisture, error is almost certain to arise. In the semi-wet process, the treatment of the raw material is also in a manner imperfect, because of the variable texture of the chalk and clay, and also owing to the presence of siliceous and flinty ingredients, which cannot be intimately absorbed, blended, or eliminated in the mixture.

Until but recently the principle of accurate blending of the chalk and clay was disregarded, owing to the want of sensible recognition of the chemistry of cement-making. It was not well understood why such perfect mixture was necessary, and the losses and disappointments arising from such a want of intelligence were ascribed to various causes: "Too much lime, too much clay, bad fuel, or imperfect combustion of the kiln," were dogmatically advanced, according to the humour of the practical cement-maker, or the whim or caprice of his guides and counsellors. So long as the engineer and architect confidingly accepted the cement, and relied on the reputation or fame of its maker as his security against danger, all went well and merrily as a wedding-bell; but a change took place, on the introduction of sensible testing, which altered the whole state of affairs. The old-standing firms and well-known names no longer served to screen the shortcomings of or the dangers of imperfect cements which could not pass the intelligent and unimpeachable challenge of the ingenious testing-machine, and the conditions by which its action was regulated and controlled.

THE DECORATION AND FURNITURE OF TOWN HOUSES.—V.

THE general treatment of the drawing-room and boudoir, bedroom and offices, formed the subject of Mr. Edis's fifth Cantor lecture, delivered on Monday evening, at the Society of Arts. The walls of the room were hung with various kinds of stamped leather and paper and silk hangings, and on the platform were cabinets and chairs, lent by some of the leading art-decorating firms. The drawing-room of a London house should, the lecturer observed, be the room of all others in which good taste, both in decoration and furniture, should be everywhere apparent; it is essentially the ladies' room of the house, and should be rendered pleasant and cheerful, and without stiffness or formality. The walls should not be cold and dreary blanks of merely one-tinted paper, varied with birds or bunches of flowers in gold, scattered in monotonous array; the furniture should be comfortable, couches and chairs really pleasant to lounge and rest on; and, above all, the rooms should look and be home-like in all their arrangements. The good taste of the ladies will find innumerable ways of rendering their especial quarter of the house bright and cheerful. Any scheme of decoration which shall consist merely in so-called artistic papers arranged in two or more heights, without reference to proportion of rooms; or of stiff spider-legged furniture of would-be quaintness in make or shape, covered with crétonne or stuff to match the paper—anything, indeed, that shall give a cold, comfortless not-to-be-touched appearance—is as much a mistake as the dreary, lifeless formality of the gilt-and-ginger-bread type of imitation French work so long affected. We want a room we can live in, delight in, and be really at home in; not a museum in which we may walk about and admire, but must not touch, in which everything seems got up in the high-art fashion, but from which common-sense people will go dissatisfied, doubting if such frozen art is artistic bread. A drawing-room should not only contain books and works of art, but should be a room in which you need not fear to move, or joke, or have a pleasant hour before dinner with the younger members of the house. The unfortunate feature in modern drawing-rooms is the everlasting seeking after novelty in papers, curtains, or other hangings; everyone wants a room different from her neighbours, and decoration is being done as a fashion, not from any real love of it. There is no reason why a few good papers should not be the groundwork of truly artistic decoration — when the narrowness of worldly circumstances prevents the more elaborate and expensive hand-decoration in paint or distemper — and let the rest follow from the design of the artist. Not to have what your neighbour possesses is the bane of decorative art; if we could give someone the monopoly of some half-dozen or dozen really good papers, plain and good chairs and table, we should be at peace, and the refinement of luxury would make frugality once more possible. Without objecting to or despising individuality or originality in art decoration, a protest must be raised against the craving after eccentricity and so-called novelty, which is called "originality," and the striving after quaintness, bad in taste and effect, which is styled "individuality." These qualities will, in the true artist, show themselves in the tone and treatment of the colouring and furniture in the various rooms, in all of which there will be grace and beauty and harmony, together with contrast, but no stagy and striking effects, no glaring colours, no fantastic forms. The artist's aim should be so to design and decorate the buildings of to-day, they may be looked upon as equally beautiful, artistic, and appropriate a hundred years hence. Nothing can be more opposed to true decorative art than to have one room Pompeiian, a second Mediæval, and a third Queen Anne, while to complete the anachronisms of the house, a fourth shall be gilt and carved to imitate a Chinese joss-house or an Indian temple; if the general effect be not mean and trashy, it will be suggestive of the poverty of invention and artistic design which finds shelter under the adaptation bodily of other men's work. It is the mere decorator who makes art-decoration costly and extravagant: the true artist will have an ideal of his own of simple refinement and graceful completeness.

In the drawing-room, a dado, is not, as a rule, desirable; cabinets, bookcases, and general furniture of unequal size and height, are better framed against the general colour of the walls, than cut in two by a dividing dado, or chair-rail. A broad frieze may be retained under the cornice, decorated, where possible, with good figurework, either in oil or distemper. In any case, try to have some pleasant lines of colour in this upper frieze, with distemper and stencil ornament of good form, or get some of the exquisite Japanese drawings of birds and flowers, and frame them in panels. Under this frieze may be a broad gilt or painted moulding, with picture rods of light painted or gilt iron, as suggested in previous lectures. Below, the walls should be covered with some good decorative paper, one which will look bright and cheerful with or without pictures; such, for example, as Messrs. Morris's "pomegranate" pattern; there will be no difficulty in selecting, amongst other almost equally-good designs, such a covering, at no greater cost than the French papers with which it has so long been thought necessary to cover our walls. Avoid stiff and staring patterns, and all patterns wherein the flowers are frozen into conventional forms, and have an unnatural and lifeless look. The colour of the woodwork in a drawing-room must depend much upon the general tone of wall-covering selected. If the paper has much colour it may be framed in with black, and if so, the woodwork should be finished in half or bastard-flat; gold, if used, should be in masses, and not in thin lines. For a drawing-room in a large house, where it is chiefly required for great entertainments, a rich and effective treatment of the wall would be with a low panelled dado, dark or black, with delicate inlaying or ivory-toned ornament, the doors, and general woodwork, being painted to match, the general wall-sur-

face coloured bright; warm coloured yellow, and powdered all over with a flower pattern or diaper of a darker tone of golden-brown; the frieze being coloured a delicate vellum or ivory-tone, with arabesque or figure decoration in black, the cornice treated with delicate shades of brown and green, and the ceiling slightly tinted to match the frieze. The lecturer lately saw a drawing-room of a newly-built Queen Anne house, in which the whole of the lower portion of walls was covered with a yellow-pattern paper, the woodwork painted a cream-coloured white and varnished, and the frieze formed in decorative plasterwork in very slight relief, like Adams' work; the ceiling formed after similar designs, and all slightly tinted like Wedgwood-ware. The general appearance was bright and cheerful, and the low tone of colour throughout formed an excellent contrast to Persian rugs, marquetry furniture, blue and white china, and other decorative objects in the room. There was a bright home-like look pleasant to see, and yet it was eminently an artistic room in which money had in no way been lavishly or carelessly expended. Mr. Edis proceeded to detail a few other examples of the general colouring and decoration of drawing-rooms executed by Messrs. Crace and Co., and proceeded to point out that in the treatment of drawing-rooms much must necessarily depend on the light and aspect, the chief uses of the room, and the special objects which may be intended to become features in the ultimate finish. Tones of colour selected as a ground-work for old pictures would rarely be equally favourable for water-colour drawings. Whereas in London houses any decoration which favours the lodgment of dust must be avoided, this condition need not be so strictly enforced in the country, where silk, tapestry, and other stuff hangings may be employed, and give an air of comfort and completeness not to be obtained with mere paperings. The greater play of light and colour on woven fabrics has led some manufacturers to seek to reproduce their appearance and effect by various methods of relieving or embossing the surfaces of papers. Some of these reproductions of ancient brocades, cut velvets, &c., by M. Balin, of Paris, are excellent examples of what enterprise and skilful handicraft can do. It would be unfair to exclude from consideration, on the score of their being imitations, papers like these, which are distinctly decorative and agreeable, and in the case of paper reproductions of stamped leathers, the surface treatment is quite as legitimate in thick paper as in leather, while the former afford an excellent covering at one-third to one-sixth the price of the latter. They are, perhaps, most suitable for libraries, dining-rooms, or smoking-rooms, but they may occasionally be used in drawing-room decoration with good effect. Provided that one aims at making a room a home, and not a museum, there are innumerable excellent ways of rendering your walls beautiful with stamped leather, damask and silk, and tones of gold and silver, ivory and ebony, dark blue and gold, dark red and white, grey and red, chocolate and gold, all look well when harmoniously arranged. In the refreshment-rooms at South Kensington there are many suggestions for interchanges of colour, but all carried out utterly regardless of cost, and the walls are overladen and crowded with detail. Another decorative treatment of a small drawing or music-room would be by panelling the lower portion of walls with a deal dado, delicately painted in yellowish pink or blue, and covering the general wall-surface with a golden-toned paper arranged in panels, with painted and stencil Arabesque patterns on the dividing spaces; the frieze marked with good figure and ornamental enrichment of canvas, plaster, or papier mâché in low relief, painted white, with a groundwork, or reddish gold, or Bartolozzi engraving tint. The floor might have a border of light ebony and maple or boxwood parquet, with a low-toned Persian carpet in the centre, with easy lounges or divans all round the room, the centre space being left clear of furniture to afford space for the movements of guests. Or the general tone of wall-surface may be of a bright bluish-drab-coloured pattern paper with a frieze of small yellowish diaper, the woodwork throughout being painted in brighter tones of blue with mouldings and stencil decoration on white-like Wedgwood china. Examples of this kind of treatment look quiet and pleasing where the walls are lighted up with a few water-colour drawings, and here and there brackets with vases of deep red and blue "splashed" Chinese porcelain. In any treatment adopted, be it remembered that the walls, while bright and glowing in colour, should have no staring pattern or designs, which give a feeling of discomfort and unrest, and destroy the general harmony of the room. Most of the good taste and agreeable effect of the room will depend on the skill with which the wall-surface is divided, and by the contrast and arrangement of the colouring and general belongings. The most harmonious proportions may easily be destroyed by an awkward arrangement of wall-paintings, while the narrowest and most inconvenient spaces may be rendered not only pleasing, but of comfortable aspect. In Pompeiian work we appreciate the magic effect of an adornment to walls which makes the rooms (almost without exception small) appear much larger and more elegant than they really are. In this style the ornamentation becomes substantial by the opposition of colours. It must, however, always be borne in mind that tricky conceits and glaring eccentricities in colouring are equally wrong in house-decoration as in a lady's dress; there should be throughout grace and beauty of design and colour, and quietness and repose of ornamentation. In treating a London house it must be remembered that dark papers and dark hangings absorb an immense amount of light, and that you can reduce the amount of candles or of gas by one-half if you keep to a reasonably light tone in the general decoration. Gas may be necessary in a dining-room, but candles or lamps should be used in drawing-rooms, as softer and less damaging to all works of art. A glass candelabra of small size, so as not to obtrude itself, in the centre of the room; a few good sconces, with light brass *répoussé* backs, or with small Venetian mirrors behind them to reflect the light, fixed here and there to the walls, will be found ample for lighting purposes. The brass gaseliers now made after old Jacobean forms are better than all the pretentious Mediæval forms that have so long been the fashion. Messrs. Salviati make some pretty Venetian-glass sconces and lamps, inexpensive and fairly good. For the furniture of the drawing-room no fixed rules can be set forth, as it must depend upon the good taste of the lady of the house. A drawing-room may be purely eclectic in taste; works of every period of art may be here collected, provided there be a general harmony of arrangement. Mr. Edis expressed his indebtedness to Mr. Graham for the loan of various pieces of decorative furniture, which set the views he had expressed as to simplicity of form and design, and of the use of lacquer and painted decoration in panels. Simple cabinets, inlaid or marquetry cabinets, with their collections of valuable works, bric-à-brac, armour, jewellery, rare china, embroideries, or whatever else may be the fancy of the owner, may well find a place in the drawing-room, provided all are arranged in some sort of careless harmony of grouping and colouring. The floor may be painted, or covered with Indian matting, with good coloured rugs scattered here and there about it; the chairs and couches should be easy and comfortable, and all furniture should be disposed to show off to best advantage a piece of tapestry, a lacquered cabinet, Persian embroidery, or Indian brocade, and to avoid anachronisms and jarring contrasts. If the background be inappropriate, the finest pieces of armour will assume the look of old iron. Let the drawing-room be filled with beautiful objects, which need not necessarily be expensive. Comfortable "causés" and divan seats, low tables for work or papers, cases for books, and cabinets for ornaments and china, and let everything tend to make the room bright and cheerful, homelike and artistic, with general grace and quietness of design and colouring throughout.

In most London houses the bedrooms are sacrificed, as regards height, to the reception-rooms, and the principal staircase too often ends at the second floor of the house. It is, therefore, desirable to utilise every corner and recess, without filling the rooms with heavy and inconvenient furniture. The recesses formed by the fireplaces may, in part, be filled in with good hanging closets, carried up to the ceiling-line, which can be screwed to the walls and removed at will. In these rooms it is necessary, above all, to have a bright and cheerful appearance. All heavy curtains and hangings which tend both to collect dust and to exclude fresh air should be removed, and the whole room should be cleared of everything that can retain dirt undisturbed, such as wardrobes and chests of drawers carried near the ceiling, or mounted on short legs under which it is not easy to sweep. If a room must be darkened at night, double blinds, or shutters, of a thick green tammy or tussore silk blind should be used instead of curtains. For health, cleanliness, and comfort's sake it is well to have as little carpet and drapery in a bedroom as possible. It is equally undesirable to cover the whole walls with paper, and in any case the pattern should not be of a kind to torture the mind of an invalid with endless processions or multiplication tables. A dark matting dado may be used as a base, and the remainder of the wall distempered of some grateful soft tint, with pattern border and freize stencilled on, and here and there watercolours or photographs so hung as not to stand out from the wall too prominently. The woodwork of doors, windows, and skirtings should be painted in a plain colour, harmonising or contrasting with the walls, and the whole varnished. The bed should be of brass or iron, and the furniture of light wood varnished or polished, and painted tiles might be introduced with good effect into washstands and as a lining for 2ft. or 3ft. of the wall behind. The present endeavour to revive the heavy wood bedsteads of our ancestors is in every way a mistake. It is well to avoid carpeting the whole floor; paint the surface some dark shade and lay down mats and rugs as required. Ample ventilation ought to be provided in sleeping-rooms, either by the ordinary gratings and tubes through the outer wall, or, less favourably, from the staircase-well by ventilators over the doors. If this punctual attention to health requirements be neglected the art-decoration may almost as well be left undone.

The nursery is too often the dreariest portion of the house, and yet it is the room in which our little ones spend a large portion of their lives. Nothing that can be easily damaged should be placed in the nursery; rare china, cabinets, and even wall-pictures, would not be understood, and would be but a discomfort to the children. While the furniture should be strong and useful, it need not be prison-like. In the windows of a day nursery should be boxes of flowers, and the illustrations from our illustrated papers and magazines might with advantage be cut out and papered over all the lower portion of the room, a band of colour being introduced by a series of pictures from the Christmas books, and then varnished over to protect from dirt. No hangings of any sort are wanted in the nursery; they only breed disease and dust. The floors may be stained and varnished, or painted all over, and a small centre carpet pinned down in the day nursery, and small slips of carpet, or India matting, laid besides the beds in the night-nursery. Painted or stained deal will be amply good enough for the furniture, and too much care cannot be bestowed on securing efficient and thorough ventilation. It is imperative that there should be no overcrowding of the generally low rooms, and that light and pure air be provided in abundance. In concluding his lecture, Mr. Edis stated that his next, and closing, paper will deal generally with articles of domestic use.

SCHOOLS OF ART.

Crystal Palace Engineering School.—A meeting was held recently at the Crystal Palace for the purpose of presenting certificates to the students attending this school. Professor J. Stuart, M.A., Cambridge University, presided, and spoke of the advantages offered by a school in which engineer students might be taught the elementary details of the profession. He commended the manner in which theoretical and practical instruction were combined at this school, and expressed a hope that its example would be followed in large public schools and in the Universities. After remarking that the profession was not overstocked with capable persons, but only with incapable ones, the chairman concluded by advising the students to learn French and German. A very satisfactory report from the examiners was read, and 52 certificates were presented. Mr. J. W. Wilson, the principal, said that of 313 pupils who had attended the school, 66 were still in it, 105 were with engineers studying, 135 were gaining their livelihood, and only seven had left the profession.

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ILLUSTRATIONS.

HOUSE AT SUNNINGHILL.—"THE HOLLIES," FINCHLEY.—COFFEE-HOUSE AT CRANBROOK.—ST. PAUL'S CHURCH, BENTLEY.—OFFICES IN LONG-LANE.—NEW SCHOOLS AT TETSWORTH.

OUR LITHOGRAPHIC ILLUSTRATIONS.

HOUSE AT SUNNINGHILL.

This illustration of another of Mr. Norman Shaw's admirable works is hung in the Academy, and was alluded to in our notice of the architectural drawings exhibited there.

"THE HOLLIES," FINCHLEY.

This house, which we illustrate to-day, has recently been erected at Finchley for A. de Bock Porter, Esq. It is faced with dark red Ballingdon bricks which were laid in black mortar, the joints being struck as the work proceeded, and the gables are finished with moulded and projecting brick courses; the ornamental bricks for bands, &c., were made by Brown, of Braintree. All the window-sills are of red Mansfield stone, and the roofs of brown Broseley tiles. All the joinery of the interior (except in attics and kitchen offices) is varnished, that of the ground-floor being of pitch-pine and yellow deal combined. Slow-combustion stoves and tile-hearths are used throughout, and all the chimney-pieces are of wood, those for the reception-rooms of black walnut, designed and executed by Mr. Viscardini, of Gough-street, Gray's-inn-road, and those for bedrooms of stained deal, designed by the architect. The large recess in dining-room is filled by an organ. The architect is Mr. John Slater, B.A., of 14, Bedford-row, and Messrs. Sheffield and Prebble, of Poplar, were the builders.

COFFEE-HOUSE, CRANBROOK.

The site of this coffee-house is in the middle of the town, and the building is now in course of erection. The main portion of the building is at present a large shed 26ft. square, to which has been added an entirely new front and rooms at the back. The chief entrance is through a porch into the coffee-room, which is heated by a double fireplace in the centre; the bar, being at the further end, has direct communication with the kitchen at the back. A parlour at the side of the kitchen is for the use of single men who have furnished bedrooms in the attics. Above the coffee-room (and the same size) is a library and reading-room which is reached by a stair leading from the coffee-room, and has also an entrance at the side, as seen. Above the parlour is a room for boys, and over the kitchen is a committee-room which will be used at times as an extra reading-room when lectures are being given in the large library. In the attics are seven bedrooms, five of which will be let to single men who will have the use of the parlour; the other two rooms will be occupied by the manager, and his wife, and a servant. A bath-room is also provided on this floor. The front will be half-timber work with plaster panels, the sides and back being covered with weather boarding. The perspective, which we illustrate, is now in the Academy, and is designed by Mr. W. West Neve.

ST. PAUL'S, BENTLEY, NEAR BRENTWOOD.

This Church, which, with the adjoining parsonage, is now close on completion, will afford accommodation for some 250 worshippers. Externally it is faced with flint, and with dressings in Westwood stone. Corsham stone is used for all internal work. The design throughout is of a simple and early character, the more enriched work being found internally in the chancel, chancel-arch, and the pulpit, which, with the screen-wall, is of alabaster. The whole of the seating, screens, doors, &c., are of wainscot, as is also chancel-ceiling. The chancel and west windows are to be filled with figure-subjects by Messrs. Clayton and Bell. The carving has been executed by Mr. Thomas Earp; Mr. Hammond, of Romford, is the builder, and Mr. Ernest C. Lee, the architect.

OFFICES AND WAREHOUSES, LONG-LANE.

These shops, with offices above, now in course of erection, have a frontage of 44ft., with an average depth of 40ft., and are opposite to the Manchester Hotel. Above the ground-floor the building is so arranged that each floor can be divided into convenient rooms for offices, or left undivided for warehouses. The doorway on the right, being nearest to Aldersgate-street, leads to the upper floors. The owners of the building have decided not to build the door on the left until they know the requirements of the incoming tenants; and they have also objected to the stone pier as occupying too much space, putting in its place an iron column, which does not show on the face of the building, thus losing the proportion represented in the perspective. The builder is Mr. G. Crabb, the architect being Mr. W. West Neve. Our illustration is from a drawing hanging in the Academy.

VILLAGE SCHOOLS, TETSWORTH.

Tetsworth is a picturesque village secluded amid the undulations on the Oxford side of the Chilterns. The new school buildings indicated in our drawing have been just erected to provide for 120 children with teachers' residence. They are built of dark red brick, and black Staffordshire dressings, and covered with Broseley tiles. The fittings are by Messrs. Colman and Glendenning, of Norwich. The total cost has been £1,246, including playgrounds and fencing. Mr. Holland, of Thame, was the builder, and the work was carried out from the designs of Mr. Arthur Vernon, architect, 26, Great George-street, Westminster, S.W., and High Wycombe, Bucks.

NORTH LONDON COLLEGIATE SCHOOL.

Last Saturday afternoon the Architectural Association paid a visit to the North London Collegiate School for Girls, recently completed in all essential points, from the designs of Mr. E. C. Robins, F.S.A. The original school and the Camden girls' school were founded by Miss Buss nearly thirty years ago, and are said to be the first which adopted the large day-school system for girls, and, some time ago, the Charity Commissioners authorised a scheme, on the application of the Brewers' Company, for the erection of permanent buildings for both upper and lower schools, which Miss Buss's trustees have carried out. In our volume for 1877, page 412, a view and plan of Mr. Robins' design for the Camden Lower School for Girls will be found, which is designed in a Tudor style. The North London Collegiate Schools have been generally described in these pages in Mr. Robins' recent paper, read before the Society of Arts, on "Secondary Educational buildings," page 439, ante; it will, therefore, only be necessary to remark upon the main features of the building, from our own personal inspection. A portion of the present building was once a store, and has been remodelled and refronted, from the designs of Mr. Robins, in connection with the new buildings opened last year. The architect had to convert a rather irregular-shaped site, the frontage of which forms an obtuse angle towards Sandall-road. The central hall, or hall-passage principle, has been adopted; five class-rooms are placed on one side, communicating with the hall. On the ground-floor these open directly on the floor of hall, while, on the first floor, a gallery on one side, overlooking the hall, forms the approach. The examination-hall is 70ft. by 30ft., and 32ft. high, and its flank windows are in the main front. The main entrance at the corner is pronounced by a cupola of plain, and effective outline; but the pupils enter at one end of the hall on the basement, through spacious cloak-rooms obtained below the class-rooms. Here are provided rows of pegs, a shoe and umbrella-rack, with metal channels, so that as each girl enters, she can change her shoes for slippers, each girl having a bag, with her number on it, for that purpose. The rest of basement is occupied by a dining-room and drying-closets; the latter have lattice-floors, with a gridiron arrangement of heating-pipes below, and the flooring is laid in small-size wood-blocks (Gregory's paving) Burnettised. Ascending one of the stone staircases at each end of hall block, the ground-floor of hall is reached. We observe that the hall is divided into five bays; on the inner side is an arcade of elliptical arches carrying the gallery, and these arches are carried by small square shafts of Dumfries sandstone, with moulded caps and bases.

Continuous desks in three rows are provided over the area of hall; at one end is a raised platform and organ-recess, capable of being converted into a stage. Six inlets, with gratings for warmed air, occur on the side-walls, while additional inlets for cold air are provided by Tobin's shafts, below the window-sills, regulated by hit-and-miss valves in the recesses. The foul air is extracted by square-valved openings in the flat part of roof, which is boarded and ribbed in panels, and the design of these, and the open stained and varnished principals produce a very pleasing effect. The walls are faced with red bricks from Hampshire, pointed, and a dado surrounds the lower part of hall. At one end is a balcony, with seats. Entering one of the five class-rooms, we find the lighting and ventilation arrangements are perfect. Each room, 24ft. by 18ft., has three windows on north-west side (left hand of the pupils); the walls are of brick, with a dado; the desks are single, and thirty is the apportioned number in a class. Ventilation is secured by extract openings, with gratings leading into flues, and by others, with valves in the ceiling, supplemented by open casements, for cross-ventilation, on the corridor side, and by Tobin tubes. The flues lead into the stacks, which have louvred apertures on each side. Boyd's stoves are provided. To increase draught in the extract-flues, gas-jets can be burnt. All the class-rooms—of which there are three stories—are similarly fitted up. A lavatory and w.c. is provided at end of corridor, on each floor, and there is a supplementary concrete stair, constructed of Drake's concrete, at the end, in case of fire. On the second floor, at the top, is a drawing-school, top-lighted on one of the boarded slopes of roof, and the walls are surrounded by stained and varnished boarding. In the old building there are provided the head-mistress's room, office, waiting-room on each side of entrance, a large board-room, or library, handsomely fitted up, with panelled ceiling, and a science-lecture room on the first floor, with a chemical laboratory near it, besides teachers' and class-rooms. A spacious and well-filled gymnasium, 60 by 24, occupies a partly-detached wing on the left side. A portion of the sub-basement is used as a heating-chamber, and is fitted with hot-water pipes, which lead through main channels, the fresh air being introduced by other cross-channels. There are six coils of pipes in the shafts, the system of heating being that known as Bacon's high-pressure system. We may add that the buildings have been well carried out by the contractors, and that Queen Anne features have been appropriately introduced, without affectation. Mr. Adamson and Son, of Putney, are the builders, and Mr. Woodley, the clerk of works.

CHIPS.

A memorial is to be erected on Chislehurst Common to the late Prince Imperial. The design of Mr. E. R. Robson, F.S.A., has been accepted, and is now on view at the Academy. The contract has been taken by Messrs. Shearer, Smith, and Co., of Westminster, and will be executed by them in grey granite.

The new Army and Navy Provision Market, 121, Regent-street, was opened on the 4th inst. The principal roof has been glazed by Mr. T. W. Helliwell, of Brighouse, on his patent system without putty.

The high school for girls at Truro was opened on Monday.

NEW SCHOOLS &c. TETSWORTH, OXON.

ARTHUR VERNON, 26 GREAT GEORGE STREET, WESTMINSTER,
AND HIGH WYCOMBE, BUCKS, ARCHITECT.

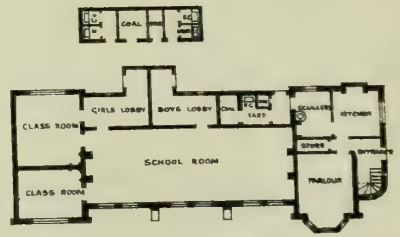


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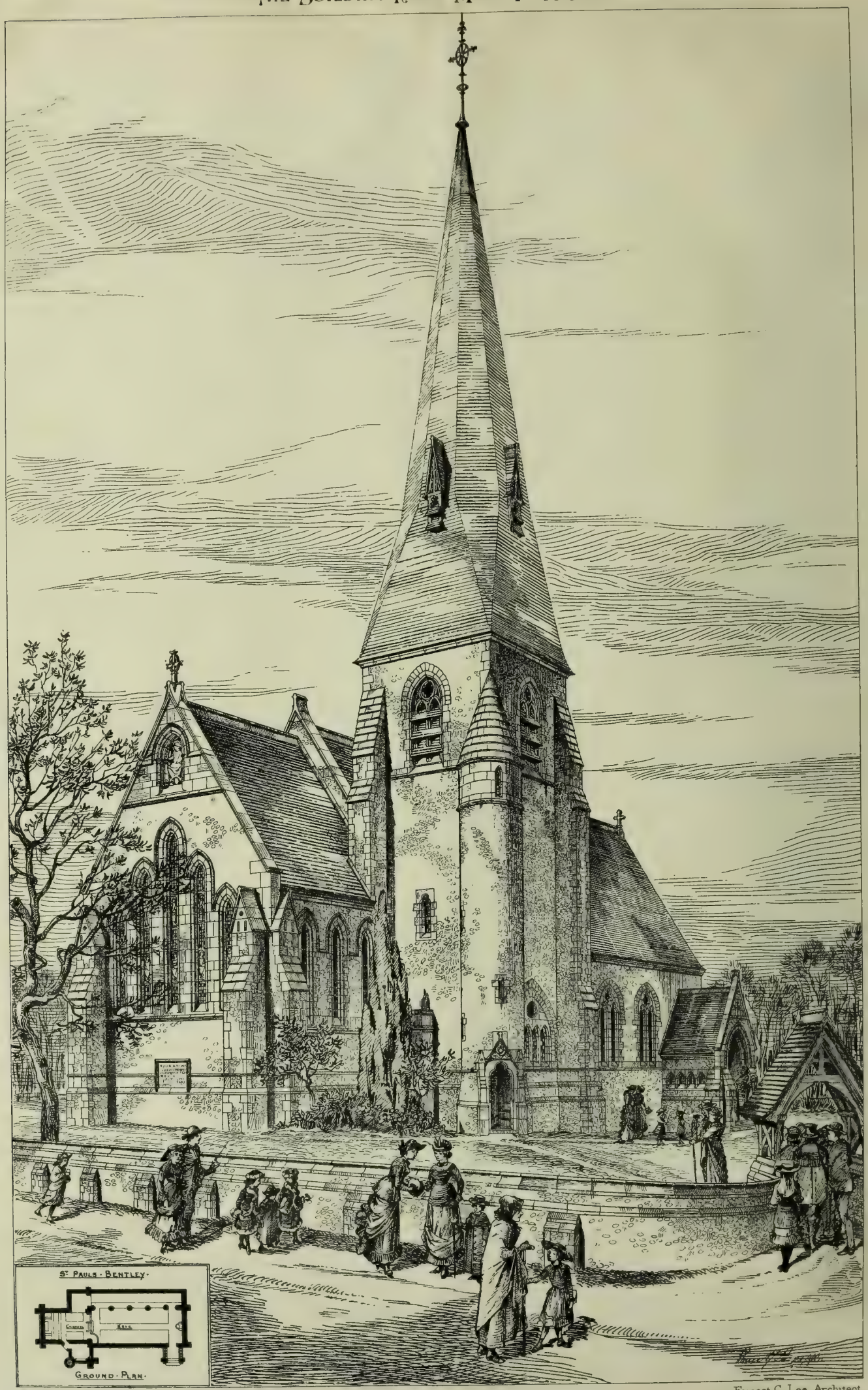


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Ernest C Lee Architect.

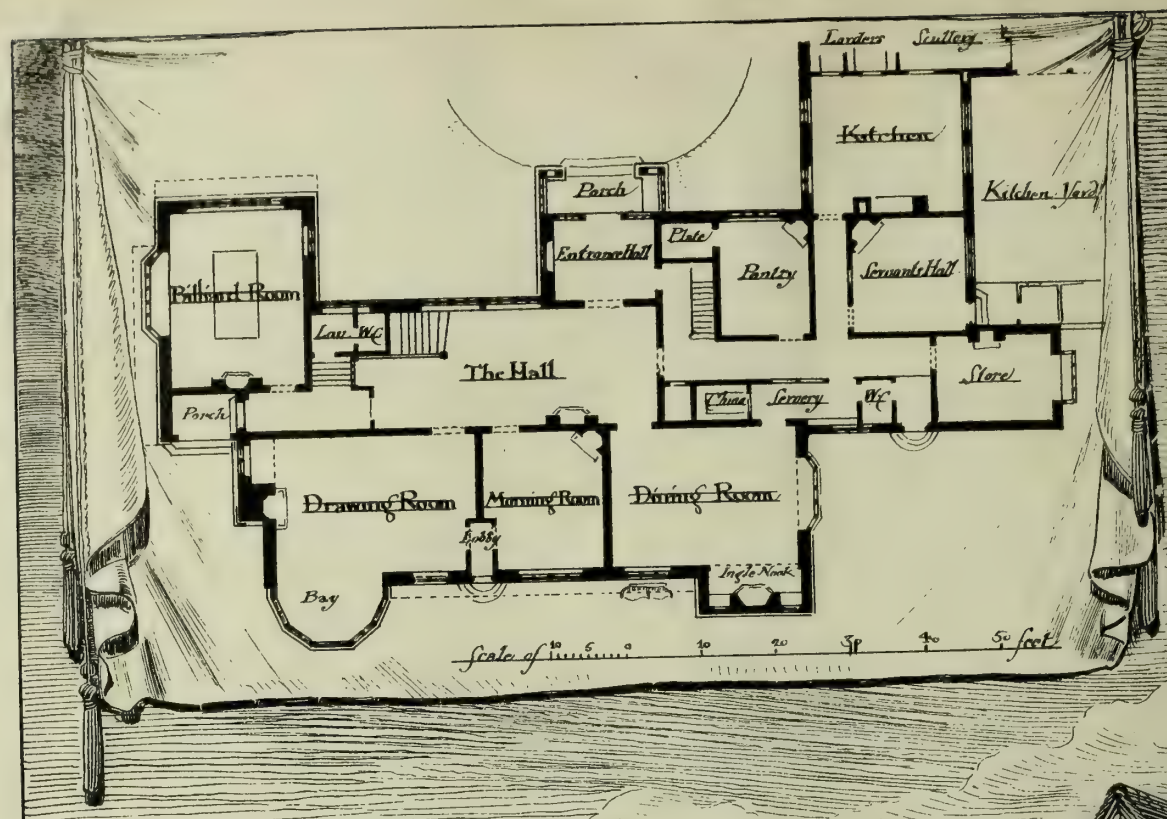


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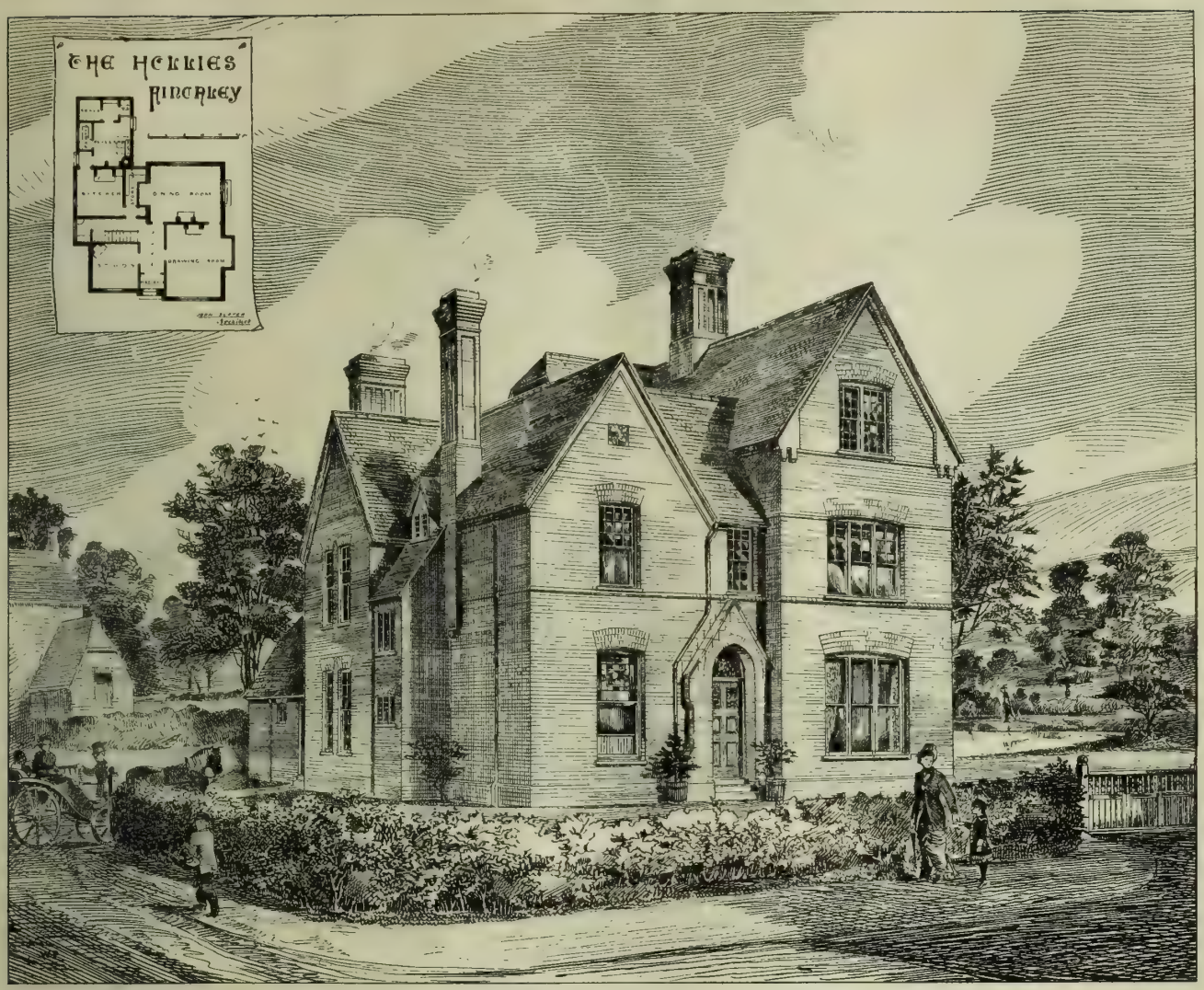
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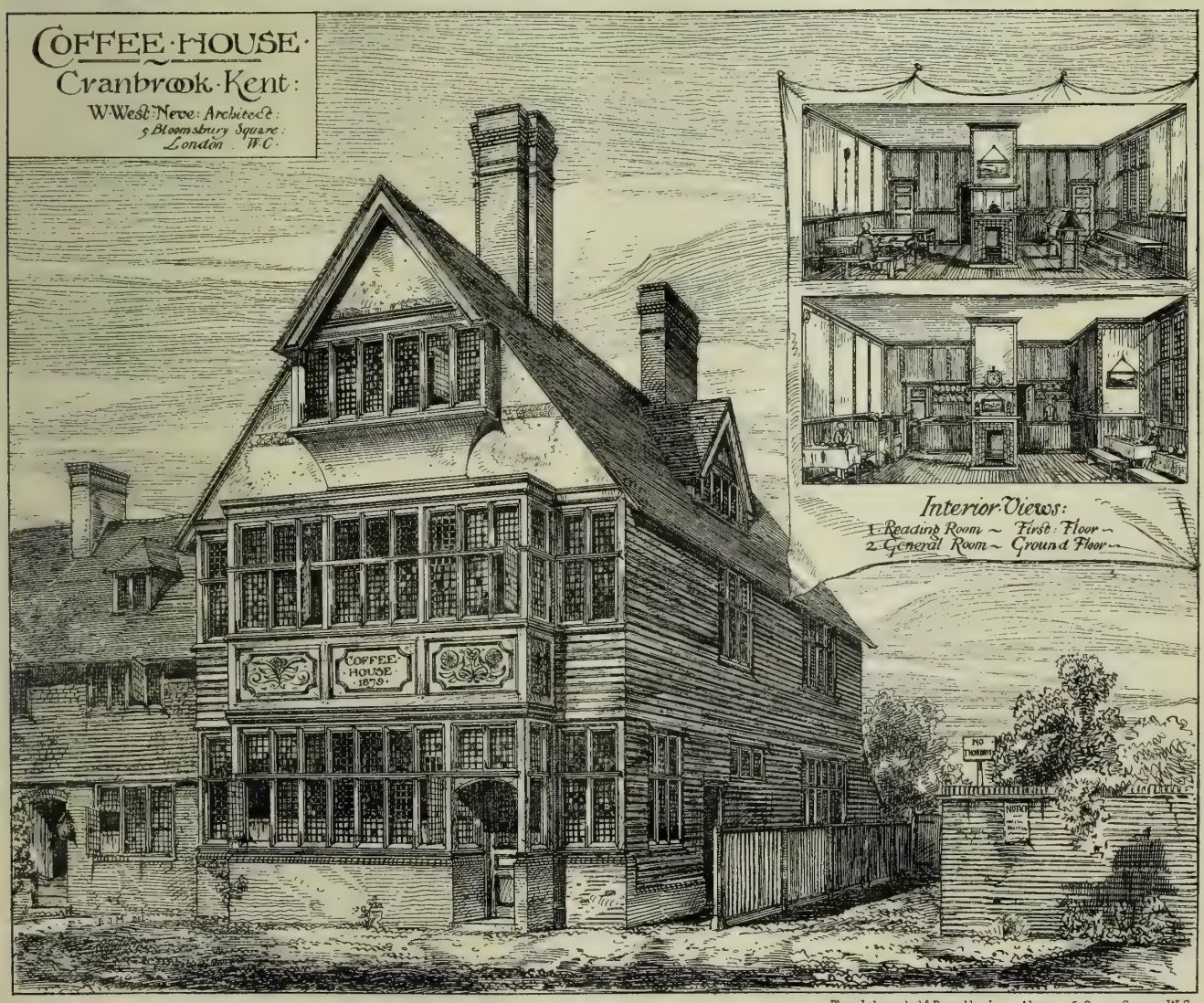
unninghill.

THE HEKKIES
FINCHLEY



COFFEE·HOUSE·
Cranbrook·Kent:

W.West·Neve: Architect:
5 Bloomsbury Square:
London W.C.



Interior Views:
1. Reading Room ~ First Floor ~
2. General Room ~ Ground Floor ~

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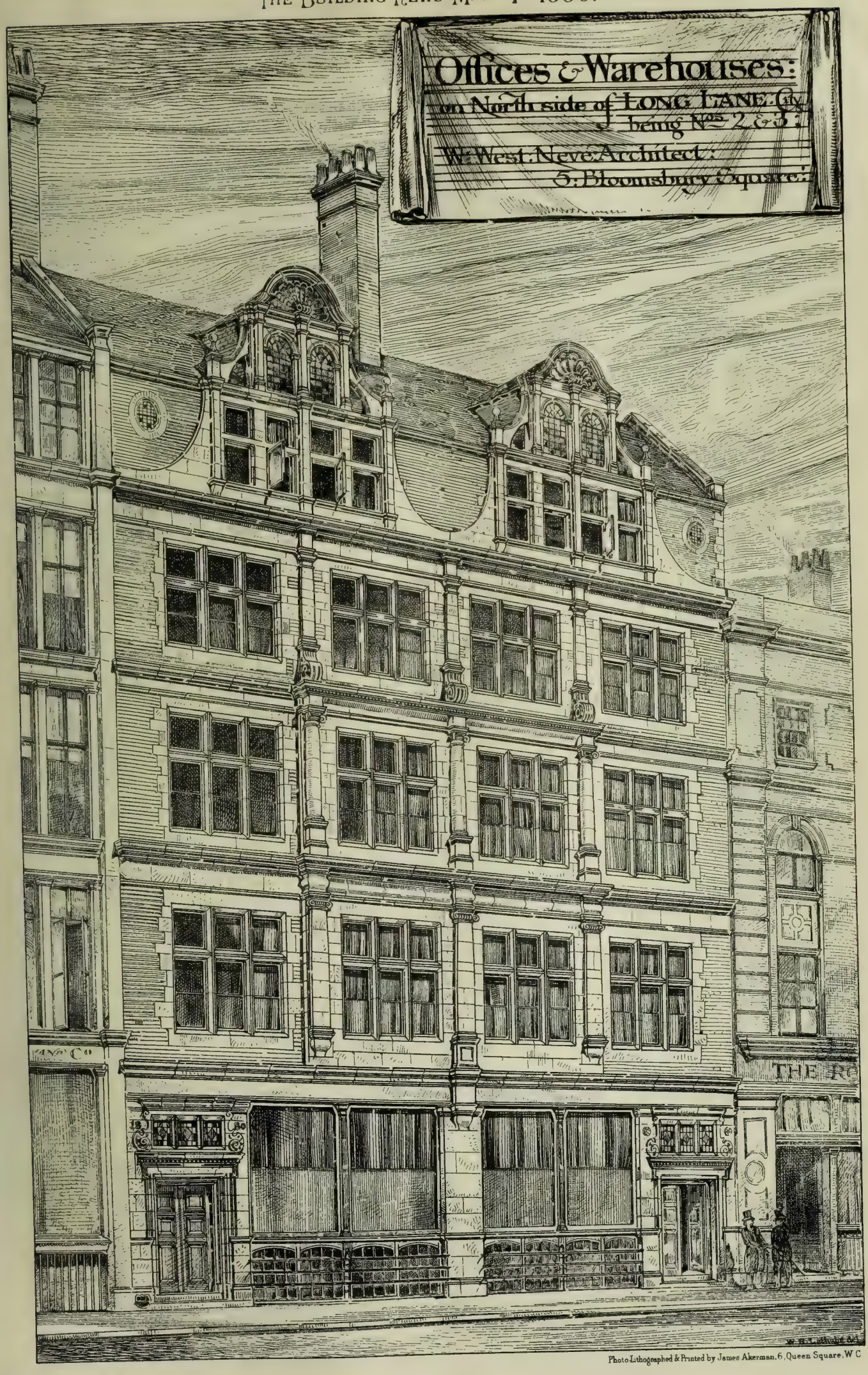


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THE DECORATED PERIOD.

A PAPER on "The Gothic Architecture of the Decorated Period," by Mr. R. Herbert Carpenter, was read at St. Paul's Chapter-house, before the members of St. Paul's Ecclesiological Society, on Tuesday evening. Mr. Joseph Grimshaw, V.P., occupied the chair, and, in opening the proceedings, spoke in glowing terms of the grace and beauty of the style to be described, which he regarded as marking the culminating point of English architecture. During the formal business of the evening, Mr. Howard Wall, hon. secretary, announced that the day excursion to Canterbury Cathedral had been finally arranged for Saturday, July 3rd; members to leave Victoria station at 10 a.m. The visit to St. Etheldredra's, Ely-place, and Austin Friars Church, originally fixed for to-morrow (Saturday) afternoon, is postponed till the 22nd inst., at 3 p.m. Mr. Carpenter's paper was illustrated by a large display of tracings and measured drawings, some to large scale, plans, details of tracery and mouldings, and engravings of buildings of the Middle Pointed style; and Mr. G. H. Birch, who read the paper in the author's absence, supplemented these by drawing sketches of typical mouldings and tracery on the black-board.

The commonly-applied term, "Fourteenth-Century Gothic," is, the author observed, rather misleading, as the change from the previous style commenced many years before the close of the thirteenth century. The transition from Early English to Decorated is to be regarded, really, rather as a development of the former style, there being no difference in principle between the work of the two periods. In the thirteenth century the use of the pointed arch, both for constructive and ornamental purposes, effected a revolution in architecture. The designing of a great building was set about in a perfectly different manner. Instead of building huge masses of masonry, as the Normans generally did, to carry nothing more than a wooden ceiling, the construction of the pointed groined stone ceiling influenced the designer in his whole plan. He had now to place his piers and supports in such positions and to devise them of such proportions as would both carry and support the weights and thrusts of his walls and groining. The Normans did not thoroughly understand any such principles of construction; their towers fell in all parts of England, and what little remains to this day of their attempts at groining (excepting the Roman form used in their crypts) is more or less dilapidated. With the newly-built noble "Pointed" cathedrals and churches before them, the architects of the latter part of the 13th century were content to take their starting-point from them, and tried to develop and improve the style in various forms to suit the ever-changing fashion of their age. It is nowadays difficult to sympathise with the utter irreverence shown towards the earlier buildings by the men working in the favourite style of the latter years of the 13th century. With the utmost confidence in their new style, Norman choirs and towers were remorselessly swept away and replaced by larger works, and the details were continually being altered to suit new ideas. In England there was, however, a certain sense of unity preserved; the proportions of the later styles being influenced, as at Winchester and Gloucester, by those of the Norman work reconstructed. On the Continent the builders of the choirs of Beauvais and Le Mans thought differently: they designed *de novo*, and grand and beautiful as their work is, there is wanting the harmony and one-ness apparent at Ely, St. Alban's, and Lincoln. In the time of Henry III. the Early English style had practically passed away; the lancets had grouped themselves together and become but lights of a window; the piers between them had diminished in size and become mullions; and the space over them had changed from distinct and separate circles or piercings to geometrical tracery, all included under one centering arch. Windows had, in fact, now become vast fields of light instead of apertures cut through the wall, and this resulted naturally on the proper working out of the Pointed system of ground-plan, in which the masses of masonry were placed exactly where wanted as piers and buttresses for the purpose of carrying weights and resisting pressure, while the intervening spaces became lighter and slighter of construction. In France this was carried to an excess, as in the choir of Beauvais Cathedral, where, in an attempt to outrival Amiens choir, this daring defeated itself, and the result was the partial destruction of the work and the permanent patching up and injury to the original design. At Leon Cathedral, in Spain, an edifice of French design, the attempt was made to reduce the piers and buttresses to a minimum, and it is amazing to see the extreme slightness of the work. Here, again, the endeavour to get the effect of walls of stained glass with the least possible stonework between partially failed, and the outer lights of the great windows and triforia had to be filled in. After all, the idea was practicable, and failed only through faulty workmanship, for the south transept has been quite recently rebuilt, and the original design has been executed in its entirety with perfect success by the talented architect employed (and recently deceased) Senor Don Juan de Madrazo. In England there was a more sober spirit in design, and our Decorated buildings always show an ample and satisfying reserve of strength, although we could sometimes wish that their architects had not felt so fettered by the proportions of their predecessors' work. The duration of the style was from the reign of Henry III. till about the end of Edward III., about a hundred years, but the period of the advent and abandonment of the style differed greatly in various parts of the country. In the far north of England the style was still improving and getting almost to perfection, while in the south and west, as at Winchester and Gloucester, the fashion had changed into a more mechanical, but, when well carried out, a truly magnificent style, peculiar to England and English architects. There was not, as a rule, any essential difference between the ground-plan of a Decorated and of an Early English building until the style grew Late, when more spaciousness was aimed at; the piers then became smaller and were placed at wider intervals apart, as in the nave of York Minster, Holy Trinity Church, Hull, Boston Church, or that of Austin Friars. After Norman times the English planned square east ends to their churches, but occasionally an apsidal form is found, as at Lichfield and Wells cathedrals, Bayham and Tewkesbury abbeys, and the Templars' church at Little Maplestead, Essex. There was at this period a general rebuilding of Lady-chapels on a grander scale than formerly, and an enlargement of the space reserved for local shrines. At Lichfield, the great shrine of St. Chad stood between the high-alta and the Lady-chapel, leaving the procession path between St. Chad's altar and the rood-screen of the Lady-chapel to form a retrochoir, as in the earlier examples at Westminster and Ely. At Hereford, the Cantilupe shrine was placed in an unusual position, in the north transept, which had been re-erected for its reception. At Chichester, the shrine of St. Richard seems to have been placed in the south transept. At Ely, the new Lady-chapel was built at the north-east angle of the north transept, a passage joining it to the choir-aisle. At Lincoln, Wells, Exeter, York, St. Alban's, and Carlisle, the Lady-chapel was an eastern extension, leaving a retrochoir or space between it and the choir for the saint's shrine. In some collegiate churches, such as that at Higham Ferrars, the Lady-chapel was built on the north side, as also at Osney and Wymondham Abbeys.

France changed its Early Pointed architecture into Geometrical, and then into the Later Decorated style; the choir and transepts of Le Mans Cathedral date from 1217 to 1254; the choir of Amiens was consecrated in 1244, and completed 1288; that of Beauvais was built in 1225-70, and rebuilt and repaired in 1324. In 1245-57, the Sainte Chapelle in Paris was built. All these buildings are earlier in development than buildings corresponding with them, of the Geometrical style in England. Doubtless, the English work, especially in the Early Decorated period, was influenced by the close connection which then existed between England and the northern and western provinces of France; and, on the other hand, the reflex influence of English Early Decorated on French work is remarkably evident in Brittany. In later times the English style advanced into the magnificent works of the Perpendicular period, while the French lost itself in the debasement of florid Flamboyant.

Mouldings of the Decorated period became bolder in proportions, and softer in outlines, than the Early Pointed ones; chamfers became hollows, and sharp lines of shadow were modulated by joining the moulding to its fillet by an ogee, or by turning the fillet itself into a small rounded projection. Yet, while the mouldings gained somewhat in breadth of effect, they lost in sharpness and clearness. The bases much deteriorated from those of Early Pointed date, which had been founded on the old Classic traditions, and the shaded hollow between the two filleted roll mouldings was often replaced by another roll moulding—a most inferior treatment. The use of detached shafts in piers became almost obsolete, though in the "Angel choir" of Lincoln Cathedral, and in the noble chancel arcade of Winchelsea Church, we find them combined with clustered and quatrefoil piers respectively; in Edward the First's work at Westminster Abbey there are detached shafts for four out of the eight surrounding the great piers, the other four being engaged in the pier itself. There was often a monotonous sameness in the size and planning of the clustered piers. In small churches the simple clustered column, quatrefoil-shaped on plan, became a favourite treatment, giving the light and elegant effect of a group of four shafts with the strength of a solid pier. Vaulting became more elaborated by the addition of intermediate ribs and ridge ribs as at Westminster and Exeter, and in later days by the further addition of lierne ribs. The mouldings of windows were elaborated and subdivided, the early shafted mullions gradually changing in character till the shafts became identical with the tracery mouldings, though they frequently retained their carved capitals and bases; the subdivisions of the mullion mouldings are beautifully managed, and are most effective in leading the eye to appreciate the principle of design in even the most elaborate flowing tracery. Of tracery, there are very many varieties, each peculiar to certain districts. In Northamptonshire and Leicestershire a common type is the two, three, or four-light windows with simple chamfered or hollowed mullions, from each of which starts a curve identical with the window arch; these constantly intersect each other and each of the spaces is filled with very delicate Geometrical soffit cusping, forming a charming type of window. Another type is more common, of which there are fine examples in the aisle windows of Chichester and Lichfield — a three-light window, the lights with a simple pointed arch and three circles over, cusped with soffit cusping. The same treatment is found in windows of more lights than three. Many of these, and of the intersecting windows, have suffered from wanton injury by country glaziers; the delicate cuspings have been cut out, leaving only the larger mouldings of the circles, or the intersecting tracery. It has been stated that these empty circles are types of the growth of tracery; but the author much doubts it, for in almost every example of the kind which he has examined, it is clear that soffit cusped tracery once existed, but has been cut out. Another charming type of window is that known as the "Reticulated." Elaborate as it appears in effect, it is simply composed of a repetition of circles ogeed into each other so as to produce the "net-like" aspect giving it its name. In Kent and in some parts of Sussex, a beautiful and peculiar type of tracery is found, of which it is not easy to explain severally the peculiarities; examples exist in the choir of Winchelsea Church, in Anselm's Chapel at Canterbury Cathedral, in Chartham Church, and in the great cloister opening at Westminster, opposite to the grand entrance to the Chapter-house. Many examples of flowing tracery are to be found in Kent and Sussex, as at Hawkhurst and Etchingham. Traceried windows are often found in this period with flat or but slightly carved heads. In Northamptonshire, as at Ringstead Church, types of flowing tracery are found, but it is, perhaps, in the large and costly churches of Lincolnshire that this style developed in its greatest beauty. The carving of this period differed altogether from that of the earlier style, inasmuch as it departed from a conventional treatment, and changed to a natural representation of foliage and flowers. The change was not altogether for the better, exquisite and beautiful as the execution of the work often is. Early examples of this kind of carving are to be seen in the arches of the doorways of Lichfield and Lincoln, beautiful alike in workmanship and design. Later, however, the effect of the carving became weaker, outline

being less thought of than richness of execution. A form of decorating the hollows of mouldings, as in windows at Gloucester and Leominster, was by means of so-called "ball-flowers," small round balls opening and budding in the centre, placed at regular intervals. In Lincolnshire and elsewhere we find rich square bosses of foliage placed at intervals on the mouldings, and smaller ones in the hollows, both of arches and jambs. Crockets were very bold and undulatory in outline, frequently joined to each other by continuous foliage up the angles of the pinnacles or gables. Richly diapered-work is found on the screens at Canterbury, Westminster, Lichfield, Beverley, and Winchelsea. The best figure-sculpture is that at Lincoln in the beautiful series of angels in the spandrels of the triforium of the choir of St. Hugh. These rank among the highest works of English art. There is very fine figure sculpture in the doorway of this Angel choir, and on some of its buttresses, and also on the western screen of Exeter Cathedral, where the figures represent the Old and New Testament saints, and the kings of England from Saxon and Danish times up to Edward III., in whose time they were executed. These figures are bold and characteristic in attitude and treatment. At Lincoln Cathedral and at Heckington Church there are magnificent "Easter sepulchres." That of the latter is remarkable for the excellence of its sculpture, representing the risen Lord with angels, and a row of sleeping soldiers below. The sedilia at Heckington, Winchelsea, and Dorchester are of beautiful detail. There are fine reredoses in the Lady-chapels of Exeter and Wells, and remains of a superb one in that of Ely Cathedral. Excellent examples of tombs are those of Edmund Crouchback and Aylmer de Valence in the choir of Westminster Abbey. These have recumbent effigies on an altar-tomb, with statuettes on each side, and over it an arched canopy and gable, flanked by pinnacles, and originally with figures on the brackets of the gables. These are executed in oak, and were originally painted and gilded, but the design was a favourite one to be carried out in stone. Woodwork of this period is found in the rich stalls of Winchester, Ely, and Chichester cathedrals, and at King's Lynn; the extreme delicacy and beauty of the mouldings, carving, and details is characteristic of the period. Till comparatively recently there was some good stall-work at Wells. Good examples of high-pitched roofs of this period are those of Winchelsea and Penshurst, St. Martin's, Leicester, the transepts of Ely, till late years the roof wantonly removed from the guesten-hall at Worcester, and at St. Etheldreda's Chapel. Often the roofs were low in pitch, especially in Lincolnshire and Northamptonshire, with tie-beams and curved braces under them simply moulded. Frequently the roofs of churches ran through at one level for both chancel and nave, sometimes without chancel-arches. Clerestories are often found in the finer churches, but they did not become so general as in the next period. The best steeples are found in Lincolnshire and Northamptonshire; the spires are frequently set inside a parapet with rich cornices and corbelling under, and having angle pinnacles supporting quasi-flying buttresses to the spire; the spire lights are multiplied, and are often arranged on all eight sides of the space alternately. The author having described the leading characteristics of the style, proceeded to trace and criticise the work of the Decorated period in the chief buildings of the country, giving full particulars as to Merton College, Oxford, most of the cathedrals, especially Chichester, the octagon at Ely, and the west front and Lady-chapel of Lichfield, Westminster and St. Alban's Abbeys, and the Sainte Chapelle at Paris. The members will soon have an opportunity of examining a beautiful example of the style in the St. Etheldreda's Chapel, Ely-place, Holborn. They will see that it has the same defect as Merton College of extreme lowness in the window-sills, and that the exterior of the east end has not had its clustered angle pinnacles and buttresses restored nor the central buttress under the window; it has thereby lost much of its former effect, nor does it gain in appearance by the modern doorway and window of the crypt; but we may congratulate ourselves on the care with which the internal restoration has been carried out.

In concluding this paper, the arts of painting and stained glass of the period must be briefly touched upon. Almost every example of painting has perished, but there is ample evidence to prove that English painters had at this period attained to a very high position in their art. The wooden tombs and canopies at Westminster Abbey were once painted, so was the stallwork of Chichester and Ely, and the groining of the lantern of the latter cathedral. We possess most clear records about the work at Westminster in the "Painted Chamber," and in St. Stephen's Chapel, both destroyed by fire in 1834. In the former building, a Norman structure, the walls were painted by order of Henry III., by Otto, and Master William, a monk of Westminster, and Peter de Hispania, followed by Master Walter de Durham. These paintings were continued in the reign of Edward I., and the subjects were painted more or less three times, the gilding especially being renewed. The subjects were carefully examined by Mr. Stothard, who has left records of them; they represented scenes from the Old Testament and the Apocrypha, together with the coronation of the Confessor, and King Offa, and female figures representing the Virtues triumphing over the Vices. All the figures were represented in the costumes of their own day, and were executed in distemper on a blue ground, and coated with an oily varnish. The paintings in St. Stephen's Chapel were of the time of Edward III., and the records that are preserved of them by John Carter and Smirke's drawings show that they were of the very highest order. The whole of the stonework was painted, the grey marble bench table all round being alone retained in its natural colour. Apple-green, blue, and red were indifferently used for hollows and projecting mouldings, fillets were gilded, and the chief moulding covered with embossed gilded patterns, and on the columns and coloured mouldings were laid raised paterae, formed in stucco gilded. At the east and on the north side of the altar were represented Edward III., the Black Prince, and his royal brothers, all richly-clad, and gazing upwards at a great picture above of the Adoration of the Magi; on the south side was Queen Philippa and the princesses, and above them other pictures of the Presentation in the Temple and the Nativity. Over the royal party was a rich arcading, painted in red on gold, with an architectural background painted on gold and silver. Along the sides of the chapel were painted angels holding drapery, and above the windows scenes from the lives of Job and Tobit. It will ever be a subject for keen regret that such glorious works of art no longer exist, and a debt of gratitude is due to those who copied them so far back as 1729.

As to the stained glass, it will be remembered how Mr. G. E. Street, in his lecture last year on "Thirteenth-Century Architecture," described the stained-glass of that period, and how it was continuously and gradually changing from the deep rich-coloured mosaic of the twelfth century, and becoming lighter in tone, owing to the introduction of white glass and grisaille work. This process continued through the Decorated period, even though the small windows gave place to large ones, occupying almost all the wall-space. In the earlier work the walls and their decorations were kept light in tone, often by means of red lines and patterns on a cream-coloured ground, while the windows were rich and dark in colour. The Decorated artists gave dark rich colours of red, green, and gold, to their walls and architecture, and as much lightness in tone as possible to their glass. The so-called "white" glass of this period was really of a light sea-green tint, blending most happily with richer tones of colour. Glass was not now so thick as in Early English work. "Pot-metal" glass (a yellow glass of one colour throughout the whole thickness) was replaced by glass with a yellow stain of a lemon tint; and this was largely used for the architectural features of canopy-work, and also in the simpler quarry patterns on a white ground. Patterns were very natural in their treatment of foliage and animals. Sometimes the only rich colour introduced was in a shield of arms in each light; sometimes belts of pictures in rich colours were introduced in two tiers, with colours in the tracery. Towards the middle of the style, figures and lofty canopies over them were introduced, often with small pictures under, as in the great west window of York Minster; in this window the peculiar line of the "white" glass and the yellow stain of the canopy work is very remarkable. One of the finest windows of this later period is the eastern one of Gloucester Cathedral. In this there is still an angular and somewhat rigid drawing of the figures with broad and flowing draperies, and a great quantity of white glass is employed. The colours used in glass of this period are lighter in tone than in the earlier work, the shading is effected by "smearing," and white glass is more used for flesh tones than the early flesh-coloured glass. In the east window of Wells Cathedral there is very beautiful glass, light in tone, and also in the east window of Bristol Cathedral. The documents relating to the original glass at Exeter Cathedral are all preserved. They give precise instructions as to the relative quantities of white and coloured glass to be used, in about the proportions of five to one respectively.

And now, although there is so very much that might be said on so many of the details of the Decorated style, and on so many of its buildings, on its cathedrals, its abbeys, and its parish-churches, I must break off. I have not been able even to allude to the domestic work of the period, nor to the magnificent castles erected by Edward I. I have sought to give a brief outline of the characteristics of the style, and to mention to some extent where these may be seen, so that, when you travel about England you may know where the most remarkable ecclesiastical works of the Decorated period are, and the reasons why they are remarkable and worthy of your most careful study.

ST. MARY OVERIE'S CHURCH.

THE double church now known as St. Saviour's London-bridge, Southwark, the eastern portion of which is a fragment of the priory church of St. Mary Overie, formed the subject of Saturday afternoon's "visit" by the members of St. Paul's Ecclesiological Society. Mr. F. T. Dollman, who has for many years made a study of the church, acted as conductor to the very numerous party, and showed in the retrochoir or Lady-chapel a series of elevations and sections of an ideal restoration of the priory church as it existed in the fifteenth century, founded on numerous engravings from the date of Hollar to the present time, and on the portions of the original fabric which remain. In our issue for July 11, 1879 (p. 51, Vol. XXXVII.) we reported Mr. Dollman's description of the church, and paper read before the London and Middlesex Archæological Society in the previous week, and as the Saturday's address was necessarily based on the same lines, we can merely indicate the leading features, and refer those interested in the building to that issue, and also to an article entitled "A Cathedral for Southwark," published in the BUILDING NEWS for Nov. 22, 1878. Mr. Dollman's restored perspective of the former nave of this church was published in our issue for June 15, 1877, and measured sectional drawings of the choir (for which the Academy silver medal for 1877 was awarded to Mr. G. E. S. Langford), on Jan. 25 and March 8, 1878. The Mediæval church still left consists of transepts each two bays in depth; choir of four bays, with aisles, and a retrochoir, or Lady-chapel, divided by two clustered piers into four aisles, of Late Thirteenth-century character. To this is annexed, on a higher level, and quite shut off by a glazed screen, a modern nave, erected in the worst period of Early Revived "Gothic," with plaster vault carried on wiry iron columns, plain wooden gallery on three sides, supported on iron trusses painted dark green, and cutting through the aisle windows, and an organ-case hides the impoverished lancets at the west end, while carvings from Salisbury are reproduced in papier mâche in altar-rail and the eastern gallery. The high box pews and lime-washed walls complete an instructive contrast to the genuine Gothic of the eastern limbs, wherein the charm of fine proportions and beautiful, if simple, details has not been obliterated by neglect and injudicious restoration. Very few traces of the old nave remain, and all the eastern part is subsequent to the rebuilding by Peter de Rupibus, Bishop of Winchester in 1212. The exterior is almost entirely the work of C. E. Gwilt, and the church was conscientiously restored by him forty years ago. The work seems, as Mr. Dollman pointed out, to have progressed from west to east and from north to south, for the old nave (unroofed by the parishioners so lately as 1831,

and demolished in 1839) was of plainer and ruder work than that remaining. At the end of the north aisle the junctions of the Thirteenth-century mouldings of this aisle with those of the Fourteenth century in the north transept are very apparent, as are also at the crossing the lines of the central belfry and tower added by Bishop Fox. The north transept was restored by Gwilt forty years ago, from motives of economy, externally in Bath stone and in Roman cement within; the stone is disintegrating from exposure, and the cement is everywhere cracked and beginning to peel. Mr. Dollman remarked that in a parsimonious manner, upwards of £60,000 has been expended on the church during the present century, a sufficient sum, if the work had been carried out in sections, to have satisfactorily repaired the whole fabric. In the choir, the massive cylindrical piers with engaged shafts and richly-moulded arches, the triforium arcading and lofty lancets of clerestory, and quadripartite groined vaulting, well repay study. Here it is curious to note the deviations between the north and south arcades; probably in order to cut down the cost, the dogtoothing has been omitted on the south from the clerestory mouldings, and the hoods are corbelled out instead of being carried down; the general, although slight, irregularity of spacing or setting-out and of details is very remarkable. At the east end of choir is the elaborate 15th-century panelled reredos, closely resembling those at Winchester and St. Alban's Cathedrals, Christ Church Priory, and All Souls' College, Oxford. This was discovered by Gwilt concealed behind a reredos of Wren's, and was further restored by Wallace. In the retro-choir Mr. Gwilt has left a careful copy of 13th-century work in the eastern wall, built since the removal of the Bishop's Chapel in 1831-2. We noticed that the second triplet from the north in this wall has just been filled with stained glass, representing John the Baptist as the Forerunner, Christ's Sermon on the Mount, and Paul at Athens, in memory of the Rev. Wm. Curling, for 45 years chaplain of the parish. In this retrochoir, after conducting the visitors over the church, Mr. Dollman read some historical notes, in which he traced the priory from its second foundation in 1106 to its culmination in 1540, when the church was made parochial, and the long series of demolitions and desecrations, with partial rebuildings, which have subsequently marked the history of the building. An earnest hope was expressed by the lecturer and others that the present nave may be removed to give place to one more in harmony with the mutilated, but still exquisitely beautiful, eastern church.

THE LARGEST CONCRETE TANK IN ENGLAND.

THE students of the Institution of Civil Engineers visited, on Friday afternoon, the South Metropolitan Gas-Works, adjoining the Surrey Canal, Old Kent-road, S.E. They were received by Mr. George Livesey, M.I.C.E., the engineer and secretary, who explained that the works themselves were forty years old, and contained few features more recent than fifteen years ago, except a series of large gas-tanks and holders, in which the company was trying to solve the problem of erecting, at a reasonable outlay, capacious gasometers that should be water and gas-tight, on a low, marshy site, of very unfavourable character for securing stability of foundation. Having shown the process of gasmaking, from the reception and mixing of kinds of coal, the stoking of the retorts, to the cleaning of the gas through lime, bog-oxide and water, and in purifiers, washers, and scrubbers, Mr. Livesey led the way to the gasometers, which stand in line on the company's works in the order of time at which they were erected, as well as in size. The chief improvement has been in the construction of the tank. The soil of the company's works, after a few feet of loam and a layer of gravel, is a fine running greensand, shifting in position, if wet, at every disturbance of the bed; at the depth of about 45ft. this is succeeded by a 6in. layer of flints, and that again by chalk deposits of unknown thickness, pierced with numerous springs. The difficulty encountered was that as each fresh excavation for a tank was made the sand "ran" or "blowed," endangering those already built, and in some cases occasioning troublesome cracks and leaks, which had to be remedied. The first tank of the series was constructed in 1866, and is 127ft. 6in. internal diameter, and is embedded 35ft. 6in. below the surface. It was built in brickwork, surrounded by clay puddling to ground-level, in order to render the sides impervious, and in the centre a cone of puddle was erected as a support to the roof of gas-holder. The next tank, formed in 1871-2, was 152ft. 6in. diameter and 38ft. 6in. deep. It was of "composite" character, of brick and concrete. The excavation was lined with 9in. brickwork, with a 14in. course of bricks at every 2ft. to serve as a keying for the concrete backing, varying from 42in. at bottom to 18in. Hoop-iron was introduced as bond about every 5ft. At the foot was a course of stone, which was also used for piers and for the centre of central cone, and, as before, clay puddle was filled in as a backing. The third tank, built in 1875-6, was 184ft. diameter by 47ft. deep, and in this the puddling and brickwork was replaced by concrete and cement rendering. The outer gas-holder was 180ft. across by 45ft., and the inner one 177ft. by 45ft. 3in., and this had a roof of iron supported on timber-work and iron struts resting on a brick cone. This tank stood perfectly for a time, but, after being filled, five small cracks developed, and were now being repaired. The brickwork skin to the earlier tanks was adopted to save trouble in giving a true face to the work; but Mr. Livesey said he was satisfied it was needless as well as costly, and the present tank, like the last, is being constructed entirely in concrete, and when completed will be the largest of its kind. The dimensions as now being executed are 218ft. diameter and 55ft. 6in. in depth. The contractors for this tank are Messrs. T. Docwra and Son, of Balls'-pond, N., who also built the previous tanks, and their contract, taken at £26,500, will be completed in about a month's time, and has now been in progress for twelve months, from Mr. Livesey's designs and under his superintendence. The contract for the iron gas-holder is in the hands of Messrs. Ashmore and Wiles, of Stockton-on-Tees, and will be commenced as soon as the tank is finished. Messrs. Docwra's manager is Mr. C. W. Robinson, who supplemented Mr. Livesey's explanations to the students, and conducted the party into the new tank. In excavating the site great difficulties were occasioned by the influx of water, not alone from the sub-soil, but also from springs in the chalk; and a "sump" has been formed to which the water is drawn from under the tank, and is pumped at the average rate of 1,800 gals. per minute into the sewers. The drainage holes in the tank are rendered round in cement, and will be caulked up when the work is complete. Three hundred navvies, 14 engines of from 6 to 25 h.p., three locomotives, and six steam-cranes are employed on the works, besides two steam-pumps. Three 18in. and three 15½in. pumps are at work, capable of throwing 3,000 gals. per minute, and at the lowest excavations they were in full use. Only one horse has been in use during the work. The concrete used is composed of 7 parts of ballast, mixed with broken retorts and clinkers from the gas-works, to 1 of Portland cement. The walls vary in thickness from 3ft. at surface to 5ft., the lowest portion being only 4ft. 6in. thick. At intervals of every 3 or 4ft., this is strengthened by iron bands, 3½in. wide by ½in. thick, set edgeways in double row, and the face is rendered to a true surface in ¾in. pure cement. This wall has been built by the ordinary boarding by day labour, no special apparatus being employed. The concrete is mixed in the tank, care being taken by cleaning off the surface before laying another course to secure homogeneity in the work. This wall is backed up by the green sand found *in situ*, which, when kept dry, forms a solid and water-tight packing. The great central cone for the support of the roof, the cylinder upon it, 20ft. high, and 2ft. thick, and the base platform between the tank wall and this cone, are also of concrete, no puddle, brick, or stone, being introduced, even for the heaviest work. Mr. Robinson mentioned that 13,000 14ft. deals, as timbers, and 3,000 struts, of an average length of 15ft., had been used in support of the concrete walling. This work, as we have before intimated, is approaching completion, the cement-rendering being in progress over a great portion of the wall. The holder to be placed within and upon this concrete substructure will be in three lifts, rising when full to a height of nearly 160ft. above the surrounding streets. The holder of 1872 at these works was constructed of ⅛in. plates with occasional ribs of 3-16in. metal; the extra thickness, instead of increasing the stability, was found to occasion unequal expansion and a slight "buckling," and the present holder will be throughout of ⅛in. iron plates. The roof, which is supported by the gas when the holder is charged, will rest, when the vessel is empty, upon a timber frame not unlike the ribs of an umbrella, with simple struts between the beams. The usual cup and grip and water-joints will be adopted to render the tank and holder gas-tight. The total capacity of the new holder will be 5,678,000 cubic feet of gas, and the cost of tank and holder, including the necessary mains and connections, will exceed £50,000.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE Annual General Meeting of the Institute was held on Monday evening. Mr. J. Whichcord, the president, occupied the chair, and, in the course of the evening, referred to the death of Mr. Hesketh.

The Annual Report of the Council (of which we gave a summary a fortnight since, p. 482), having been taken as read, the President moved that it be received and adopted. The motion having been seconded by Professor Lewis, a discussion ensued, in which Messrs. Wyatt Papworth, R. Kerr, J. Jennings, W. White, C. Barry, J. Edmeston, H. Dawson, Chatfeild Clarke, and others, took part. An amendment, moved by Professor Kerr, and seconded by Mr. Woodthorpe, that the words "and adopted" be omitted, having been put, was negatived, and the original motion was carried. The following gentlemen were elected to the various offices for the year terminating on the first Monday in May, 1881:—President, John Whichcord, F.S.A.; Vice-Presidents: T. Hayter Lewis, F.S.A., Horace Jones, and Ewan Christian. Members of Council: J. Macvicar Anderson, A. W. Blomfield, M.A., David Brandon, F.S.A., A. Cates, Joseph Clarke, F.S.A., H. Currey, John Gibson, O. Hansard, J. Honeyman (Glasgow), Edward I'Anson, F.G.S., J. T. Knowles, J. Loughborough Pearson, A.R.A., F.S.A., Geo. Vulliamy, A. Waterhouse, A.R.A., and Thos. Worthington (Manchester). Hon. Sec., T. H. Wyatt, F.S.A., and Secretary, W. H. White. The treasurer and solicitor were re-appointed, and T. Roger Smith and John Hebb were appointed auditors. The following gentlemen were elected to serve on the Board of Examiners (appointed under the Metropolitan Building Act) for 1880-81:—G. Aitchison, B.A., T. Blashill, F. Chambers, C. Fowler, E. I'Anson, F.G.S., J. Jennings, R. Kerr, J. T. Knowles, J. Douglass Mathews, H. Parsons, F. W. Porter, T. Roger Smith, and Sancton Wood.

THE LATE MR. HESKETH.

WE regret to record the death of Mr. Robert Hesketh, of Sherborne-lane, E.C., which occurred, from dysentery, on the 25th ult. Mr Hesketh, who was 63 years of age at the time of his death, first studied under Pugin, and was subsequently an architectural pupil in the office of the elder Hardwick. When his articles had expired, he joined Sir Chas. Fellowes in his travels, visiting Rome, where he wintered, and Smyrna, and thence journeying through Asia Minor. In 1840, he returned, and commenced practice as architect on his own account. Two years later, he was elected district surveyor for Bermondsey, by the magistrates of Surrey, and on the formation of the Metropolitan Board of Works, in 1855, the appointment was confirmed, and has been held by Mr. Hesketh till his death. In 1868, he became surveyor to the Goldsmiths' Company, which he also retained till now, and amongst the important works carried out for that body may be noticed the renovation of the Company's Hall, and its decoration with marble mosaics, effected by Messrs. Burke, under his superintendence, in 1872-3, and the erection of a new church at Acton, which has only just been completed. In 1869, he was appointed surveyor to the Portman Estate, but resigned the post three or four years afterwards. As a district surveyor, Mr. Hesketh made himself a name in connection with light and air cases, and was very frequently appointed as a reference in complicated cases of this kind.

Amongst his principal works as an architect, may be mentioned church-restorations at Hampstead, Stoke d'Aberon, Hetheringsett, Chessington, and St. John's, Redhill; new schools at Milford-lane, St. Clement Danes almhouses, the Homeless Poor Asylum, in Banner-street, mansions in Berkeley-street, and many private residences in the country. He had been a Fellow of the Royal Institute of British Architects since 1849, and some years since served on the Council of that body. For the vacancy in the district-surveyorship of Bermondsey (which will be filled by the Metropolitan Board of Works on Friday in next week), and also for that in the surveyorship to the Goldsmiths' Company, we may mention that his son, Mr. R. L. Hesketh, of the firm of Ford and Hesketh, is a candidate.

COMPETITIONS.

Peterborough.—The award in the competition for plans for villas, invited by the Peterborough Land Co., will be found advertised in another column. Mr. Browning, F.R.I.B.A., was the referee. The successful competitors are, 1. Mr. F. J. Ward; 2. Mr. Hampden Pratt; 3. Messrs. Hambridge and Sedger; 4. Mr. Patrick Auld.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Leeds Architectural Association.—At the meeting held on Thursday week last the officers for the ensuing session were elected, the President being Mr Henry Walker, F.R.I.B.A., and the Vice-Presidents, Mr. Stephen E. Smith, A.R.I.B.A., and Mr. Thomas Ambler. A paper, entitled "An Architectural Ramble on the Continent," was read by Mr. John Tweedale.

Building Intelligence.

Arnold, near Nottingham.—The School Board have enlarged the British Schools by the addition of another story, which has increased the accommodation by 202 scholars on the 10ft. basis. The mixed schoolroom is 61ft. 3in. by 20ft.; there are two class-rooms, each 20ft. by 20ft.; spacious stone staircases are provided for boys and girls; the new schools are 13ft. high to wall-plate, and 18ft. to collar-beam. The old rooms had to be raised 4ft. high before floor was put on; the whole of the works have been executed by Messrs. Smith and Greaves, of Arnold, at a cost of £1,070, from the designs and under the superintendence of Mr. Robert C. Clarke, Journal Chambers, Nottingham.

Bromley.—A new church, situated in Park-street, New Bromley, Kent, will shortly be opened. The building materials are Kentish rag and Bath-stone dressings, with red tile roof; inside red bricks with Bath-stone dressing; walls covered with plaster. There are eight brick columns with carved capitals; the nave and chancel are 172ft. long by 28ft. wide; aisles are 11ft. wide. The floor is herring-bone pattern deal in cement. The font was presented by Lady Hey, of Bromley, and was carved and supplied by B.de Sziemanowicz, of Westminster, who has also done the carving at the church. Mr. T. Crossley, of Bromley, is the builder. The whole is from the designs of Mr. G. Truefitt, architect, of Bloomsbury-square. Mr. Dickens is the clerk of works.

Dartington.—A new church has just been completed at Dartington, near Totnes, from the designs of Mr. J. L. Pearson A.R.A. The contractor was Mr. Jonathan Marshall, of Plymouth, and the cost £12,000. The style is Perpendicular, and the building consists of a nave, north and south aisles, chancel, vestries, south-west porch, and western tower, 82ft. in height. The materials used are limestone from Shinner's Bridge for the walls generally, and Box-ground stone for the dressings. The old granite battlements of the previous building have been preserved, and now stand in similar positions on the north and south aisles: a continuation, but more ornate, is carried around the chancel in freestone. The blue slates with which the church is covered are also old, and they are surmounted by a red crease. Two octagonal turrets, surmounted by crocketed spirelets, stand at the eastern end of either aisle. The south-west porch is groined with the old groining. There is a deal of stone carving upon the edifice, particularly upon its exterior, and this, together with the fine sculpture, is the work of Mr. Harry Hems, of Exeter. The church is built to seat 280. The clerk of works was Mr. James Babb, of London, who leaves Dartington immediately to undertake the duty of clerk of the works of the new Cathedral of Truro, the erection of which is to be forthwith commenced.

Long Ditton.—The new parish-church of St. Mary's, Long Ditton, Surrey, was recently consecrated. The building has been erected from the designs of Mr. G. E. Street, R.A. It consists of a nave, two aisles, chancel, organ-chamber, and vestry, and will seat 450 persons. It is built of Bargate stone from Godalming, with Bath-stone dressings. The whole cost, including fittings, warming, and lighting will be about £6,400, of which nearly £500 remains to be collected. There are three stained-glass windows, one at the east end and two in the south aisle, which are memorial gifts.

Pinner.— The parish-church of St. John the Baptist, Pinner, was reopened on the 17th ult. after restoration under the direction of Mr. J. L. Pearson, A.R.A. The contractors were Messrs. Wall and Hook, of Brimscombe, Stroud. The lath-and-plaster ceilings have been taken down, the old roofs removed, and new roofs, in pitch pine, have been put to nave and chancel. The north transept roof has been reconstructed of old sound rafters from the nave and chancel roof: the roof of the south transept remains pretty much in its former condition. The roofs of the aisles have been covered with new boarding, and the oak wall plates made good where required. All the roofs are covered with boarding, and then with a thick layer of felt. The tiles on the nave roof are new, but upon the chancel and transept roofs the old tiles are re-used. The aisle-roofs are covered with new lead. The architect has preserved the character of the old nave-roof, and has placed two dormer windows on each side in carved oak. The tie-beams have also been renewed in pitch-pine. Both nave and chancel-roofs are now of the same height and pitch. The organ and organ-gallery have been removed, and the west window and tower-arch are thrown open to view. Various alterations and additions have been made to the south chancel-aisle. A new vestry has been built, in flint and stone, to correspond with the rest of the church. An outside doorway has been added. The east window has been taken down and rebuilt, and is now surmounted with a new stone gable and a cross. The tower has been thoroughly restored and rebuilt, and the roof stripped and retiled. The south porch is nearly rebuilt in Bath stone and flint, with new lead roof. The doorways and windows throughout the church are for the most part rebuilt in Bath stone. The boards and joists below the seats have been removed, and wood block flooring substituted, and the old seats have been replaced, but with a few alterations in position.

Plymouth. — The foundation-stone of St. Peter's Church, Plymouth, was laid on the 1st of April by the Earl of Devon. The new building will stand on the same site as the present building. The whole of the old building, with the exception of the sanctuary and vestries, will be demolished, and it has been a matter of no small difficulty to make the portions retained harmonise and group well with the new building. The sanctuary was built some thirty years ago from designs by Mr. G. E. Street, R.A. The designs for the new church have been prepared by, and are now being carried out under the supervision of, Mr. Geo. H. Fellowes Prynne, architect, of 11, Adams-street, Strand, W.C. The building was commenced last year by Mr. Finch, builder, of Plymouth, but is now being carried out by Mr. Alfred Guy, builder, of London.

Preston.—St. Wilfrid's Church, Preston, Lancashire, originally built in 1797, has been reconstructed and considerably enlarged, and was recently reopened. In the reconstruction the outer walls of the old edifice, which were very thick and in sound condition, were retained; otherwise it has been entirely rebuilt. It now consists of a nave and sanctuary, with aisles on either side, terminated by side chapels, and an additional aisle one side, 20ft. wide, terminated by the chapels of the Blessed Virgin and St. Joseph. The baptistery is at the side of this aisle, as well as the confessionals; over it is a large chapel, with fireproof floor, for the use of the guilds or confraternities, approached by a wide stone staircase, which also gives access to the organ-gallery. The nave is divided from the aisles by a range of Corinthian columns, having polished Shap granite shafts, marble bases, and carved stone capitals, carrying the entablature, and a clerestory and vaulted ceiling; the sanctuary is terminated by an apse, and has also two large semicircular recesses, inclosed by marble screens with sculpture. The aisles are terminated by chapels, richly adorned with marble work, sculpture, and paintings, and dedicated in honour of the Holy Ghost and of the Sacred Heart. The general contract has been fulfilled by Mr. John Walmsley, of Theatre-street, Preston, Mr. Swarbrick acting as foreman. The chapel of St. Joseph, an interesting portion of the old edifice, has been preserved; it was designed by the late Mr. J. J. Scoles, the father of one of the architects of the new building, and the master in art of both. The high altar and Lady-chapel have been designed by the Rev. J. Scoles, S.J., the chapels of the Holy Ghost and of the Sacred Heart of Jesus by Mr. S. J. Nicholl, the joint architects for the entire building being the Rev. J. Scoles and Mr. S. J. Nicholl, of 1, Caversham-road, London.

Salford.—New public baths in Blackfriars-street, erected by the corporation of Salford, will be opened in a few days. The building, which is in the Queen Anne style, is of brick, with ornamental terra-cotta work, and has a frontage of 71ft. and extends 131ft. backwards. The large swimming-bath is 87ft. 6in. long and 37ft. broad, and the depth varies from 3ft. 6in. to 6ft. On the first floor of the men's department are eight first-class and 16 second-class porcelain slipper-baths. The women's department consists of a plunge-bath, 38ft. long by 23ft wide, the depth varying from 3ft. to 5ft.; twelve second-class slipper-baths on the ground-floor, and on the upper floor seven first-class slipper-baths. The plans, which have been prepared by the borough engineer (Mr. A. Jacob), have been carried out under his superintendence by Mr. John Wilkinson, of Pendleton. The cost has been about £7,000.

Taunton.—The foundation-stone of a new church was laid at Taunton last week. Plans were prepared by Mr. J. H. Spencer, and the building was intrusted to Mr. H. J. Spiller, both resident in Taunton. The church, which is in the style of the Decorated period, will consist of nave, with clerestory, chancel, north and south aisles, with tower and spire at the east end of the south aisle. There will be a vestry and south porch. The walls are to be of Monkton stone, faced with Westleigh stone, and having Doulting stone dressings, the walls being lined internally with brickwork in various colours. A square tower, containing one bell, will be surmounted by an octagonal spire, covered with pale-green Westmoreland slates. The height of the tower and spire will be 90ft. Including the aisles, the width of the nave is to be 40ft. and the length 73ft., while the total length of the church, taking in the chancel, will be 102ft. Accommodation will be provided for nearly 600 people.

Torquay.—A new residence is near completion at Cockington, Torquay, for Mr. S. Porter. The external walls are of wrought stone, from the estate, and the quoins from the red-stone quarries of Paignton; the stone dressing to entrance-door and windows, and oriel window is of Portland and Beer stone. The house contains on ground-floor, vestibule, large inner hall, extending to roof, breakfast, drawing, dining, and billiard-room; library, lavatories, w.c.'s, garden entrance, strong-room, butler's pantry, housekeeper's-room, still-room, servants' hall, kitchen, scullery, larders, dairy, and other offices, with extensive cellarage on the first and second floors, and bath-room, and numerous bed and dressing-rooms. Messrs. Doulton supplied the terra-cotta; Messrs. Geo. Jackson and Sons, the ventilated cornices: Mr. Harry Hems, executed the stone carving; Messrs. Maw and Co., tiling; Messrs. Benham and Sons, the ranges, steaming apparatus, bath, w.c.'s, dog-grates, and grates generally; Messrs. Howard and Sons, Berners-street, staircase-window, carved newels, parquet-flooring, chimney-pieces, tile-covings. The decorations are to be by the same firm. Messrs. Rowell and Son are the architects. The works have been under the immediate supervision

of Mr. Rouse, clerk of works, without the intervention of a contractor.

WAKEFIELD.—The remaining part of the Old Rectory in Wakefield, which for a number of years past has been used as a Lodge for the Freemasons, is now undergoing demolition, to give place for the new Freemason's Hall, to be erected on the same site. The new building will have a frontage to Zetland-street of 72ft. At the west end of the site will be the principal entrance, instruction, waiting-rooms, and other conveniences; the centre of the building will contain two rooms, each 33ft. by 21ft. by 14ft. high, the upper room for the Lodge meetings, and that on the ground-floor for the banqueting room; the eastern wing will be the caretaker's residence, of six rooms. The materials used will be best red pressed bricks, and Huddersfield stone for the front. The large rooms inside will all be plastered and have coved ceilings. Mr. William Watson, of Wakefield, is the architect employed, and the contracts for the various works have been taken by local contractors at under £1,300.

WICKEN, BUCKS.—A further addition has just been made to St. James's, Wicken, a church some three miles from Stony Stratford, in the shape of a new reredos. It is composed of well-seasoned English oak, standing upon a super-altar of polished Devon marble, and is of Gothic character. It consists, mainly, of a triple set of recessed compartments; the central one of these contains an ornate brass cross, whilst the panels on either side are painted groups of figures upon a gold ground. These decorations are by Messrs. Clayton and Bell, of London. The reredos has been made by Mr. Watson, builder, of Stony Stratford, and the carved work thereon is by Mr. Harry Hems, of Exeter. Mr. E. Swinfen-Harris, jun., of Stony Stratford, and Craven-street, Strand, W.C., is the architect by whom it was designed, commissioned by Lady Penryn, whose gift it is.

WOLVERHAMPTON.—A new building, designed for the accommodation of orphan girls, was recently opened at Wolverhampton. The elevations, which are simple Gothic, are faced externally with Kingswinford bricks, with stone and moulded brick dressings, and the roofs are of Broseley tiles. In order that the schoolroom may be supplied with a certain quantity of fresh air, Messrs. Shillito and Shorland's principle of ventilation has been adopted, viz., the passing of cold air through a pipe or pipes, which mixes with the warm air before passing into the room; so that air at any desired temperature is supplied, as the cold air is regulated from the exterior to the interior by means of a valve. Warm or cold air may be supplied at discretion; these pipes are fixed in the angles of rooms, close up against the jambs of chimney-breast. This arrangement insures most perfect ventilation, by the placing of air-pipes in the corners of the room which will insure thorough ventilation. The cost of the whole is about £2,500. The builders were Messrs. Cockerill, and the architects Messrs. Banks and Doubleday.

YEOVIL.—A Reformed Episcopal church has been opened at Yeovil. The plans prepared by Mr. Henry Hall, F.R.I.B.A., of 19, Doughty-street, Mecklenburgh-square, London, W.C., were selected from about 20 sets of designs submitted. The church will accommodate about 500 persons. It has a nave, with aisles and transepts, and chancel with polygonal apse, forming a cruciform building. There is also a vestry. The style is Early Decorated. From the intersection of the nave and transepts roofs, a timber spire or flèche rises 31ft. above the roof, and is finished with a weathercock of copper and gilt. The floor of the church is formed with the whole battens laid with joists on oak sleepers, and the chancel is paved with encaustic tiles. The nave is 74ft. by 19ft. 6in.; the aisles 44ft. by 11ft. 6in., and the transepts and chancel are each 18ft. by 19ft. 6in. The total height of the building is about 36ft. to the apex of the roof. The contractor was Mr. J. Lane, of Yeovil. The gas-fittings and church furniture were executed by Messrs. Jones and Willis, and the tiles by Messrs. Carter and Co., of Poole. The stone carving is by Mr H. Hems, of Exeter. The outlay has been about £3,630.

Some marbles discovered at Jerabulus have been acquired for the British Museum, and will shortly be sent to this country.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

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BETA. (It is of little use sending a sketch of the fireplace. The position of the grate with regard to doors and windows is probably of more importance. An Arnott's ventilator would probably be of little use, and, in total ignorance of external surroundings, it is difficult to advise.)—M. H. E. (Banister Fletcher's book, published by Spon and Co.)

DRAWINGS RECEIVED.—B. C., H. and C., S. W. R., Cardiff—these will be used. J. S., J. B., J. L.

"BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED.—Sub-Rosa, Edwin, Ap Adam, Merlin, Vis, Alfred, Gemshorn, Wasp, D'Ewes, B., Honey Dew, Con Amore, North, Toledo, Clansman, Sub Silentio, Binny, Boz, Burswell, Our Praises are Our Wages, No. 90, Pupil J., Heart and Arrow, Ernest, Attempt, Fleur-de-lis, Mot, Steffano, A. U. C. in triangle, F. W. in lozenge, Sagitta, Fogo. Press of matter obliges us to postpone our review of these designs.

Correspondence.

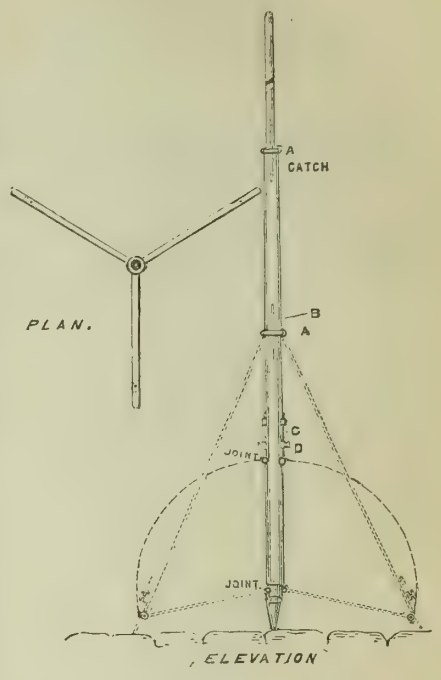
SELF-ERECTING SURVEY RANGING ROD.

To the Editor of the BUILDING NEWS.

SIR,—The difficulty in erecting ranging rods on stone-paved or macadamised surfaces, is often very vexatious to surveyors, necessitating, as it does, the loss of valuable time; sometimes the rods are shattered in driving them into almost impenetrable surfaces. This difficulty (mostly felt in town-surveying), is an increasing one, owing to the modern and excellent manner of paving, with setts bedded on concrete, and jointed with pitch and gravel.

It is often a source of annoyance to surveyors when ranging lines, to find that the positions most desirable for stations, are impossible owing to the impenetrable nature of the surfaces.

The arrangement shown in the sketch will entirely remove the difficulties enumerated.



The rods are of the ordinary form. The steel rods of support may be very light, say three-sixteenths inch square, three in number, set at an angle of 120 degs.

The arrangement does not practically alter the outline, or increase the weight of the rods.

Where the surface is penetrable, the rods can be erected in the ordinary manner.

To erect the poles, the ring A (to which the poles are loosely attached), must be lowered, by pressing the catch over the lower catch B; the three legs will then adjust themselves to the tripod form (shown by the dotted lines), in such a way as to allow the survey chain to be drawn immediately alongside.

Where the surface is very irregular, the rods can be erected perfectly plumb by fixing the lengthening bar C to any desired length, by the set-screw C.—I am, &c.,

Bolton, May 1, 1880. B. H. THWAITE.

THE LONDON WATER SUPPLY.

SIR,—Amongst the many remarkable statements made by Mr. Smith in his communications to the *Times* on the London Water Supply, the two following demand special notice:—

1st. "Capital has for many years become nothing to do with the subject. . . Under this transfer no provision of capital is required from the ratepayers, nor any increase of annual payment from anyone."

2nd. "Moreover, the Water Trust will at once obtain a disposable income of £130,000 a year, by *economies*, and *sale of land*, consequent upon consolidation of the companies' interests. . . Almost immediately further economies and sales of lands will increase this disposable income to £170,000 or £180,000 a year, and its disposable income will continue to increase ever after."

Even should these statements, on close examination, prove to be matter of fact, it is scarcely possible to see in what way they can affect the quality of the water, convert its unwholesomeness, or secure for the metropolis what it is most in want of, an abundance of softened spring water, perfectly pure, on the constant supply system, and at high pressure. It is worth while, however, to examine Mr. Smith's allegation, and novel plan of buying without money, and at even so low a price, and the vaunted "economies" to be effected thereby, and in the interest of the ratepayers of the metropolis.

It has been asserted again and again, that not a penny of capital is required to be provided by the ratepayers under the provisions of the "Metropolitan Water-Purchase Bill." This statement is quite at variance with Clause 21,

which says that at the expiration of twelve years the ratepayers will have to make provision for the purchase and extinction of the Consolidated Water Stock, bearing 3½ per cent. per annum interest, of the eight Water Companies. In 1893 this consolidated stock will amount to:—

Ordinary stock	£22,315,657
Deferred stock	9,280,000
Conversion of loans	3,600,000
	35,195,657

Upwards of thirty-five millions, then, besides a number of other comparatively insignificant amounts, must be paid off in 80 years. The same Clause, under the ominous title of "sinking fund," enacts that "at the expiration of twelve years from the passing of this Act, provision shall be made for the extinction of the consolidated water stock by means of a sinking fund, and shall lay aside such sum as in eighty years would enable the consolidated water stock to be extinguished." At the expiration of the twelve years the consolidated water stock would amount to 22½ millions paid down; 9½ millions paid during the twelve years; 3¼ millions preference stock in round numbers; total, 35 million pounds sterling.

One eightieth of the 35 millions amounts to £437,500, so that in the year 1893 the water consumers would have to pay—

1-80th of consolidated water stock.....	£437,500
Interest on 35 millions at 3½ per cent.	1,200,700
Working expenses	600,000
Total	2,247,200

This calculation is exclusive of interest on the aggregate of the large sums (probably 3 millions) that must be laid out year after year during the next twelve years for extension of pipes and works to meet the normal increase of population, and which is estimated at about a quarter of a million a year, thus making an aggregate sum of three millions for the next twelve years at least. The annual interest on this sum at 3½ per cent. would be £105,000, making, when added to the former sum, £2,342,000, and which must be raised by water-rates in 1892.

Mr. Smith over-estimates the amount when he says the population of London pays 7s. per head for their water supply. At the present time the estimated cost per head is 6s. 6d., and in 1892, the population, which would stand at about 4,680,000, will have to pay 10s. 1d. per head per annum. No doubt the sinking fund would diminish year by year, until at the end of 80 years it would be extinguished; but after deducting the amount to be paid for sinking fund, the payment by way of water rate will have risen to more than 8s. 1d. per head of the whole population of London.

1. This large increase, it must be borne in mind, will arise without any provision having been made, or expenditure incurred for what must be had—namely, an abundant supply of wholesome, pure spring water, in place of the infected liquid now drawn from the Thames and Lea, and subjacent subsoil waters, together with a constant service at high pressure.

2. As to "economies," so blandly and invitingly dangled before the ratepayers as an additional inducement to purchase, and which, Mr. Smith informs us, must follow unification, or centralisation under the Water Trust, these, he says, will commence at £130,000 per annum, and increase to £170,000, or £180,000, with a proportionate increase ever after! In whose interest unification is to take place he does not say, and I have a shrewd idea it will not be in the interest of the ratepayers. A portion of these "economies," however, will, we are assured, arise from the sale of lands; where the lands are situated, and what portion of them, is not mentioned; but I suppose it must be taken for granted that lands of value are situated somewhere, for does not Mr. Smith tell us so? Other "economies" hinted at, but not particularised by Mr. Smith, have been set forth by an expert, Mr. Edwin Chadwick, and they are (1) a saving of £51,964 11s. 7d. per annum in maintenance; £50,894 10s. 1d. in management, this, together, making up an aggregate sum of £102,859 1s. 8d. (Mark the shillings and pence in these figures! !)

Having submitted these items to a gentleman thoroughly well versed in the cost of maintenance and management of waterworks, I am assured by him that, in place of any annual saving being effected, it will be an unusually fortunate circumstance if the working expenses are not materially increased, especially when it is seen that the new trust will be placed under the fostering care of a chairman and two vice-chairmen, with "unification." The fact is, that for many years past the water companies have seen looming in the distance the purchase of their undertakings, either by the Metropolitan Board of Works, the Government, or other public body, and, like business men, they have taken every precaution to reduce their working expenses to a minimum, and, at the same time, they have taken care to increase their charges for water, their object being to secure the largest net income, and divide the profits amongst their shareholders. This manœuvre has enabled them to set forth a larger claim for compensation and for the forced sale of their works. How successfully the paramount object of directors has been accomplished, and with how little care to the interests of the consumers of water, more especially of the poorest amongst them, is patent to those who have bestowed attention on the matter. The other "economies" put forward from consolidation are the greater strictness with which the rates would be collected (a bad look-out for the ratepayers), the lower percentages paid for collection, and the yearly net gain which Mr. Smith says will arise "from the yearly increase of income," which, for the first twelve years, will have to be equally divided between the ratepayers and the companies. "The first year this will amount to £35,000. But, I ask, with the large outlay that must be made year by year for mains, distributing pipes, providing for an improved supply, pumping-engines, filter-beds, and a host of contingencies of one kind or other, is it at all probable that a profit will be made?

Mr. Smith will probably reply, the "Water Trust Bill" contains no provision for improvement of supply, nor does it contemplate the providing of new pumping engines, &c., although it certainly does provide for a payment of £5,600 a year for three new officers, and for another of £16,669 per annum as compensation for the abolition of offices, and pensions of directors, engineers, and secretaries, which will have to be met, although such small matters have not apparently entered into the elaborate calculations required for "effecting arrangements and economies" in the purchase of the water companies, but which may possibly convert a supposed profit of £35,000 a year into a large deficiency, which will have to be made up by imposing an extra rate on London, as has come about at Manchester.

But what, after all, may I ask, will "unification" of the water supply do, in the way of improving the quality of the water? What has the supply on the north side of London to do with that on the south, divided, as they are, by the river Thames, and great differences of elevation? What has the east end, which lies at a low level, to expect by "unification" with the west? Certainly, for all practical purposes of a water supply, they may just as well be twenty miles apart as six.

The quality of the water supplied to the metropolis by all, save one, of the water companies, is, from one cause or other, exceedingly bad. Month by month, the Water Examiner reports that they "contain moving organisms, and are unfit for dietetic purposes." Will the purchase of this unwholesome water-supply remove this serious danger to the public health? Will it not rather delay improvement in quality, prevent new competing companies coming in (and who are quite ready to give us a supply of pure softened spring water, at a cheaper rate), whilst it will increase water-rents, and saddle London, for ever, with the annual payment of the interest of an enormous debt. Is it, then, I ask, worth while to run so serious a risk, to pay for any possible "economies in management and maintenance"?

The inhabitants of the metropolis, in common with other large towns, have an undoubted right to demand of Parliament "effectual protection in the matter of purity, abundance, and regularity of supply," as well as parity of rating, for is not good water an actual necessary of life and health? The new House of Parliament can hardly be expected, however, to take the matter in hand, urgent though it be; but it can so far do an important service to the metropolis by passing a short Bill, which shall be of so restrictive a nature, that it shall prevent the water companies increasing their charges for water until the question shall be taken in hand in an equitable and comprehensive manner.—I am, &c.,

James Hogg.

1, Bedford-square, April 29, 1880.

MANHOLE COVERS.

Sir,—While acknowledging your kind notice of my invention in regard to manhole covers and lamphole covers in your issue of 23rd ult., I may, perhaps, ask the favour of your granting me a short space, partly in reply to the letter of of Mr. Rawlinson, C.B., inserted in your issue of 30th ult.

At the present time the ordinary grids, at least in London, are entirely choked up with road débris, and, consequently, have ceased to be ventilators. Mr. Rawlinson's suggestion that the manhole covers should be circular in plan is good; but still there seems not to be any reason of a sanitary or mechanical character that should necessarily enforce such a method.

In respect to fitting the covers, that my invention specially provides for, while easily removable such is quite unnecessary, because the dirt, &c., can be removed in a few minutes by a small piece of bent flat iron without the necessity of lifting them.

I quite agree with Mr. Rawlinson in regard to the dangers that flat covers may give rise to; but this I have provided for by curving the surface of the covers so as to give good foothold to horses.

I prevent vibration of the whole arrangement by external wood-packing.

William Batten,
Assoc. M. Inst. C.E.

150, Lozells-road, Birmingham.
May 4th.

MR. MARCUS STONE'S HOUSE.

Sir,—In that part of your notice in last week's Building News where you describe the concrete window-frames, it would have been more satisfactory to your readers, and certainly far more just to Mr. Lascelles, had the writer taken a little more pains to ascertain the cause of the failure. He makes a very good shot at it; but, by giving an alternative, he leaves it with an air of uncertainty alike unnecessary and unsatisfactory.

Had he examined the work, he would have found it perfectly sound and hard, and that, instead of the "process of the crumbling away of the mullions having already assumed the form of a serious difficulty, which little short of reconstruction will overcome," he would have found the failure (if failure it can be called) to be of the most superficial character, and owing entirely to his other suggestion, viz., the "too-early application of oil-colour." To the best of my belief, this was done by an irresponsible painter, who did not understand what he was about, and the simple result was to shut in, in a small space, a certain amount of damp, which, in drying out, caused the surface to scale off, certainly in a disagreeable manner.—I am, &c.,

R. Norman Shaw.

29, Bloomsbury-square, W.C.

WORKMEN AND ARTISTS.

Sir,—Surely no architectural sculptor, or any art-workmen connected with architecture, could read your article under the above heading in a recent issue of the Building News without feeling deep gratitude to the writer of it. I have read nothing so clearly true and distinctly to the purpose for many a day. It is certainly correct, that the system under which the majority of architectural sculptors are compelled to work in this country, is simply shameful, and the way in which some architects lump their carving and sculpture into the quantities to be let by the contractor to the lowest bidder, is degrading to the profession. For my own part, I think the men who compete upon such terms are much to blame. I have made it a rule, myself, never to give in a tender unless the selection rests with the architect, and I have never had cause to regret my determination. But the fact is, that until recent years, architectural sculpture has been looked upon in England as a kind of pauper-child of the arts; and, even now, what was once one of the noblest professions is little better than a trade. Its growth has been

stunted by hard treatment and neglect; but—thanks to those architects who have intelligence enough to grasp the importance of the subject—there is a better day dawning, a day whose full light will look upon carvers who are artists in every sense of the word. There is only one thing to delay the good time, and that is the marked tendency of the more advanced men to leave off work themselves and employ others to do it. There is a growing desire to manufacture largely and quickly; to sink the merit of especial excellence in favour of a profitable mediocrity. But, to my mind, a good carver who does not carve is very like a nightingale that does not sing, and of no more use to the art, as an art, than an exploded sky-rocket may be to the science of fireworks. I wish some of the men who take the earliest opportunity of putting aside the mallet and chisel and donning the black coat would study that famous portrait of Peter Vischer, and reflect a little upon it. Let them look at the sturdy old fellow as he stands there. A skull-cap covers his bushy curls, an ample leather apron spreading from hip to hip and from neck to knees, his hammer firmly grasped in one hand and a chisel in the other. Depend upon it, Peter made up his mind that if they would insist upon painting his portrait he would be painted as he was—as he was proud to be—as an art-workman in the midst of his work. After looking at him thus, we may with profit look upon the duplicate of his shrine of St. Sibald at South Kensington, and understand how much the pride of the workman in his work accounts for the beauty of that production. We want more of that spirit to-day. We want men who can feel pride in being art-workmen—men who can believe, and prove, that art is not wholly confined within gilt frames; that architecture is something more than a science, and its attendant arts something higher than mere trimmings. But if you are to do that, you must make art-workmanship respectable, and you must give the men a recognised status. Now, is it altogether impossible that the art-workmen of this country should be formed into a guild? Could not the Institute of Architects devise some means of taking such a guild under their own protection? I will try to sketch what I mean. Say there should be one rank of the first order: a rank composed of men who could submit examples of figure, animal, and foliage-work, in different styles, for the judgment of the Institutute; and those who were successful should have a certain distinction given to them. Others who could pass an examination as animal and foliage-producers might take another grade; and those men whose bent leads them to work wholly in foliage-work, another grade still. This would simply be going back to the system of guilds in vogue long ago, a system which kept up the pride of the craftsmen, and imparted a wholesome spirit of emulation to young men. How do we know how much unrecognised merit there may be wasting away in the shade? Think of poor Grinling Gibbons, carving as a common drudge for builders in London; ground down until he grew heartsick, and went out of the great beef-witted city altogether. I think there is nothing more instructive in the whole history of art-work than that lucky morning walk of Evelyn's, when he accidentally heard the noise of a mallet and tool, and, peeping into a stable at Greenwich, discovered the finest carver this country has ever seen. It was a lucky walk for Evelyn, and lucky for Gibbons; but what can be said of the system that leaves such men with little but luck to lift them? At the present time, as you have very truly stated, art-workmanship labours in the cold shade. Art-workmen know it, feel it, and—"Nature is subdued to what it works in, like the dyer's hand"—men grow narrow in the narrow groove custom has made for them. It is a pity, for I can never believe that the real art-strength of a nation can be tested by a few statues dotted here and there in public places, or by the display of a few hundred feet of well-painted canvas, any more than I would believe that the soil of a country could be fairly judged by a few fruits gathered from a favoured valley. Let us have true art in common things; let us build from the foundation upwards, as it were, rather than from the apex downwards; when we do this art will have a national growth, not a mere partial one, as at present.—I am, &c.

Birmingham. JOHN RODDIS.

ARCHITECTURAL EXAMINATIONS.

SIR,—I am very sorry to see that your correspondent "F. W. H." in last week's BUILDING NEWS, tries to prove that it is impossible to give architects a professional standing, by making it a close profession, and as this would be the only way to prevent those scandals that are weekly ventilated in your paper, I will try and refute his arguments. In the first place, he seems hazy as to the questions that we should pass in, and says, we have no laws as to what is correct in Gothic! and Queen Anne! He seems quite to misunderstand that such things would never be asked. But that the examinations would be Practical Architecture, and not in the correctness of styles, and that the students would have to show they were well up in their geometry, &c.; that they knew all about the different materials used in building, the strength of materials, how roofs and every thing are to be framed and put together, how to write a good and clear specification, to be able to draw good and full-size details of joiner's work. Now, Sir, I maintain that, on these and similar points, there is no difference between architects. The argument about the law is puerile. How about doctors?—they have to pass an examination in medicine, and how to set broken limbs, &c., and as we know in practice, two never agree. Why can they, without your correspondent's desideratum of fixed laws, be a profession? It is the same thing: they pass in the practical part of their profession, and can then treat as they wish. So with us: we should pass in the practical part, and then take to Gothic or Queen Anne as we wished.

Now as how to manage those that are already in practice, and can show their articles, and that they have carried out works—let them be enrolled without examinations. We should then weed out those who have no business in the profession, and mostly cause all the scandals.—I am, &c.,

CHARLES A. CLIFTON.

ARCHITECTURE AT THE ROYAL ACADEMY.

SIR,—In reference to the design for restoration of the tower of St. Lawrence's Church, Ipswich, exhibited at the Academy, kindly allow me to say that the name of Mr. Barnes, Hatton-court, Ipswich, should have been associated with my own, but has been omitted from catalogue, though duly sent for insertion.—I am, &c., HOWARD GAYE.

SIR,—I shall feel obliged if you will allow me to explain, in reference to your remark in last week's issue, on the Academy Drawings, that the "first premiated design for the Over Darwen Town-hall was conspicuous by its absence," that it was entirely owing to my having mistaken the day for sending in the drawings, that I was precluded from submitting for admission both the Town-hall and Market-house perspectives, but which I shall hope to do, if all be well, another year.—I am, &c. CHARLES BELL.

CHIPS.

A discussion on district surveyors' fees for alterations to chimneys, roofs, and gables took place at the last meeting of the vestry of St. James's, Westminster, and ended in the passing of a resolution that, in the opinion of the vestry, the charges made by the Metropolitan Board of Works with reference to necessary repairs to premises in the parishes are unjustifiable, and that the fees charged by the district surveyor for similar work appear not to be authorised by the 2nd schedule of the Metropolitan Building Act.

Mr. A. W. Conquest, late town-surveyor of Ramsgate, and now occupying a similar office at Folkestone in succession to Mr. W. Springhall, has been presented with a timepiece, with barometer and thermometer attached, by the men in the employ of the Ramsgate Improvement Commissioners.

At Naples, a few days since, died the well-known Dr. Wilhelm Wagner, professor in the Johanneum of Hamburg, being only 37 years old. Dr. Wagner had gone to Italy on a scholarly and artistic tour, and finally succumbed to a sudden attack of typhus fever in sight of Herculaneum, the object of his most enthusiastic curiosity.

The parish-church of Fen Ditton, near Cambridge, is undergoing restoration from the plans and designs of Mr. J. L. Pearson, A.R.A. The contract has been taken by Mr. Brown, of Lynn, who is also restoring the neighbouring church of Foxton. The first work undertaken is the demolition, and rebuilding in fac-simile, of the tower, which was in a dangerously decayed state.

Intercommunication.

QUESTIONS.

[6116.]—**Wheelbarrow Hoist.**—Can any of your readers inform me where I can see or obtain particulars of hoist worked by steam suitable for lifting a loaded wheelbarrow or materials on to scaffold in building a lofty warehouse?—A. T. D.

[6117.]—**Wood Block Flooring.**—Can any of the readers of the BUILDING NEWS oblige by informing me if they have used wood block flooring bedded on concrete as floor of bedroom or living-room to dwellings for the industrial classes? If so, I shall be glad to know how it is fixed, the sizes of blocks, and with what success.—YRUBLA.

[6118.]—**Restaining and Varnishing Wood.**—What is the best way of treating woodwork that has been stained and varnished, and can the varnish be removed, the wood re-stained same colour or darker, and how? Or is it possible or necessary to paint same? An answer from a practical correspondent would oblige—AN INQUIRER.

[6119.]—**Cardboard Models.**—I am anxious to know what sort of glue or gum is the best for making cardboard models. I want some strong transparent preparation that will not discolour the model. Having made one lately I used liquid glue, but where some intricate joinings occurred the effect of model was destroyed by the cardboard being discoloured by the glue, which could not be easily removed. Also, what is the best sort of board to use?—T. P. F.

[6120.]—**Sanitation of a Small Town under a Local Board.**—Will surveyors, builders, or others having knowledge of the sanitation of towns under local boards inform me of the method adopted for ventilation of street-sewers, and also for ventilating of house-drains, stating the names of such towns? I shall also be glad to know in what towns damp-courses are insisted upon by local boards for houses. Also in what towns the board insist upon kerbstones being set in new streets before houses are allowed to be built. And also in what towns the board insist upon pantries or larders of cottages being ventilated. Any information respecting these matters will oblige—A SURVEYOR.

REPLIES.

[6079.]—**Measurement of Earthwork.**—For calculating cuttings and earthworks, I should recommend "F." to get Baker's or some other work on Mensuration. A complete set of rules and tables is given in Molesworth's "Handbook for Engineers." A railway cutting of the usual form may be measured by dividing the section of cutting into three parts by vertical lines from the angles of road and slopes. The centre portion might then be found as a prism or frustum of pyramid with rectangular ends, the triangular portions up to the slopes of cutting as wedges. Rules for these solids can be found in any book on measuration. Railway cuttings are generally calculated by the prismoidal formula, which may be explained as follows:—Find the two areas of end sections of the cutting and also the area of a section through the middle, then the solidity of the cutting will equal the length of cutting multiplied by the sum of the two end areas plus 4 times the middle area divided by 6, or contents $= \frac{L(A + 4a + A')}{6}$ the letters A and A' representing the ends, and a the middle area. In large earthworks tables are generally given for calculating the sloped parts and for varying heights. Cuttings in side-long ground may be similarly calculated.—G. H. G.

[6080.]—**Crushing Weight per Square Inch.**—If "Student" can understand the meaning of so many lbs. pressure per square inch in a boiler, he ought to be able to understand what is meant by "crushing weight per square inch." Let him imagine the steam generated to the extent of bursting the boiler, the steam would then have a pressure per square inch which might, by analogy, be called breaking or tearing pressure. In the same manner, let us take a common stock brick. The weight per square inch that will crush such a brick is put at 3·558 tons according to one authority, which means that over every square inch of the brick's surface there must be put that amount of weight before the brick yields to the pressure, or we may imagine a cube of brick crushed by that weight. I hope this illustration will be sufficient for "Student's" understanding.—G. H. G.

[6106.]—**Casements.**—Twenty-five years ago I fixed some iron casements between stone mullions manufactured by Sealey and Sons, Cirencester. They are glazed with plate-glass, and are now as good as ever.—B., Lincoln.

LEGAL INTELLIGENCE.

RESTORATION OF ST. ALBAN'S ABBEY.—On Saturday week, the Chancellor of the diocese of St. Alban's (Mr. J. E. P. Robertson, D.C.L.) held a court at Mr. Jeune's chambers, No. 2, Paper-buildings, Temple, London, to hear further arguments in the matter of the application for a faculty on the part of Sir E. Beckett, Bart., Q.C., to carry on the restoration of the Abbey Church. Sir Edmund represented himself as the petitioner, and Mr. Jeune appeared as the representative of Archdeacon Grant, Earl Cowper, and Mr. John Evans, of Nash Mills. The other gentlemen present were the Mayor of St. Alban's (Mr. Chapple), Mr. H. J. Toulmin, Mr. Tebbs (solicitor to the Society for the Protection of Ancient Buildings), Mr. Longmire (contractor), and Mr. Day (one of the secretaries to the Bishop of St. Alban's). The arguments as to the *locus standi* of two of the parties opponent being closed, the Chancellor expressed his desire to hear the arguments on the main point, as to whether or not a faculty ought

to issue. Mr. Jeune said the question was a very simple one. A faculty could not, he said, be granted until proper plans had been brought in, a proper estimate of the cost furnished, and a proper bond given that the work should be carried out. This was the invariable practice, and one which ought not to be departed from in this case. As to the citation which was issued, it was there stated that Sir Edmund was willing to take the work at his own expense and restore the western front, except the three porches. There was no reference in the document to plans and specifications or as to any bond which was proposed to be given. Certainly he had put in a sketch which was wholly insufficient for the purpose, and which was not drawn by a professional architect. (Mr. Jeune then read an affidavit made by Mr. Christian, architect, as to this plan and in support of the learned gentleman's argument. On such a drawing as that deposited, he said he could not give an opinion, and he thought it would be undesirable to grant a faculty till there were proper plans deposited. There were two other affidavits, one being from Mr. J. L. Pearson, confirming the opinions expressed by Mr. Christian). So it came to this, the learned gentleman said, that the Chancellor was asked to grant the faculty absolutely in the dark.—The Chancellor: All that I can say is that if plans and specifications were presented to me, you might as well show me the Chinese alphabet; it would be just as intelligible.—Mr. Jeune: Plans, &c., may not be intelligible, but there are such things as professional advisers.—Sir E. Beckett: And they will swear on either side. You get half the Institute of Architects on one side and I will get half on the other.—Mr. Jeune: If the question of external elevation and such matters came before the distinguished Chancellor of the diocese of York, he would not express any difficulty in deciding upon them, and deciding rightly too. (Laughter.) —Sir E. Beckett: Wait till you come before me and then you will see. The Chancellor: Of all the cases that ever came before me, I never had one for the entire restoration of a building. Mr. Jeune: Indeed. In my tiny experience, which extends over as many days as yours does years, I have had a good many. Sir E. Beckett: You must have been very busy in Wales. Mr. Jeune: I have had eight, to be exact. As far as he knew, the invariable rule was for plans to be deposited; and for plans, specifications, and a bond he pressed. It was not as if Sir Edmund said he was going to employ a man like the late Sir Gilbert Scott, and they were told what was going to be done. The Chancellor: There is his son. Mr. Jeune: But what guarantee was there that the son would be employed? As far as was known, Sir Edmund would employ no one. A cathedral ought not to be handed over to be treated at the caprice of a single individual; but in any case the invariable practice of diocesan chancellors ought not to be departed from, and therefore in this case plans, specifications, and a bond should be given. Sir E. Beckett knew why plans were pressed for—because there were plenty of architects who would criticise them and then leave him either to hire a certain number of other architects to swear they were all right or take the chance of having the application rejected. The architects would criticise the plans for nothing, as it was well known that the Institute had taken a part in this matter of restoration; and therefore he was not surprised to find that his learned friend had been pleased to get the affidavits he produced, or any number of them. But this was not a question of giving plans and estimates. He wanted to restore the building and spend a sum of money—£20,000, people had been pleased to say—and everybody but Archdeacon Grant was extremely willing that he should spend it. As to the bond which had been asked for, he did not know what his friend's experience in his Welsh cases had been, but he (Sir Edmund) did not find at York that security was asked. Did Mr. Jeune, in Welsh cases, have bonds? Mr. Jeune: Always; invariably. Sir E. Beckett: Whether you do or not, I won't give security, and I won't give it still more, for this reason. It is intended by Archdeacon Grant to be a personal insult. Mr. Jeune: If I thought that, I would not ask for it. Sir E. Beckett replied that he knew a good deal more about the matter than did Mr. Jeune. But he would not do as he was requested, and the day he was refused the faculty he should send down to St. Alban's and request the men employed at the Abbey to be started, and Archdeacon Grant could take the consequences. So much for that. But as to plans, he would remind the Court that the Faculty Committee did not deposit any, nor did they give a bond. The plan of what he proposed to do he showed to the rector and most people in St. Alban's last September. The parish was in favour of the work being done, and the rector and the churchwardens, after opposing, now approved of the proposal. But one man—Archdeacon Grant—was not in favour of the restoration, though everybody else was. Plans he (Sir Edmund) would not deposit. Did he consent to do so, he would have to be fool enough to pay Mr. Scott some £300 in order to make them, and then perhaps he might not get the faculty. The drawing produced was, he contended, sufficient to show the general features of what was proposed to be done. The question really came to this. The building was stated, in the previous faculty, to be in a ruinous condition. There was no doubt about it; and now came the point: was he (Sir Edmund) to send down to St. Alban's, and say "Discharge everyone"? If he did, then he had a right to say that the result would be that the building would fall down—but Archdeacon Grant did not care—and on these ruins he should put a board or something more permanent of its kind, with these words on it—"*Hanc ædem prostravit Antonius Grant*"—(laughter).—On Thursday week, the Chancellor, in giving judgment in the case, said: During the work which has been effected the majority of the committee were desirous, as was their duty, to restore the original high roof of the nave. This proposition was opposed by Archdeacon Grant and Mr. Evans, who ultimately, on the 12th December, 1878, withdrew from the committee on failing to attain their end. Since that date the petitioner has most generously and magnificently offered to restore, at his sole cost, probably to the amount of £20,000, the west front of the cathedral, which is now in a very ruinous condition; and though in the first instance nine or ten persons appeared to oppose the grant of a faculty to him for that purpose, the opposition is now confined to three—namely, Archdeacon Grant, Lord Cowper, and Mr. Evans. The interest of the two latter to oppose is denied. This question of interest would have been disposed of in the early stage of the cause had there not been some misunderstanding between the petitioners. Lord Cowper and Mr. Evans assert that they have an interest on the ground that they are large landed proprietors in the diocese, and that they contributed to the general fund, now exhausted, for the repairs. These circumstances, however, do not, in my opinion, constitute an interest in law. The Archdeacon, as a parishioner, is entitled to the rights of any other parishioner in that part of the Cathedral which constitutes the parish-church, and also to visit the same officially—to nothing more; as on the 12th Dec., 1878, he withdrew from the Executive Committee. He has not attempted to show that his interest, such as it is, will be affected in any way by the proposed restoration of the west front. The opposition to the grant of the faculty asked for is based on the asserted want of "plans, designs, specifications, and estimates by a professional architect." This is certainly in keeping with an unseemly interference contained in a letter addressed to me at the very outset of this cause by the Institute of British Architects, dated December 5th, 1879, and it is fully echoed by three affidavits from the same quarter. It is impossible, in my opinion, in such a singular case as this, to furnish specifications, working plans, and estimates until the outer coating of the west front is taken down, in order to ascertain the extent of the decay. To have this in the first instance the building would have been exposed during the past winter to further mischief. Two drawings or designs for the outside were laid before the Bishop and the Executive Committee; one by the intended professional architect, the other by the petitioner. All were unanimous in choosing the latter, and the committee resolved on Dec. 5th, 1879, that they "will offer no opposition to the issue of the new faculty to Sir Edmund Beckett in pursuance of the citation, and that the thanks of the committee be given to him for his generous offer." This so-called "sketch" was exhibited for many weeks at the office of the clerk of the works, and is intended to show what the general effect would be. It is not said in any one of the three affidavits brought in by the opponents that it is out of keeping with the rest of the Cathedral. The sin shall not rest at my door for allowing any part of the Cathedral to fall down, by insisting on a bond being given for the completion of the work intended to be executed at the cost of the petitioner. The case seems to come to this, that out of a population of about 9,000 in St. Alban's—I take my numbers from last census tables—one parishioner only is found to oppose the grant of a faculty, and that individual is the Archdeacon. I feel no hesitation, in this very remarkable case, in pronouncing for the faculty asked for, and for condemning the opponents in costs. Had the cathedral not been in part a parish-church, a faculty would not have been requisite in the first instance. Mr. Tebbs, solicitor for the Society for the Protection of Ancient Buildings: I beg to give notice of appeal from your judgment. The Chancellor: I require Mr. Tebbs to prosecute the appeal within fifteen days from this date, and if at the end of fifteen days the appeal has not been prosecuted, then the faculty will be issued.—A meeting of the Council of the Society for the Protection of Ancient Buildings was held in London the same evening, when the judgment was the subject of discussion, but whether or not it was decided to prosecute the appeal we have not heard.

STATUES, MEMORIALS, &c.

ASHSTEAD, SURREY.—A memorial drinking-fountain, partaking somewhat of the nature of an Eleanor Cross, has just been erected by the wayside in the village of Ashstead, near Epsom. Standing upon four octagonal-shaped steps, the structure is octagonal in plan throughout. The lower parts are constructed of grit-stone, whilst the upper portions are of Ancaster. The bowl projects from the cant nearest the road; it is circular, font-like, and boldly moulded. Its surface is level with the top of the second step, at a height that can readily be used by horses and cattle. The structure above is of spherical outline. In the cants over the bowl are recessed and traceried panels, being shields suspended by ribbons from pateræ. These shields bear arms and monograms. Above are labels, enriched by crockets and small grotesques, terminating ultimately in finials that die into the hollow of cornice above. Over this, the structure splays off smaller, and in the cants above are more traceried panels. The whole merges then into a graceful spire, terminating by a foliated cross. The memorial has been carried out from the designs of Mr. C. Hodgson Fowler, Diocesan architect, of Durham, by Mr. S. B. Burton, builder, of Newcastle-on-Tyne. The carved work thereon is by Mr. Harry Hems, of Exeter.

Our Office Table.

ACTIVE preparations are being made for laying the two foundation-stones of the new cathedral of St. Mary at Truro, on the 20th inst. St. Paul's Cathedral, in Sir Christopher's time, was rebuilt, but that at Truro, being altogether a new cathedral, is probably the first building of its class erected in England since Salisbury. Several blocks of houses have just been removed on the north side of the present parish-church, and a large space is now clear, ready for building the cathedral upon. Upon this, and at the High Cross at the western end, huge stages are being erected for the convenience of visitors. They are intended to accommodate 5,000—the seats in question to be let at a guinea and half a guinea a-piece, the profits, of course, going to the building fund. Messrs. Julian and Sons, builders, of Truro, are erecting these stands, which are not continuous, but take the form of a number of detached platforms. The foundation-stones are to be of granite, but nothing definite is yet decided as to the materials to be used in the cathedral generally. The city of Truro intends spending £2,000 in suitably decorating the streets for the Duke of Cornwall's reception. Mr. Silvanus Trevail, architect, of Truro, has been entrusted with the supervision.

A MEETING of the Liverpool Engineering Society was held on Wednesday, when Mr. E. H. Allies, Assoc. M. Inst. C.E., read a paper on "The Victoria Docks Extension, with a few Remarks on Concrete Work." The author began by describing the site of the Victoria Docks on the Thames, and the extension works which are now being carried out there. The site was originally known as Plaistow Marsh, and is very favourably situated for the formation of docks, being between two bends of the river, and its surface considerably below Trinity high-water. The different strata encountered in the excavation of the docks were described, and shown on a section giving their thicknesses. It was shown that the materials found on the site led to the construction of these docks entirely of concrete at a very much less cost than masonry. The extension comprises some rather heavy railway tunnelling, a branch of the Great Eastern having to be carried beneath the dock. The dock extension proper consists of two timber jetties leading to the entrance lock 800ft. long, and which opens into the great dock of 90 acres, itself connected with the old Victoria Dock by a canal or passage. There are two graving-docks, and two swing-bridges of 80ft. span each cross the dock at either end. The excavation, which was very heavy, was in great part carried out by the aid of machinery, which was described, the formation of the subsoils being very favourable to its successful employment. The composition of the concrete was given, also the mode of mixing and placing it in position.

THE BUILDING NEWS.

LONDON, FRIDAY, MAY 14, 1880.

CORNER BUILDINGS.

CORNER sites, although they offer decided advantages over street plots, are seldom turned to the best account architecturally. It is certainly an advantage to an art which chiefly appeals to the beholder by the mass and solidity of its productions that two sides of a building should be visible. It gives the architect a larger field for the display of his resources, and he has this certain advantage: that he can light his building on two sides, and the planning of the building becomes a much easier problem. These gains apply only to certain conditions of corner sites, as, for instance, when the angle between the two streets is a right angle, or nearly approaching the square, for it is this condition only which impresses us by the mass and solidity of the structure. When we come to triangular plots, where the corner is rather acute, the acquisition is less valuable, because the impression of solidity is diminished, or vanishes entirely when we turn the corner. Let us take a few instances of recent corner buildings in some of our leading streets. In Oxford-street we notice a few more or less successful solutions of the problem, as regards buildings whose two fronts are square. At the corner of Oxford-street and Charles-street, a new building, called the "Walton Old Queen's Head," a public-house, has been erected, faced with stone, in which the angle is canted and carried up in the form of a lofty square cupola, a by no means uncommon mode of treatment; but we instance it as a model rather to be avoided than copied. The cupola has a very stilted appearance, from the narrowness of the canted corner, which is made one side of the tower as it emerges from the structure above. This effect is increased by the high-pitched cupola, and by the subdivision of the corner into narrow vertical strips. The fronts are cut up by pilasters and panels, producing a highly frittered appearance. An additional element of weakness is imparted to the building by the arcading over the bar. On each of the sides the architect has connected the top of the lofty pilasters, including a mezzanine, by segment arches, slightly stilted above the imposts. These are made to abut in the most ungraceful and awkward fashion against the narrow semicircular arch on the canted corner, which, being on a different and lower level, the junction has a particularly weak and bad effect. The side sprawling arches look as if they were thrusting out the corner. The detail is equally poor and feeble, and the carver has not mended matters by the heavy foliage on the keystones. Next door, by the way, in Charles-street, we notice a nicely executed shop-front, in Stuart taste, lately finished for Messrs. Felix and Wayman, art upholsterers. Continuing our way westward, we meet with another method of corner treatment between Oxford-street and Princes-street. The premises are of red brick with stone dressings, and the corner is emphasised by a semi-octagon bay window above the shop-front, over which is a cyclostylar arrangement of one story of columns, or a small peristyle without a core; this is finished at the top of the cornice as a flat, and the upper corner of the building is simply canted and crowned above the main cornice with a zinc cupola of double flexure in curve. This cupola is so buried in large zinc dormers that it has a crowded effect, and the details and capitals of columns give a heavy and lumpy look to the corner. The little semi-cyclostyle we have alluded to forms a convenient balcony to the story from which it opens by a casement, and the feature is suggestive of a pleasing and useful purpose. Between Oxford and Holles-streets we come to another arrangement. It is a large stone structure, in a florid Italian style, with heavy detail. The angle is canted, and the three stories are adorned by three orders of disengaged columns, but without entablatures, the cornices and strings between the windows being stopped by blockings over the carved capitals of columns. The columniation, being confined to the corner of the building, has a rather weak and unsatisfactory effect, particularly when the columns are seen from the sides of the building, and it would have been obviously better to have engaged the columns instead of insulating them. The roof over the corner is finished as a high pyramid. Another instance of a new corner building is afforded by Mr. Wimperis's business premises in Oxford-street and North Audley-street, illustrated in the BUILDING NEWS, p. 28, Vol. XXXIII. Here the canted corner has an entrance below, over which there is a bay window of two stories and a dormer with pediment above. A pointed pyramidal roof rises out of the mansard. This arrangement disguises, to a certain extent, the meagreness of a plain splayed corner; but the roof has a crowded appearance, and does not seem to spring naturally out of the building below. In Bond-street, at the corner of Conduit-street, may be seen another attempt by the same architect to give an architectural character to the corner. In this instance the angle is turned by a semi-octagon. The shop and the two stories above have windows on each of the three faces, and these are carried up in stone. The uppermost story forms an open balcony or loggia, the angles have shafts and arches which form the open arcade of the balcony, and above this it is carried up as an octagon turret surmounted by a plain conical roof of slate. Our readers will find an illustration of this example in the BUILDING NEWS (p. 300, Vol. XXXVI.) A want of coherence between the corner treatment of the façades, and an apparent disconnection in the cornice above the first-floor window, rather destroy the unity of the design, which nevertheless presents an arrangement that might with advantage be followed. The small angle piers in the shop look weak for the superstructure, and the detail is overdone.

In the City we find several examples. At the corner of Bell-yard, Fleet-street, close to the new Law Courts, a building, of stock brick and stone dressings is nearly finished, which rather serves to show how eligible corner sites are thrown away. Here was an opportunity of which any architect might have been glad, as it was the first building in the line of new frontage to the east of the Law Courts. In spite of its unique position, facing the eastern tower of the last-named building, a very commonplace elevation has been given to it; the corner, between Bell-court and Fleet-street, is rounded simply, and no attempt is made to vary the façade at this part. The windows, on the curve, have plain dressings of architraves and cornices, resting on badly-shaped consoles, and the corner is not emphasised in any manner. Another conspicuous City corner which has been sacrificed is that between Bucklersbury, or Wallbrook, and Queen Victoria-street, where a narrow Jacobean frontage is wedged in between a Late Gothic and an Italian building. The actual corner is an angle, and forms the joint between the two buildings, an awkward and ungainly mode of dealing with the problem. The new building is in Bucklersbury, and faces the corner of the building of the National Safe Deposit Company. We wonder the City Council did not insist on a better turning at this point. In Queen Victoria-street there are various attempts to make the corner play an architectural part. A block of buildings between that street and Cannon-street may be mentioned as a striking instance of the disagreeable effect of arcading, when it is made to turn rounded corners. In this case a series of heavy segmented arches are carried round over the windows, which not only have a very distorting effect, but also look weak when viewed at the side. Mr. J. J. Stevenson, in his "City building in Fenchurch-avenue," illustrated in this journal, p. 640, Vol. XXXV., emphasises the corner by an octagon cupola, which is carried up as a tower in the angle, a mode of treatment that has little objectionable in it if it is not made so small and finical as to become a bauble. We might extend our notes in the City, if space permitted us, if only to show how the corner has been utilised. Few modern buildings, however, can be pointed to with satisfaction. The Charing-cross Hotel afforded a fine opportunity for an effective corner, had not the temptation to carry round the divisional lines of the façades, with their piled-up stories, been too strong. As it is, we get the same features repeated without any accentuation, as if the front had simply been bent round the curve. Ludgate-circus affords another example.

Having adduced several instances of what has been done, we may now offer a few suggestions as to what might be attempted to make the corner a desirable feature in our streets. A few questions occur to the architect in dealing with corner sites. He has to consider, first of all, his ground-story accommodation; if a shop, he has probably to comply with the demand to continue the shop-window of plate-glass round it; or if offices or chambers to make them sufficiently large to become useful. A plain straight-sided corner or "cant" as the builders call it, is the least troublesome and expensive; but it rarely, if ever, looks well thus treated. Where the corner is not too narrow, columns engaged, or pilasters with a pedimental finish, might be adopted, though any such arrangement must not assume the appearance of a mask or have a stuck-on effect. It is better to leave alone than to attempt too much. Simply returning the windows and horizontal lines, if the building *façades* are at right angles, may be enough; but expression would be gained by a more emphatic treatment, such as breaking forward the entablatures and introducing columns not at the angles but within them, and crowning the corner by a pediment, or varying the summit-line by a parapet. If a bay window can be formed with advantage, it might be made to project within the angles so as to form a break on each side, rather than making the sweep from side to side as in the rounded corner; the latter is the usual custom. In treating canted corners of buildings forming a sharp angle, the difficulty is increased, and any ornamental treatment renders the corner obtrusive, and often ludicrous. If possible, it is always preferable to turn the corner of such buildings by a curve, and the least unsatisfactory mode of doing this is to let the curve spring from shoulders, rather than to start it fair with the sides or fronts of the building. An architectural corner is possible under these conditions, for the corner can be pronounced by engaged columns if the break is slight at the re-entering angles, as in the Bank of England, where Soane has made his corners ornamental features, instead of hideous excrescences. It is easy to see how the circular corner can, in this manner, be carried up as a tower, and roofed by a cupola, a feature always better omitted,

however, than made a burlesque by the addition of costly sculpture and cresting, as we see it in a new block of chambers in Moorgate-street. When too stilted, it becomes an unmeaning gewgaw. Another—and, in the hands of some, an artistic method of turning a building corner, is the adoption of the polygonal form, as we have noticed in Fenchurch-street and New Bond-street; but the angles should be well supported below, and ornamental detail should be sparingly introduced. The semi-octagon is, of course, most readily adapted to this form, in which case a square-sided building is necessary, the perfect octagon being made to emerge above the roof. A projecting octagon tower or bay is a favourite resort with Renaissance architects. An instance of this, in which the corners are capped with pyramidal roofs, is afforded in the block of middle-class mansions recently erected in Victoria-street, Westminster (illustrated by us). This form and the circular projecting angle bay or corner tower were often introduced in the old chateaux of France, especially those erected in the style of Francis the First. A recent example in this country occurs at the Temple Chambers on the Thames Embankment. But as in all architectural features, they become ridiculous travesties when too small or over-ornamented, and no rules can be laid down that will be of any service to him who merely transposes the feature from a large building where it looks well, to a small public tavern where it will remain a tower or beacon of folly. The Mediæval architects emphasised their castle angles by towers or angle-turrets, but those were intended for use in the discharge of arrows through the balistraria or loopholes which are seen in them. The angle bay or oriel became both a useful and beautiful feature in the Tudor times, and why should not our angles be turned in the same elegant and picturesque manner? In our street residences the architect is open to adopt the angle window with corbelled balconies as we find in Venice, or a turreted corner pierced with narrow lights between mullions, or treated as open balconies or loggias. A columnar arrangement admits of the corner being thrown into the room as a bay, or made a loggia. The question of roofing the corner is important, and its solution may sometimes suggest whether an angle cupola or turret finish is desirable. Nothing can look worse than the roofs of an acute-cornered building; they seem almost to demand the expedient of a pavilion or conical termination, to disguise the unsightly lines of hipping; but the subject is one that would take us too far, and we only broach the point as an important one for the architect's consideration. We might extend our remarks to another kind of corner—the inverted circular corner, like we see it at Regent and Ludgate Circuses; but we pause here, believing the subject is worthy of more attention than it receives, especially now the interception of new streets with old ones have created a formidable number of corner plots.

THE ROYAL ACADEMY.

[SECOND NOTICE.]

WE are glad to see fewer unhappy specimens of worked-out mediocrity than have been sadly conspicuous in some former exhibitions. Still, there are some which call for serious remonstrance; surely when so many good pictures are of necessity marked doubtful or rejected altogether, there ought to be some means of excluding or putting into a higher or lower place such absolute inanities as R. Thorburn's "Rediviva" (No. 892). The "Pilgrim's Progress" things were bad enough, but this is past endurance. L. J. Pott is fairly successful in recalling the oft-told tale of the Trial of Queen Katharine. The time chosen is when she addressed her assembled persecutors. In the same room (No. 973) is a very beautiful sea piece by Henry Moore. "The Beachéd Margent of the Sea." The gorgeous glow spread over all the scene by the setting sun is charming. The fresh retiring sea, flying scud of the angry sky, the waggons and its fine team, are delightfully depicted. F. Goodall shows five pictures, displaying his usual ability. The subjects are all from Eastern life. No. 339, "Hannah's Vow," shows how the young mother brought her fair child into the House of the Lord in Shiloh, the whole very simple and pretty. No. 334 represents a fine Egyptian woman leading a white goat, and carrying her frightened baby through the rising waters of the Nile "at the time of the overflow." In 224 we have an Arab and family moving to fresh pastures. He is seated majestically on a camel, followed by his wife and flock of goats. A. Long has this year devoted most of his time to portraits, the one exception being No. 210, "An Assyrian Captive." A poor sad, dark-eyed little Hebrew girl is sitting sorrowful on a stone bench, with her harp at her side, grieving over her hard lot of being forced to sing the songs of Sion in a strange land for the amusement of the victor. Of his portraits, the most important is that of "Henry Irving as Hamlet." "Mrs. Angerstein" (No. 276) is also admirable in every way. Fredegonda, Queen of the Franks, watching the espousal of her husband Chilperic to Galeswiathe, the Arian Visigothic princess, is in a larger and broader style than we generally get from Alma Tadema's pencil. We like the chief figure and her adornments better than the scene she is gazing at—which requires to be seen at too great a distance to fall naturally into place. Though the attention of Fredegonde has previously been turned to her own beauty, and the adornment of it, by the choice jewels which lie before her, she has but one thought and purpose now, as she fixes her deadly look upon her hated successor, and sees her husband break the bough of marriage over her head. The ceremony takes place in an open enclosure, surrounded on two sides by gabled buildings—the crowd being kept at a distance from the bridal party. Alma Tadema never showed greater power in painting precious materials than in the amber, gold, onyx, and other valuables, heaped upon the table of the discarded queen. The management of the light is masterly. No. 176 represents the "Festival of Ceres" at the beginning of Spring, calling down a blessing from her upon the coming crops. The revellers, crowned with leaves and bearing garlands, dance through the flowering meadows; all is life and brightness. At the back are some fine stone pines, and it is interesting to compare their execution with that of T. McWhirter's "Lord of the Glen" (177), close by—

> "Moored in the rifted rock,
> Proof to the tempest's shock,
> Firmer he roots him the ruder it blow."

No. 195 is called "Not at Home." A fine Roman lady is seated in a beautifully furnished bed-room, while her attendant is trying to exclude an eager visitor from her presence: but is just too late, as the handsome and persistent caller has managed to push his head past the curtain. The painting of the beautiful inlaid bronze furniture is most satisfactory. We have seen few better pieces of colouring than Sir John Gilbert's "Scene from King Henry the Sixth." The attitudes are a little forced. The poor, weak king, who had previously swooned on hearing of the death of his old and faithful friend, the Duke of Gloucester, is being requested by Warwick to go in and see the body—which can be seen as of a strangled man, in an adjoining closet—and he, half-fainting, is led off, saying, "That is to see how deep my grave is made; for with his soul fled all my worldly solace." The expressions of the faces are well conceived. We miss John Pettie's capital delineation of character, which we generally look for at the Academy. "His Grace" (249), a full-length figure of a very fine gentleman of the time of Charles the First, in white satin dress, is an exception. It is very clever in conception and execution. Great dexterity of handling is shown in his other small picture of the "Knight Preparing for Battle"; his thoughts anxiously fixed upon the serious business he is about to engage in, while his squire fastens on his armour. The greatest pains have been bestowed on every detail. On a much larger scale, but not altogether satisfying, is the family-group of Mrs. Dominick Gregg and children. She occupies the centre, one child on each side dragging at her to make her join their games. The painting of the dress, both of mother and children, is faultless, but there is a want of reality, a strong feeling of acting a part manifest in all three of the figures. G. D. Leslie has several pleasing portraits, quite as admirable for the subjects as for the manner in which their likenesses have been put upon the canvas; No. 323, "Ida, Daughter of I. D. Coomber, Esq.," is especially worthy of notice. We have also, by the same artist, one of his pretty garden scenes (No. 131) "All is not Gold that glitters." An itinerant vendor of gold-fish is trying his most persuasive powers to induce a lady to buy some. All this takes place in a prim, formal garden, such as was the fashion a hundred years ago. There is a quiet, gentle calm in the scene which is very pleasant; the half-hesitating look of the elder lady shows that she will pretty surely fall to the persuasive manner of the vendor. Ezra Crowe is very disappointing; he has shown that he can appreciate and draw fine old architecture in "Queen Eleanor's Tomb" (No. 103), in which we have a vigorous and faithful representation of that choice piece of architecture which surrounds the Confessor's shrine at Westminster Abbey, but No. 448, "Forfeits," in no way corresponds to the great promise of his early work. Except in a faithful description of some of the texture of the dresses, little is to be said in praise of this commonplace subject. H. W. B. Davis only shows two pictures this year, one of which (No. 255) is purchased out of the Chantrey bequest; it is the smaller of the two, but of great sweetness and simplicity. It is called "Returning to the Fold." In the glow of a summer even a shepherd is driving his flock of sheep and lambs through fat pastures homeward. In the other (No. 65), "Family Affection," a fine cow is fondling its young calf. Very true to nature, and beautifully done. No. 271, Cecil Lawson's "A Moonlight Pastoral" is an excellent piece of moonlight effect. Out of a simple and interesting narrative H. T. Wells has produced a very unsimple and exaggerated painting, in his "Victoria Regina." The portraits, however, are good. From the diaries of Miss Frances Williams Wynn we are told that, on the death of William IV., the young queen had to be awakened to receive the messengers—the Archbishop of Canterbury and Lord Cunningham—and how, in a few minutes after hearing what had happened, she came into the room in a loose white nightgown and shawl, her night-cap thrown off, her hair falling on her shoulders, her feet in slippers, tears in her eyes, but perfectly dignified and collected. Surely there was no necessity to introduce a halo of glory from the rising sun, to add to the interest of this really touching account. The rough, splashy style of No. 199, "Mary, the Maid of the Inn," detracts from its undoubted cleverness. We do not like either of C. W. Cope's pictures, though there is a good deal of character in the faces of "An Inquisition," where a young lady, to

whom a love-letter has been sent, has to bear the scrutiny of two hard-hearted old spinsters. The drawing is very hard, and the colour crude and unsatisfactory. Val. C. Princep's enormous picture of the Imperial assemblage held at Delhi by the Viceroy, Lord Lytton, on the occasion of the Queen's assuming the title of Empress of India, occupies the entire side of Gallery VII. It is a present from the people of India to Her Majesty, and, as it contains faithful portraits of all the principal chiefs of the Indian Empire, it is a valuable historical painting. To be seen properly, it wants to be hung higher, and in a larger gallery. There is plenty of humour in Hamilton Macallum's "Rocked in the Cradle of the Deep." The rocking here is of an artificial kind, and not conducive to sleep or quietness. Three mischievous boys have taken four little ones out for a row, and are frightening them out of their wits by pretending to upset the boat. In the same room No. 607, "Spring," an elaborate landscape, upon which Ernest A. Waterlow has bestowed immense labour; No. 612, "A Hot Day: Rivermere, Cookham," by Otto Weber, an excellent cattle piece; No. 617, "Primrose Gatherers," by Tom Lloyd, are all well worth seeing. In animal life, and all connected with it, Briton Riviere still shows his unrivalled power, both in its serious and comic side. Of the former we have a splendid moonlight scene of Egyptian ruined temple, No. 298, "The Night Watch." Under the ghostly silver light of the full moon, which almost puts out the light of the stars overhead, lions and lionesses, glaring with their green, spectral eyes, wander through the desolate ruins. The splendid modelling of the foremost black-maned monster is above all praise. No. 1051, "The Last Spoonful," is an equally good image of the gentle animal life. "The last spoonful" of a healthy country-girl's breakfast is being anxiously, and doubtless fruitlessly, waited for by an expectant crowd of her farmyard pets: ducks, cock, and hens swarming round, dogs looking over her shoulder and watching with painful suspense, while black puss, inside the passage, gives an extra touch of nature and drollery to the amusing scene.

DECORATION AT THE ROYAL ACADEMY.

DECORATIVE subjects form a large and yearly-increasing feature at the Royal Academy, and no review of the architectural drawings would now be complete without reference to a few designs of more than ordinary significance; we, therefore, purposely abstained in our last notice from commenting on these works, feeling that they were entitled to special remark, as a lesser, but, still, important branch of the architect's province. Those who had the management of the hanging arrangements do not appear to have consulted, in all cases, the degree of delicacy and intricate detail of the drawings. A safe rule would dictate a lower level for this class of works than those of bolder drawing and power of colouring, which generally lose little, if they do not gain, by being hung at a moderate distance from the eye. Strong colours are softened and improved by distance, and vigorous ink drawings are seen to advantage in the higher positions, where their shadows are brought into play. We begin with Mr. J. J. Stevenson's "Interior Grand Saloon, Kenhill, Norfolk" (1088), an important work in a Renaissance spirit, but with a touch of Gothicesque feeling in many of the details. The work has a modern impress, and the author has wisely striven to avoid the coarse archaism of manner prevalent among some artists. Ink drawings do but faint justice, however, to decorative interiors, and the rule applies to this; notwithstanding the avoidance of heavy shadows and other pictorial expedients for effect. The ceiling is divided by beams into panels, and these are enriched by acanthus ornament of a somewhat too sprawling kind, and the corbels supporting the cross-beams look flat and feeble. The wall treatment is perhaps rather too much broken up, and there is an evident want of rest for the eye. No. 1085, "Proposed Ball-room Decoration," by Mr. Henry G. Liley, is a cleverly-coloured drawing, showing interior decoration in a nice key of colour; the ceiling is richly panelled, and a buff ground forms the predominant tone upon which the marginal bands are brought out in a subdued pinkish tint, heightened by a moderate use of red in the enrichments. The elevation of one wall divided into compartments by detached columns of the Corinthian order in a light veined marble, has a rich effect; the wall-surfaces are harmonised by a complementary use of green and red, the latter being confined to the panels, and the scheme of colouring introduced is brilliant without being tawdry or over-laden. The drawings are hung too high for a close appreciation. Mr. Geo. E. Fox sends a "study for decoration for the great drawing-room ceiling of Dorchester House" (1114) in a very different scale of colour to the last. The octagon panels in the centre are brought out in gold, toned with grey or blue, and the cove is emphasised with a dark shade of cool colour between the square panels, which are painted with relief figure subjects, in a light creamy tint —a treatment which, as far as we can judge from the height of the drawing, has the merit of enhancing the architectural ornamentation without over-burdening it. The "Dining-Room, Crathes Castle, Aberdeenshire" (1115), by Mr. W. Wallace, is conceived in a style and tone different to either of the above. The drawing shows a room in a heavy Jacobean style, with a sort of double dado, the upper one apparently in embossed leather of gold or bronze, while above this the walls are covered with a green wall-paper in panels. We must confess the decoration leaves an unsatisfactory division of the wall-surface, and a patchy look, and the difference in the size of patterns between the leather and large blocks of the paper quite destroy all scale. The drawing leaves us uncertain whether the room is arched; the shading and pattern seem to suggest it is. We certainly must protest against the middle dado as a very unnecessary subdivision of the wall. In 1121, Mr. Lewis F. Day sends a small bit of delicate flower-work intended as a design for portion of a painted frieze. The flowers are shown on a black ground, but there is a degree of naturalness in the design which, to our minds, scarcely suggest a decorative treatment, though the realist would find Mr. Day's work exceedingly charming. Among the few drawings illustrating ecclesiastical decoration, we must mention Mr. E. Hampton's well-conceived altar-piece (1128), in the centre of end wall of gallery. The design is tempered by a thoroughly Mediæval spirit, and there is a fine gradation of colouring rising from the row of conventionalised figures or winged Seraphim below the mensa of the altar to the series of canopied figures above. The composition consists of a series of canopied arches, in the centre over the altar is the early symbol of Christ, the Lamb, with Evangelistic emblems on either side, outside which the series of panels are filled with representations of seated figures of the Apostles, distinguished by their usual individual symbols. The figures are well drawn. Mr. Street, R.A., exhibits a rather heavily-coloured "Interior of Guards' Chapel, Wellington Barracks" (1134), a design of Romanesque character having a semicircular apse and a barrel-vault. The height at which the drawing is hung prevents a detailed examination of the colouring and decoration, the apse appears to be enriched with mosaic work on a gold ground, and painted figure-subjects are indicated in the circular-headed panels under windows and in the wall-spaces. The vault is simply relieved by red bands or stripes. Red strings occur over the arcading, which look heavy and obtrusive; but polychromatised treatment for obvious reasons can merely be indicated in coloured perspectives, where, of course, the artist has to give the general effect under conditions not favourable to a scheme of colour rising in tone and splendour in the apse. The same difficulty occurs in Mr. Herbert Gribble's fine interior of his church at Brompton, which we noticed last week. Before leaving ecclesiastical decoration, we must take note of two designs for painted windows, one by Mr. E. Frampton for the east window of Barnston church, Essex (1168), a well-designed, three-light window, with figure-subjects representing incidents of the birth of our Lord and the Lord's Supper, in subdued colouring; and the other by Mr. Ion Pace (1186), representing a design for the "Annunciation," chaste in design and also well toned. In No. 1133, Mr. T. Hall exhibits "Decoration of Dining-room, Craig House, near Edinburgh," in the Adams style. There is a deep red-draped dado, with peacock-green in panels of doors, and a light shade of same in the ground of the wall-paper, which combination has a quiet effect, though rather dark. The wall is divided by pilasters of a light olive or citron tint, enriched by arabesques, the same colouring being found on the frieze. The framing is painted a citron or gold ground tint, and the general tone is low and quiet to a degree that would be almost fatal in dark rooms. As an extreme contrast to this treatment, we turn to "Morning-room Decoration," by Walter Hensman (1139), a large and attractive drawing of wall and furniture, not in the happiest balance as a composition. A fine, but too vivid, blue kills the drabby colour of the furniture, which is exceedingly elaborate and fussy in design. The frieze also suffers from the same spirit, and a heavy dark drab dado finishes the scheme. The "Study for Interior Decoration of Corn Exchange, Mark Lane," must be pronounced a success. Messrs. I'Anson and Son have avoided the flights of bizarrerie, the fantastic or eccentric treatment which many would have been led into in a work of this description. A quietness of tone pervades the wall and arcade. A blue frieze with figures, emblematic of husbandry, runs along the wall beneath the glazed roof. The latter is plainly treated, and the medallions with ears of barley in the arch spandrels are pleasingly relieved. No. 1144 is an ink drawing of an organ-case and screen, by Mr. Arthur G. Hill. The work is bold in outline, and the treatment appropriate, although the instrument has a rather crushing effect on the elaborate screen below. Mr. Piggott's decorative design, "Conventionalised Mistletoe" (1150), is a clever study, but a trifle blue in tone; No. 1157 is skied, a panel decoration, by Mr. E. Page Turner. We must not pass by a nice drawing in sepia of "Angle Fireplace in Oak Room, Rawdon House, Herts" (1167), by Mr. John B. Gass, a fine example of oak panelling bearing the date 1622. The detail is thoroughly Elizabethan, and the figures and carved work in the jambs and frieze, and the figures over mantel are quite characteristic. Essentially Greek in feeling is Mr. Lewis F. Day's design for decoration of a door (1174); the small running white ornament in the margins of panels, and the folial border round the architrave, give an extreme neatness and finesse to it, and the

work is chaste and quiet in colour. Mr. G. Aitchison's drawings of coloured decoration of "Arab Hall, Holland Park-road, for Sir Frederick Leighton" (1176-1180), is, as the name implies, a study of Moorish decoration. The decorative design disappoints us: for instance, the naturalesque foliage in the soffits of arches and the arabesques in the frieze; we fail to realise the delightful ornamentation of geometric form and interlacing arabesques of Moorish work. The contrast of colour is—as, for example, between the red shaft and lintel and the deep blue jambs of lower doorway—rather glaring, but the general tone is in harmony, and the work must be taken as one of the most noticeable exhibits in this class of art. The same architect's "Drawing-room Decoration, 1, Grosvenor-crescent" (1179), is a well-sustained harmony in yellow and black, and is a more successful instance of positive colour of a trying kind. The fireplace, with its over-mantel of ebonised wood, and the black dado, relieve the eye, and are quiet and chaste in design, and further relief is obtained by a frieze of lighter yellow, with arabesques in black. The work is for Sir Wilfrid Lawson. No. 1178 is the *bonne bouche* of decorative colour in the room. It represents Mr. Burges' library at Kensington, an interior in the Mediæval style carried out in the spirit of the old Mediæval artists, and with an unstinted splendour of colour almost unknown in modern times. Mr. Haigh, the artist, has done his best to produce in perspective a semblance of the real work; the reflected light on the beams of ceiling is cleverly managed, the depth and brilliancy of the scarlet and gold in the upper part of walls have been well harmonised to avoid the appearance of garishness and heaviness; the rich foliage upon the red ground in the frieze, and the carved foliage under the mantel-shelf have been depicted with masterly effect worthy of the artist's pencil. The arched windows and the bookcases, with their painted legends, the sculptured over-mantel are all rendered with extreme accuracy in the detail, and the drawing is a piece of architectural illumination which throws in the shade all beside it. Of its merit as a design we may forbear to speak; we rather look upon it as a study of Mediæval decoration. In a much quieter key is Mr. Theodore A. Howard's "Decoration for Morning-room," Limes, Dulwich (1187), where a pleasing harmony of tint is gained by the use of light shades. The bluish-green dado, and light apple-green wall-paper, with its freize of panels and relief on a light blue with the breaks of dark arabesques at intervals, make up a highly-agreeable decorative treatment in Classic, without absorbing daylight. There is a nice gradation in the tints, and the furniture and details are refined and classical. No. 1215, by Mr. W. Clausen, a dining-room wall, with a subject in tapestry, from Spenser's "Faerie Queene," is an able study of oak panelling; the tapestry is well drawn, and the whole is subdued in tone, and in good keeping, but the pilasters are meagre and narrow. We may mention No. 1093, an archaic interior in the Gothic style, by Mr. Theodore Howard, also for the Limes, Dulwich, very much less satisfactory than his morning-room work just mentioned, and with an evident want of rhythm and scale in the details, as, for instance, the huge corbelled chimney. Terra-cotta, and other fictile decoration, are not altogether overlooked. We may mention a pleasing recasing of some new offices and warehouses at Leeds (1153), and two entrance halls decorated in Burmantofts faïence, by Mr. Maurice B. Adams, showing the effect that may be obtained by a not too lavish use of ornament of this kind.

The examples we have mentioned serve to show the extreme diversity of taste in decorative style and colouring, and it would be probably futile to expect, if it were even desirable to hope, a general agreement in these matters. Within the limits, however, of the extreme schools of ornamentists represented at the Academy it is some gratification to observe a quieter and more chastened regard for colour generally, but we cannot say the same of design. There is still apparent an attempt among some artists to put elaboration in the place of art; to exhibit dexterous artifice instead of graceful form and repose, and to make piquancy assert the function of truthfulness in design. As long as artists are at sea about the meaning of such qualities as constitute the embodiment of ideal forms, it would appear vain and profitless to expect the decorative artist to give us anything else than examples stamped with his own personality. If the painter cannot distinguish the beauty of the Classic style of Raphael from that of Rubens, it is not possible to expect from the decorative artist any other than a style of his own characterised by the whims or caprice of this or that master of his art. Extreme fussiness of manner seems to be the prevailing vice of the day, and is an unerring sign of weakness and indecision. An artist in this manner does not seem to know how to commence or set about his work, and we feel that he is without a scheme.

If we may supplement our last notice, we may point to Mr. John Honeyman's well-grouped, and quiet lancet-end in his church at North Merchiston, Edinburgh (1159), in a warm sandstone; Messrs. Goddard and Paget's well-studied gable-end (1111); Mr. Francis E. Jones' nicely-tinted Lych Gate (1097); also to Nos. 1101, 1205, 1206, 1213, 1221, and altogether, we cannot avoid the final reflection that the present Exhibition displays much honest, if not striking work.

A RECENT VISIT TO RUSSIA.—V.

THE CATHEDRAL OF ST. ISAAC.

THE cathedral of St. Isaac, at St. Petersburg, which, as the work of man, ranks amongst the wonders of the world, is one of the most prominent features of the city, and to the traveller one of the first public buildings that is brought before his notice. Its situation is very central, standing in the square at the west end of the Admiralty buildings, in which position it is surrounded by buildings and public monuments of the first order.

On the site of the cathedral, Peter the Great erected a wooden church in 1710, which, after existing about half a century, was replaced by a more durable building of white marble, erected by Catherine II., an edifice, owing to the faulty foundations, that was not completed until 1801. This building in its turn was demolished in 1819, between which date and 1853, the present cathedral was erected at a cost of upwards of three millions sterling.

The architect (Mons. Montferrand) has left an imperishable name in this Northern capital, his hand being traceable in most of the public works which marked the reign of the late Emperor Nicholas. As his name implies, he was of French extraction. Of his antecedents we learn nothing further than he had made himself a name in his own land, sufficiently great to attract the notice of the Emperor of Russia, who induced him to take up his residence in St. Petersburg, where his son, who finished the architectural work of his father in the cathedral, is still practising the noble art.

We have already spoken of the troubles which beset the architect in preparing the foundations of this building—troubles which are hereditary, for to-day the north side of the fabric is a forest of scaffolding, the object of which is to remedy defects traceable to the substructure. The style adopted by the architect is Classic, of the order known to us as Corinthian, of which it is a pleasing illustration. The size of the building is by no means remarkable, and it is clear that the architect has aimed more at wealth of material, and great expenditure of labour, than at colossal proportions. In this respect it is clear that he must have had lengthy interviews with his Imperial patron, for it is evidently designed to show, in their strongest light, the capabilities of the native materials for the construction of works of the first order, rank, or importance.

The plan of the cathedral is that of the Greek cross, the arms of which, we need scarcely say, are of equal length.

The floor or base-line is six feet above the level of the street pavement. This, in the case of the peristyles, which enrich the different faces of the cathedral, is formed into three colossal steps of polished red granite, each two feet high, and four feet eight inches broad, the length of which, without intermission, except where the steps or stairs are hewn therein, in each separate group is 160ft. Where the worshippers make use of these steps they are covered with broad matting held in place with strong brass stair-rods; at the time of our visit this matting was clogged with snow, but the greater steps were faultlessly clean and bright in their polish. The base of the building itself is of the same polished material, the blocks being six feet deep on their bed and of great length.

Above this base-line the building is constructed in dove-coloured marble, in blocks of thirty inches, faultlessly jointed and bedded. This material, from being veined, or possessing yellowish bedding marks, is not over-pleasing in its character. The pilasters, cornices, and other architectural details, are wrought in red and grey granite; the enrichments, such as caps, bases, panels, tympani, &c., are of bronze, highly wrought into allegorical groups of figures, modelled in the highest class of art, the whole being crowned with groups of angels, those at the four corners of the body of the church supporting colossal cressets.

The columns forming the peristyles are, in the main, 48 in number; these are each of polished red granite, and, marvellous as it may appear, they are each wrought in the shaft from single blocks or monoliths, the finished height of which is 47ft. 6in., with a diameter at the lower member or fillet of 6ft. 8in. The bases of the columns are 8ft. square on the plinth, and their height, including the base-moulds of the shaft, is 2ft. 9in.; these are of bronze, and each formed of a single casting. The caps are of bronze, and highly wrought; these are 7ft. 6in. in height, and of suitable diameter. Our first object was to search for the joints of these columns, and, failing this, to test the question of their being artificial, for it is almost beyond belief that such colossal columns could be wrought and polished in the single block. We learn they were hewn from some quarries in Finland, and brought to St. Petersburg at great cost; but how they were carried across the river, wrought, and placed in position on these bronze bases, we are at a loss to understand. We need scarcely say that one of these monoliths would be accounted a wonder in any country; but here we have 48 of them grouping round a single building; added to which there are 24 others, forming the colonnade of the great dome, the size of which is little, if any, inferior. With our further notice of these remarkable columns we may couple the Alexander monument, erected in the great square on the south of the Winter Palace, which is alike the work of Mons. Montferrand. The shaft of this column, alike of one solid block of polished red granite, is 84ft. high and 14ft. in diameter. This monolith, the finest in the world, was quarried from the rocks of "Pykerlar" in Finland. This shaft was originally 102ft.

in height; but it was subsequently shortened to 84ft., out of deference to its diameter (14ft.). These monoliths appear to have been introduced in these positions, without any previous experience as to their behaviour in such a trying climate. The frost, we are sorry to relate, has fractured them in several places; but the fissures are carefully cemented, or made good. In these repairs the colour is not agreeably matched: but it is, no doubt, the best the authorities can do under the circumstances. It is, to say the least, a melancholy reflection that these magnificent works are already giving signs of threatened dissolution.

The south, north, and west faces of the St. Isaac Cathedral are pierced with doors, the openings of which are 37ft. 6in. high and of proportionate width; these are fitted with bronze doors, the panels of which are enriched with ornaments and sculpture on either side. The ceilings of the peristyles on the north and south of the building are divided into three compartments, the centre being waggon-vaulted and enriched with panels executed in marble and bronze; the side ones are flat, with the cove of the cornice enriched with hosts of bronze cherubim.

The large, or central dome, rising to the height of 296ft., is a mass of marble, granite, and bronze, the character of which, in the ornament and sculpture, is strictly in keeping with the lower parts of the fabric. The dome covering is copper, plated or overlaid with gold, and we are told that this gilding or facing required the melting down of forty-two measures (fourteen bushels) of gold ducats. To descend more closely to detail, we learn that the great dome itself, irrespective of the surmounting cross, and the four smaller domes, absorbed 185lb. weight of gold. The effect gained by the architect in these domes is superior to that of any others we witnessed in Russia, inasmuch as the bright yellow of ordinary gilding is not apparent, their appearance reminding us more of polished brass in which a strong infusion of copper is visible. We need scarcely say that this great dome, like that of St. Paul's, in London, is visible from every point of vantage in the city; but, from powerfully reflecting the sunlight during the day, and the moonlight during the stilly night, it possesses an especial charm, as does the lower part of the building, when brought within the range of the eye, for the lights are reflected from its variant faces of polished stone in a most pleasing manner.

Travelling in a strange land is at best a monotonous occupation; but when objects like the St. Isaac Church at St. Petersburg cross our path, the spell of *ennui* is broken, and we stand before a shrine at which we cannot fail to worship. In our case, although the temple of a faith in few degrees analogous to that of our land, we freely own to being lured time after time to the precincts of this marvellous church, this tribute of a nation to a nation's God, a work to which it may be truly said that the hands of man could do no more.

We will now, with our readers' permission, visit the interior of the building, to do which we join the throng of worshippers ascending the steps, and threading their way through the monolithic columns of the southern portico, taking care to tread only on the matted path, as the marble floor, with its polished or icy face, is unsafe or treacherous ground. Our entrance is through a small wicket-like door on the side of the great entrance, the doors of the latter being only opened on great or state occasions. On passing the threshold we are in the midst of a throng of people, the like of which has become familiar to us in connection with our general election, for it must be understood there are no seats provided for the worshipper in the Greek or orthodox churches of Russia. The assembled worshippers, so far as the clerical body is concerned, are utterly ignored, and hence it is customary to witness the people at all times of the day trooping in and out of the doors, or taking up positions either standing, kneeling, or prostrate upon the floor of the nave. Not the least remarkable feature that presents itself upon gaining the interior of this cathedral is the absence of light, other than that of the wax tapers or votive candles, which are purchased by hundreds at a counter near the western door. These are carried by the worshippers to the favoured shrines, where they are stuck into the numerous sockets of the cressets or candle-stands. It is true that towards the western end windows occur; but their light fails to penetrate the thick and smoky atmosphere of the eastern end, where the offices of the church are performed—a remark that applies to the light from the central dome.

We must not trespass upon our readers' patience in describing, too minutely, the interior of this church. Suffice it to say that the walls are wrought in polished marbles of various colours, asserted to be of native origin, in which carving and inlaying are freely used. The floor is of black and white marble, laid in squares, with suit-suitable borders. The wall-plinth, or base of the dado, is of black marble, capped with a white marble mould. The dado, or die, is of red marble, with yellow veins, somewhat of the character of the Italian siena, with black and green veined marble panels. The surbase throughout is of white marble. The ground face of the walls above this line are of black marble, through which is a free admixture of white veins, and the panels are wrought in Siena-like marble. The wall-pilasters, which are of great size, are wrought in this latter marble, and provided with polished brass caps and bases. The various arches are turned in white marble, in which are sunk spandrels of black and green-veined marble. The soffits of these arches are deeply sunk and moulded, and their panels are enriched with bronze rosettes. The cornice is of white marble with Siena-like marble frieze, and the enrichments are a blaze of gold. The higher orders are of the same character as the cornice, and the arches or tympani, are of Italian mosaic, the subjects being figures worked out in great detail on a ground of gold.

As in the case of the great columns or pillars supporting the dome, wall-spaces are formed, in which, as panel-ornament, large mosaic figures are introduced. These may be looked upon as aids in the illumination of the church, for before the face of each figure a silver lamp is suspended.

The nave is divided from the sanctuary and side-chapels by a screen or "Iconastasis"; before this is a platform, in the inclosure of which the gold and purple-clad priests and choristers perform their holy office. The railing of this inclosure, which reaches across the church, is of moulded white marble, supported on massive brass balusters. In the neighbourhood, and fixed in positions where the worshippers can kiss them and prostrate themselves, are shrines and relics, the figures of which, in the case of the Virgin and Child, are studded in their crowns with diamonds and jewels of fabulous value.

We are here in the face of the great screens of St. Isaac's Cathedral, which, with that marvel of wealth, the Sanctuary, we must reserve for our next notice.

BRISTOL, PAST AND PRESENT.*

WE have received Part I. of an illustrated history of Bristol and its neighbourhood, by J. F. Nicholls, F.S.A., chief librarian to Bristol Free Libraries, and John Taylor, librarian to Bristol Museum and Library. It forms a double-columned quarto, well printed on good paper, with carefully-drawn wood engravings. Chapter I. opens with an account of the camps, hut-circles, pit-dwellings, barrows, and other prehistoric records of the neighbourhood, written by Mr. Nicholls, who enters at some length into the subject, and from a glance at the 16 pages devoted to it, we see the author evinces no mean research into and knowledge of the early traditions of Bristol. Illustrations of the long barrow at Stoney Littleton and camps of the Avon are given, with a plan of the megalithic circles at Stanton Drew. The sections on Ecclesiastical History are from the pen of Mr. Taylor, and promise to be equally interesting records of the locality. The illustrations in this part are less satisfactory; but we find the author has availed himself of abundant literary material from the best sources. These sections, though bound together, are paged separately, so that when the work is finished the civil history will form Vol. I. and the ecclesiastical history Vol. II. A third volume is contemplated, entitled "Modern Bristol," and the work promises to be an exhaustive history of the city, from prehistoric to the latest times, written by competent pens, and in a popular style.

* Bristol, Past and Present; an Illustrated History of Bristol. By J. F. Nicholls, F.S.A., and John Taylor. London: Griffith and Farran, West corner of St. Paul's-churchyard.

HADDON HALL.*

HADDON HALL is well enough known to the painter, the antiquary, the lover of the picturesque, and the ordinary tourist. It is, however, to be suspected that the value of this building to the student of architecture has not been quite so fully recognised as it might be, and it is mainly in order to point out to the members of this Society, which to so large an extent consists of students, the quality and variety of its architectural features, that this paper was undertaken. At the same time, it seemed to afford a good opportunity for bringing under your notice the method of illustrating architecture which I believe I had the honour of being the first to introduce as an aid to a serious study of architecture, in lectures given to the students at the Royal School of Engineering at Chatham—a method which has not yet been much employed, but which approaches more nearly to a visit to the building than any other. Before we separate, the magnificent image of some photographic views of Haddon Hall will be thrown upon the screen by the aid of oxy-hydrogen light, and in those cases where it has been possible to find a photograph of the parts of most interest, you will be able to follow what is said much as though we were on the spot, an advantage not so fully afforded by diagrams or by any other method of illustrating architectural lectures or papers. I am, however, also enabled to put some diagrams and lithographs before you, the latter from the pages of the Building News.

The best old published plans of Haddon Hall are in Lysons's "Britannia." A glance at one enlarged from them will show that the general plan of the hall is an oblong building nearly, but not quite, as long from east to west as it is from north to south. There are two towers, one at the north-east angle, and one at the north-west angle. For the most part, the buildings are two stories high; they are battlemented throughout. They are built round two irregular quadrangles, and occupy a rocky site, part of which slopes rapidly from east to west, a circumstance which adds not a little to the picturesque charm of the western quadrangle.

The general disposition of Haddon Hall is as follows:—The heart of the mansion, that, in fact, which contains the apartments distinctive of an English baronial house, lies in the block which divides the two internal courts. In this building we find a close conformity to the ground-plan of other Mediæval English houses, such, for example, as the residential part of Warwick Castle. At Haddon we find the ancient hall, a passage being screened off at its lower or northern end, from which the kitchens, larders, buttery, &c., open. The hall has no bay window, but it still possesses the great open fireplace, and at the end furthest from the entrance, properly termed the upper end, the dais,

* A paper read before the members of the Achitectural Association, on Friday, May 7, 1880.



GROUND-PLAN OF HADDON HALL.*

(From Mr. J. J. Stevenson's "History of Architecture.")

REFERENCES;—

A Brewhouse.
B Entrance to lower court.
C D E H I Servants' apartments.
FF Larders.
G Bakehouse.
K Entrance to upper court.
LL Offices.
M Pantry.
N Buttery.
O Porch to hall.
P Screens.
Q Upper court.
R Lower court.
S State staircase.
T Porch of chapel.
U Withdrawing room.
XY Cellars.
Z Elizabethan gallery.
a Terrace.

* Reproduced by the kind permission of Messrs. Macmillan and Co., the publishers of Mr. Stevenson's book.

a slightly-raised platform up one shallow step, on which still stands a mighty table of venerable age. Immediately beyond this, comes the old private dining-room, and the usual door of access to it existed, though it is now built up. The north side of both quadrangles, as well as the western end of the building, is occupied by the more domestic rooms. Much of the east end, and the whole of the south side, is occupied by the state-rooms, including a drawing-room, a grand ball-room, and several bedrooms; while last, but not least, at the south-west corner stands the chapel.

The domestic buildings, as well as the chapel, are stated by local antiquaries to include remains of Norman work; but there are no traces of a keep or anything like one, and no masonry has met my eye which recalls exactly the peculiarities of Norman work. There are, however, some features in the chapel which have a very Norman appearance, and certain it is that the oldest parts, as we now see them, must date at least from the 13th century. Curiously enough, these earliest portions lie at opposite corners of the block, for they occur in the chapel and the Eagle Tower.

The central block of buildings already referred to is apparently of Late 14th-century architecture. In the 15th century, the outer ranges of buildings were in many parts built or rebuilt. The 16th century saw further additions and many alterations. The great ball-room and state-rooms, forming the south range, are of this period. Lastly, many of the internal fittings are of the 17th century, especially in the domestic range on the north front. The chapel shows work of every one of the centuries named, nor is this a singular occurrence, for throughout the building small alterations and improvements seem constantly to have been made, and as in many cases the old stones were re-used in the newer work, the building offers not a few curious and perplexing little problems for the archæologist.

My own theory is that the original 12th-century domestic buildings of Richard Vernon must have occupied the site of the existing hall and kitchen. Mr. Jewett, as you recollect, has pointed out, that before the year 1199, Richard de Vernon obtained a licence to fortify his house of Haddon. This shows that at that time an unfortified dwelling-house was standing, and it is most natural to suppose that it stood where the present hall stands. The line of the wall, built in pursuance of the licence, would probably be the same as that of the outer walls of the buildings which enrich the east court, and the Eagle Tower, which I have referred to as showing marks of 13th-century work, was probably the gate-house. It appears likely that the western inclosure may have been of a later date entirely, and that the chapel, which is larger than that of a private house usually is, may have at first stood quite detached. The rather awkward way in which it joins the other buildings, so that it lies much of it outside the outer line of wall, at least on the south side, rather seems to support this idea. Possibly a careful examination and comparison of the masonry of the outer walls of the western half of the building might reveal, or has revealed, some mark of date, showing that the inclosing wall of the end of the 12th century took in the western court as well as the eastern. I cannot, however, report having personally found anything in this wall in which I recognise marks of great antiquity. If, however, it can be established that the chapel has always been included within the wall, then the space inclosed by Richard de Vernon must have been pretty nearly as much as that now occupied by all the buildings.

The situation of Haddon Hall is at once picturesque and commanding, though also sheltered. It occupies the front of a kind of projecting spur of rock pushed forward from the north-eastern side of the valley of the Derbyshire Wye. The position even before the introduction of gunpowder was not a very strong one. Still, there was some amount of natural defence, and the ramparts commanded a complete view of the plain below. The building is not a large one or lofty, yet, from the perfect way in which it retains the aspect of a mansion of the middle ages, it is one of exceptional interest.

I propose now to invite you to examine with me the different portions of the structure; and first, if you please, we will, as one always should do in visiting an ancient building, walk round the exterior. The present approach to the building is at the north-west corner. Here we find a tower which we will call the entrance tower. This is of late fifteenth-century design, and is a very familiar object in views of the place. It is, no doubt, venerable and picturesque; but were it the work of an architect of the present day, we should call the management of the windows very clumsy. There is, however, some exquisite Tudor detail about a partly-ruined doorway at the east angle. The west return wall is lofty, pierced by but few openings, and rises above a kind of crag. It terminates in the west end of the church, and, like all the external walls, is battlemented. The north wall is far more interesting. It is pierced by many windows. Its continuity is broken by the projection of the fine old fourteenth-century kitchen, with a wonderful complicated series of weatherings, buttresses, little lights, and irregularities. Work of several periods can be traced in it here and there, the changes being often abrupt. As the buildings extend eastward they have to climb rising ground, and the outline accordingly shows two breaks in height. At the north-east angle of the buildings the perspective is closed by the outline of the Eagle Tower. The domestic character of the work is shown not only by the many mullioned windows, but by the occurrence of a series of chimney-stacks, the caps of which have, I think, suffered from a bad restoration, but which otherwise are not modernised. Of this front a perspective was given in the Building News, March 7, 1879.

We will now, if you please, walk round to the east side of the building, and I cannot avoid

saying that, though this is perfectly accessible, and though in fine weather scores, if not hundreds, of visitors visit the place daily, including, of course, many cultivated and artistic persons, I seldom recollect to have seen, during a pretty long experience of the place, a visitor take the trouble to make his way hither. Of course, the east side must be occasionally visited by antiquaries and students of architecture, but the general public seem to think that there can be nothing there to look at.

Here we find a piece of ancient work. The entrance tower, otherwise Eagle or Peverel Tower, was extremely plain, but its battlements and parapets have apparently been recast late in the thirteenth or in the fourteenth century; and at the same time, a very picturesque parapet, with stepped battlements, was added to the old east wall. Part of this has fallen, leaving the narrow *chemin de ronde*, which it screened, and part is overgrown with ivy. Enough remains visible to show that this was an excellently designed addition to the earlier and plainer work. But few windows pierce the walls, and what occur are mostly small and mullioned, but not large enough to require transoms. The old archway, which appears to be a fifteenth-century insertion taking the place of an earlier arch, is still occupied by a pair of ancient framed gates. In order to complete the view of the east end, and to see the south side, it is necessary to pass into the old gardens, and we find ourselves here face to face with buildings of Elizabethan character. These probably, in part, occupy older foundations, but they are themselves new buildings of the sixteenth century.

Dorothy Vernon's doorway—plain enough in itself, but made graceful by the pretty Elizabethan balustrade, which, however, was most likely built after her elopement which took place in the middle of the sixteenth century—and the end window of the great gallery or ball-room are the features that complete the east elevation. The whole south front presents a most telling series of bay and oriel windows. Those of the ball-room have mullions and two transomes. Some of those further on are smaller, and have no transomes. At the end of this line of buildings we see the Late Perpendicular east window of the chapel looking at us. It occupies a gable of very flat pitch. The side wall of the chapel completes our south wall; and the east wall, already referred to, brings us back to the point from which we started.

In this perambulation we shall have noticed that, in the main, Haddon Hall was a building of two stories only, though here and there, there are three floors on the north front; that it is entirely built of stone, and that several qualities of stone and kinds masonry are to be detected.

We will suppose that we enter by the older, and at present little-used entrance, under the Eagle Tower. There are no signs of a moat and drawbridge, and the general configuration of the ground makes it unlikely that such a defence ever existed. There is, however, in the gateway a groove for a portcullis. The east quadrangle, in which we now find ourselves, is higher in level, less broken up by picturesque features, and more primitive as well as more simple in appearance than the western one. The east side of it [see illustration in our lithographic pages], however, is extremely interesting, and presents, concentrated into one spot, a kind of epitome of all the changes which the hall has undergone, so that an examination of it somewhat in detail may serve our purpose.

The old tower, which forms the main feature here, is built of rather rough limestone rubble, with quoins, parapets, &c., in coarse sandstone. It is oblong on plan, having an entrance archway passing quite through it, a staircase turret square on plan, and built straight without set-off's, is joined on to it. Two lower blocks of building, north and south of it, which I will call its wings, are of the same masonry and same age; and it seems to me that this when erected was a complete structure, built to stand alone. The walls of the wings have a slight batter, and where the buildings of later date are joined to them, as they now are, there is a straight joint, and the quoin of the oldest part is complete down to the ground. The jambs of the lights have but a single splay, while almost all the other windows of the building have a double one. The moulding in the jamb of the doorways is one hollowed splay. The heads, which are curious, are each one lintel cut to a slightly ogee shape. This may be the original square head altered at a later date. The battlements of this part are all cut square at the sides, and this mark of simplicity distinguishes them from those in use elsewhere, which have the moulding of the lower part of the cap carried round the embrasure. The parapets are carried on very rude corbels; but on measuring these battlements, which are roughly executed in very coarse stone, an unexpected refinement was to be detected, the higher battlement being slightly steeper than the lower one.

The remaining portion of this wall is of later date than the tower, and bears marks of one, or perhaps two alterations. The masonry is not unlike that of the tower, but includes some sandstone, and the straight joint between it and the tower has already been alluded to. It is, therefore, pretty certain to be subsequent in date to the tower, but not long subsequent, for it contains one window and another window-head, having the single splay outside already alluded to. Almost everywhere else there is a double splay. Into this wall a window or two were inserted, apparently in the fourteenth century, but without in one case taking away the head of an older and larger window already existing, and this accordingly remains in its old position.

In the fifteenth century a Tudor door-head was inserted to one doorway, and a parapet and battlements were built, obliterating whatever finish this wall had previously possessed. This parapet does not overhang, and a moulding runs round the embrasures. Later still the fine bay window which on its upper story lights one of the state bedrooms was added. This probably was sixteenth-century. Its mullions and jambs are cone sided, and it has double transoms. It must have been built either at or near the same time that a fine lead rain-water head and down pipe still in use were fixed within a few yards, bearing the date 1602.

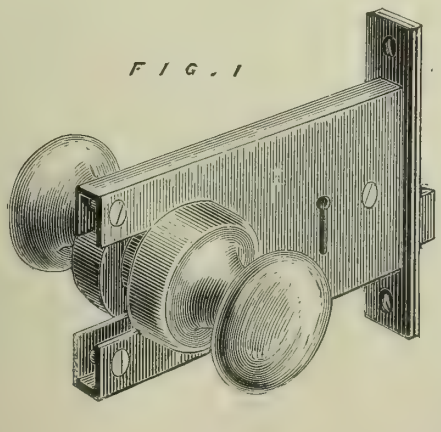
I have lingered over this little fragment of the building because it contains work of nearly every period represented in Haddon Hall, and illustrates thoroughly the kind of alterations that have gone on.

(*To be continued.*)

PATENT "BINATE" DOOR-KNOBS AND LOCKS.

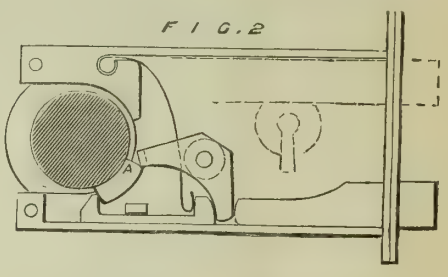
MESSRS. ARCHIBALD SMITH and STEVENS, of 48 Leicester-square, are introducing a new door-lock and furniture, invented by Mr. Samuel Russell, which is very simple, very strong, and which cannot possibly get loose. The patentee has solved a difficulty which has been tackled with more or less success by many inventors, by doing away with the spindle altogether, and making the pair of knobs in one solid piece, the central portion of which is of a diameter equal to a greater than that of the knobs. Round the circumference of this central portion, a groove is sunk just wide enough to receive the lock as shown in Fig. 1. To adjust

FIG. 1



the lock or latch and combined handles on the door a circular hole is made through the door, passing at a suitable point through the mortice cut for the insertion of the lock or latch, and just large enough to allow the handles to pass through, and into which they are inserted. When the lock or latch is slid back into the mortice, the two opposite sides of the opening in the lock or latch pass into the groove sunk in the handles, and span its diameter, by which means the handles are free to turn on their axis but can have no other motion; and the whole is retained in position by fixing the lock or latch in the ordinary way with two screws. The patentee adopts several methods of causing the turning of the handles to actuate the latch-bolt,

FIG. 2



but the one preferred is shown in Fig. 2, where a small block of metal, A, is shown, which is fixed on the bottom of the groove in the handles, and sufficiently narrow to allow the side plates of the lock to pass without contact.

The entire absence of loose pieces, screws, nuts, &c., which are always getting loose and disappearing when wanted, and the ease with which the lock and handles can be removed and replaced, will strongly recommend Mr. Russell's invention to architects, builders, and others.

THE FURNITURE AND DECORATION OF TOWN HOUSES.—VI.

MR. EDIS brought his course of Cantor lectures to a close on Monday evening by referring generally to the many articles of domestic use essential in the furnishing of a house. Mr. H. Truman Wood, secretary of the Society of Arts, occupied the chair, and at the conclusion of the paper, proposed a vote of thanks to the lecturer, a motion which was well received, and briefly responded to. Mr. Edis said he saw no reason why every little piece of pottery, porcelain, glass, plate, bronze, or iron, however humble in itself, should not be essentially artistic and pleasant in form, instead of being, as it usually was, essentially ugly and commonplace. Nor did he know why the general articles of domestic use, in our day and generation, should not be quite as beautiful, and as good in treatment, as any of those in the best periods of ancient art. It was, however, quite impossible at present to realise such a hope, as the public taste in most matters pertaining to art, was only in a state of transition, and only gradually being educated by the examples of good art to be found in the innumerable collections, public and private. At present the majority of people seemed to prefer grotesque forms and shapes, in which novelty and eccentricity were the only recommendations, to the works of true utility and beauty. Any progress was to be looked for in the education of the public rather than of the manufacturer. The author was told a few days previously, by an eminent manufacturer, that he was obliged to produce for the million, and that he could not live if he did not do as other makers did—provide articles of the form and shape and colour which the lecturer condemned, and that good artistic designs did not pay. He replied that one or two artist-tradesmen did make it pay to sell only good things, and that in the time when Messrs. Wedgwood employed Flaxman, all their designs in pottery and china were good in form and ornament, from the most elaborate vase to the humblest plate or cup. In their works were to be found examples in charming ware, delicate in tone and colouring, and of the most refined classic treatment, with infinite beauty of design, form, and workmanship. He was glad to find that this old firm were now falling back on their old models, reproducing Flaxman designs, and so offering to the public ordinary services in which the old forms and shapes were preserved, all infinitely more beautiful than the more modern productions. Examples of ware lent by this firm were exhibited, Mr. Edis drawing attention to the fact that the shapes and ornaments were those of pottery and not of metal-work. Messrs. Minton, Doulton and Co., and Osler, Webb, Powell and Co., and the Royal Worcester Porcelain Manufactory,

and other manufacturers, had respectively, in pottery, porcelain, and glass, spared no pains to improve their wares, which displayed an immense advance in skill of manipulation and artistic treatment. The history of the art of pottery was of interest, not only from its extreme antiquity, but also from offering an insight into the various processes for treating clay, and except for the introduction of machinery the manufacture had been identical through some thousand of years, and its best products had been prized in all countries as gems of artistic production. In the commoner objects of our English manufactures there was yet much room for improvement; a dish, or bowl, of good shape was often ruined by vulgar ornamentation or a handle of coarse form, or by crude enamel colouring, which chipped off at the least knock. It was questionable whether the taste which produced many really beautiful examples of pottery, faïence, and porcelain, contributed by English firms to the late Paris Exhibition, and illustrating to a great extent mere attempts at copying or imitating Oriental and European designs and colours, was right in principle. Quite certain was it, however, that English artists could never imitate the delicacy of drawing and finesse of design and decoration peculiar to Oriental art. Oriental artists never painted two flowers alike, but varied their design with grace and beauty of ever-changing ornament; whereas English artists, if they attempted irregularity, showed a manifest method in it utterly unlike the real thing. Messrs. Doulton and Co., of Lambeth, had of late years laid themselves out with great success to produce terra-cotta work and pottery of good artistic character for architectural decoration. In what was known as Doulton-ware—of which also many specimens were shown—they had been eminently successful in producing work, not only good in form, but very beautiful in decoration, design, and glazing, thanks chiefly to their having secured the services of such skilful artists as Mr. George Tinworth and Miss Barlow. This ware was practically the treatment of pure pottery-clay in the same manner known as *pâte-sur-pâte* in porcelain, an art of painting with clay upon clay, by which great beauty and artistic character of decoration was obtained. The special characteristic was the depth of the glaze, which was entirely obtained by the decomposition of salt in intense heat. The tints required were painted on the clay before firing, the uncertainty of firing and glazing preventing any two pieces being exactly alike. In the present day painted tiles were largely used, not only for wall decoration, but in the design of many articles of furniture; all that kind of work might well be taken up by women, provided they would bestow the requisite study on the art. With a little thoughtful labour and care, added to fair taste and skill in drawing and a knowledge of colouring, women might paint decorative tiles for any ordinary purposes, and by diligence could make it a work of profit as well as of pleasure. In every garden were many flowers which could be arranged naturally or conventionally for tile or china decoration. These should be drawn in outline and slightly tinted in one or two colours, so as to be easy of production, for the million would gladly buy simply-painted tiles or china-ware, if well drawn and good in design, where the few only could afford to purchase at any remunerative price more elaborate pieces of painted faïence and porcelain. This kind of work might be taken up by numbers of women who were anxiously seeking remuneration for artistic talents; too often, however, such workers aimed at producing elaborate paintings, more or less adapted from inferior copies, and so failed from insufficient knowledge or want of power in drawing and design—faults especially noticeable in figure-work. For some excellent examples of artistic tile-painting the lecturer was indebted to Miss Spiers, and for cheap hand-painted and printed tiles to Messrs. Mintons. Grace and beauty in design need be no more expensive than ugliness and eccentricity, and education in artistic matters, combined with a study of the graceful and beautiful in the best periods of art, could alone help us to that refinement and innate truth and elegance of design which should guide us in the humblest, as well as in the most elaborate, productions of pottery, faïence, and porcelain.

In the present fashion for art-needlework excellent opportunity was offered for ladies to take up an employment especially their own, and which, rightly carried out, lent itself to good decoration in the hangings and coverings so necessary in all houses; but here again something seemed wrong, either in the training at fashionable schools of needlework or in the taste of the originators of the designers, for too often the work was filled with an elaboration of detail and ornament involving infinite labour and infinite expense. It was useless repeating in crewel or appliqué-embroidery, Japanese designs, or complicated arabesques. The proper rendering of embroidery and appliqué work was as much a matter of artistic training as painting, and the poverty-stricken attempts of young-lady amateurs were often a disgust from the stiffness and ugliness of their conventional forms. Embroidery to be good must be the work of one head and one pair of hands, and for true artistic rendering an essential was Mr. Ruskin's precept "that the first condition of an ideal work of art was that it should be conceived and carried out by one person was more or less essential."

We prided ourselves on the purity and excellence of English glass, and yet how often did one see beautiful forms utterly ruined by inartistic engraving and cutting, or by coarse and crude colouring. In the numerous modern samples of Venetian glass there was much that was graceful, but the influence of bad designs and a craving after novelty of treatment was doing much to damage otherwise beautiful work, and in glass, as in china, might be seen imitations of work essentially suggestive of other materials, and utterly subversive of true artistic canons. In purity of material and skill of production glass-makers could hold their own with the workmen of any period of that art; but unfortunately with this skill of handicraft there was a manifest deterioration of design and treatment arising principally from the effort to produce in glass objects and forms inconsistent with the true use, purpose, and rendering of the material. Table-glass should be as pure and as simple as possible, delicate in shape and ornamentation, inexpensive, and fitting. It was essential to have elegance of form, combined with purity of decoration. While he did not wish to advocate the more extended use of foreign-made ware to the detriment of that of English manufacture, he felt that a dining-table looked infinitely more cheerful and artistic when covered with water-bottles, flower-vases, and glasses of variety of colour and form, than with the cold monotony of ordinary English glass, no matter how pure its crystal or how elaborate its carving. The present fashion for colour and variety in glass as well as in everything else was inducing English manufacturers to turn attention to similar work, and Messrs. Powell, of Whitefriars, and other makers, had produced exceedingly beautiful specimens of artistic glass. But to the humble glass-blowers of Murano must be conceded the prize for innate beauty of form, colour, and ornamentation, and for infinite variety of table-glass, and while that work showed artistic treatment and purity of form, it could be bought at a price which bore favourable comparison with English domestic glass. In the work of our own country we saw great variety of forms, many exceedingly graceful and good, great excellence of cutting and engraving, and occasionally some fair specimens of coloured and gilt glass, but we looked in vain for any that could compare with Old Roman or Venetian glass. There was no reason why our glass should be made heavy with red lead for the purpose of giving increased brilliancy to it when cut; we could have the same lightness of material as in the olden glass, and ought to be able to produce the most elaborate designs and the simplest forms for everyday use, equally well made and at reasonable cost. While Messrs. Powell and Messrs. Webb had exhibited a marked progress and improvement, what was wanted was that our manfacturers should give us good general forms for table use, sconces, and candelabra, and vases, bowls, and dishes for ornament and use, and at a cost within the reach of all.

In the lower sitting-rooms of most London houses it was necessary to have some sort of lower screen so as to render the rooms private from the gaze of too-curious passers-by. For this purpose, all kinds of contrivances had been carried out, from the old wire gauze with its dingy and dirty look, and everlasting painted ornament of Greek fret or honeysuckle border, to the curious twisted-cane inventions, bad in design and infinitely too spotty and strong in colour to be pleasant accessories in any room in which artistic decoration was thought of. He would suggest, instead of these coarse and unsatisfactory arrangements, that either a pattern of good repeated ornament be done on the lower portion of the window-glass by the ordinary process of embossing, or that a second sheet of glass containing the pattern—which might be done in light tints—be fixed on the inside face, or better still, there might be blinds of "jewelled glass" in square quarry lights, or good figure flower decoration in leaded glass, either done in outline and stained in delicate tones of yellow, or worked out in good stained glass of various colours; these glazed blinds could be so fixed as to be easily removed for cleaning purposes. All this kind of work could be done at a cost of a few shillings per foot super, and added materially to the charm of a room. Blinds so fixed to the sashes might be objected to on the ground that the sash weights would need to be altered, to carry the extra weight of the blind, and that when the lower sash was opened the use of the blind was practically done away with; but the first objection might be got over at the price of a few shillings per window, and if flower-boxes were fixed on the sills outside, made of ordinary zinc with blue and white tiles inserted in the front, at the cost of from 20s. to 30s. each box, not only would the latter objection be done away with, but the bright and cheery look of low shrubs in winter, and of many-coloured and scented flowers in summer, would add materially to the pleasantness of a room, and the tiles and flowers would afford grateful spots of life and colour in the dreary monotony of London streets. Separate blinds made in a frame and fixed with bolts to the sash-heads were troublesome to take down, and were often in the way, especially where flower-boxes were set outside as suggested.

In all kinds of silver electro-plate, bronze, brass, and ironwork in the present day, there was a general want of taste in form, artistic design, and general treatment. It was miserable to see on our tables the trashy cruet-stands of filthy form and ornamentation, and the hundred and one articles in épergnes, cups, vases, tea and coffee services, candlesticks and ornaments, all commonplace and inartistic, and it was equally discomfiting to see in our rooms the commonest arrangements for door-handles, and cast-brass bell-pulls, which were always coming off or breaking. There was no reason why these articles of domestic use be made good in form and shape, honest and strong in construction, at the same cost as was now paid, except perhaps that the manufacturer would not take the trouble to procure two or three really good designs, or to copy some of the exquisitely beautiful ancient examples; but that might be because the manufacturer feared that the public would not pay for them, but would demand of him continual novelty at the lowest possible cost. Both suggestions were, in the author's opinion, wrong. A vast proportion of the public were able to appreciate good forms when they saw them, and many were willing to pay high prices for old silver of artistic design and shape, and would doubtless prefer to have all these necessaries of daily use equally good in shape and ornamentation, and to pay a fair price for the better article rather than to have the same things bad in form and altogether inartistic, provided always that, having regard to better quality and sounder construction, they could get them on equal terms as regards price. Unfortunately, as a rule, this was not to be done, for the manufacturer naturally said that things artistic in character demanded much higher skill of handicraft, more careful execution, and, therefore, higher cost of production. But, surely, the higher education of all art-workmen, and the constant opportunities given to them of seeing and studying good work of all kinds, should, if they had any real heart in their work, imbue them with the same kind of artistic feeling as was evidently in the hearts and heads of the old workers, and that it should be difficult for them to produce ugly things. This might be deemed Utopian; but there was, he contended, in the workmen of past days, an innate feeling for beauty, a skill of eye and hand, and an education of mind in the rendering of everything they set their hands to, wanting in the great majority of ordinary workmen of the present day. With all our advantages, all our opportunities, all our wealth, and all our education, we were living, to a great extent, in the

absolute lowest depths of ignorance in most matters of art, so far as beauty of form and power of design, or even of adaptation, was concerned, in the commonest objects of daily life. Progress was being made in many trades cognate to art, but it was at present but a feeble glimmering of that far-off light of love and truth for art's sake, which he hoped at some time would shine forth as strong in all works of handicraft and artistic skill, as it did in the centuries that are past. To the lecturer's mind the influence of trades-unionism was asserting itself to the detriment of English work, and to keeping up extravagant prices for ordinary domestic articles. It was simply absurd that all kinds of art work, whether in decoration, furniture, or other work, should be paid for at a set price, no matter what difference existed in the skill and quickness of the workman employed. It was clear that imported art-work held its own with, and often surpassed, that of British manufacturers, and was withal, more artistic and less expensive. Competition in the world would, and must, increase, and unless the British workman learned to think and act for himself, and throw off the burden and tyranny of trade-unionism, would find himself beaten in the race. Men might be assured that all masters would pay well and liberally for high skill of handicraft and honesty of labour, while inferior work would find its own level, while the general public was not so wanting in common sense as not to know that good ornamentation of material could not be obtained without much cost of time and labour, and therefore must be paid for. To return to minor furnishings, and to silver and plated work, in this the elegance and simplicity of some of the 17th and 18th century examples, might well be copied at no greater cost to the manufacturer than the grotesque shapes and badly executed and designed chasing and engraving now produced. Instead of so-called Mediæval coronæ, and elaborate wrought and twisted brass and bronze gaseliers and brackets, why could not we have the simpler forms of the later Jacobean days, in which use and suitability were prominent features of design? Brass-work became dull, and iron and bronze rusted or corroded in a London atmosphere; the simplest forms, therefore, were most suitable and satisfactory. Good brass repoussé sconces fitted for gas and candles could now be obtained at moderate cost, and were kept clean much more easily than the twisted brackets generally used. Good wrought ironwork might be used for brackets if left rough from the hands of the smith, and merely kept oiled. Or some of the simpler sconces and candelabras now made by Messrs. Salviati and the Murano Glass Co., and these had the advantage generally of being graceful and artistic in form and colouring, and of easily being kept clean. In all artistic domestic articles, Mr. Edis urged his hearers to choose those simple in outline, and free from useless and expensive scrollwork. The plainer the service of the table, and the generally useful fittings of a house were, the better would they be in taste, the more easily cleaned, and the more lasting. Let them not have on their tables épergnes representing palm-trees with a camel grazing, or a knight in armour sheltering beneath it, or metal-work of any kind, made after the form of baskets, barrels, or other equally incongruous design.

In concluding this series of lectures, said Mr. Edis, I would again insist upon the fact that all true art should be the practical rendering, in good taste and in pleasant guise, of all the absolute necessities and requirements of modern life, and that all domestic art is false and bad which ignores the purposes to which the furniture, decoration, or general belongings of a house are to be put. First of all, it is necessary that use and fitness should be the special attributes of our general furniture; but there is no necessity that practical common sense in the requirements of our homes should in any way interfere with good artistic treatment, and everything may be, and should be, truthful and beautiful in design, form, and colouring. If, however, we start from the false idea that art means quaintness, eccentricity, and elaboration of curious forms or extraordinary colours, and that great elaboration and cost are its necessary adjuncts, we shall never really progress. We may assist in bringing in a fashion, which shall die, as all fashions do, but we shall never attain to that higher education or knowledge which intuitively brings with it an innate love for things beautiful and true, and which deprecates anything vulgar or commonplace. If we are content to accept only as a fashion of the day the more artistic rendering of our rooms, and without consideration to follow indiscriminately in the routine of style or decoration and furniture which may for the moment prevail, we shall have no real pleasure in the work done, but shall live rather in dread of the time when a new style, a new fancy and fashion shall become the order of the day. Things beautiful and artistic need not necessarily be costly, although I admit that all work requiring much skill and time in production must of necessity demand a proportionate amount of payment for time and labour involved. All these are luxuries and not necessaries, and will be at all times produced to satisfy the requirements and higher artistic culture of those who delight in surrounding themselves with articles of luxury and of the highest beauty in art. I have attempted rather to dwell upon the particularity of having good art in everyday life and in everyday things, and to point out the means by which this may be obtained at a moderate cost, rather than to enter upon the subject from a point of view in which money is no object. Although I do not pretend that all my views are correct, I have tried in a practical manner to show how your houses may be made more cheerful, more beautiful, and more artistic at a moderate cost, and I shall be satisfied if I have set any of you thinking on these subjects. The art of your houses should speak the language of our own day, and not be a reproduction or imitation of the art, no matter how beautiful, of other days, in which the conditions of life were totally different; but we should study the art-work of past ages, not as work to be cruelly travestied or slavishly copied, but as a means of imbuing us with a knowledge of all that is graceful and beautiful in art, whether in architecture, painting, or sculpture, or those off-shoots called "industrial arts."

CANAL PROJECTS.

An interesting discussion is reported in the *Transactions* of the American Society of Civil Engineers upon this subject, arising out of a paper read by Mr. Menocal. There have been various ideas formed about the best route for an inter-oceanic canal. The plan of that engineer contemplates a water communication between the two oceans of 181 miles in length, one-third of which is through Lake Nicaragua, one-third from the lake down the San Juan River formed into a succession of small lakes by dams, and the remainder by canals, so as to connect all the lakes with the two oceans. The canal proposed by the author is to be 72ft. wide at the bottom, 26ft. deep, with slopes 1½ft. to 1ft., and with locks 400ft. long between gates, and 70ft. wide. Mr. Ashbel Welch, in the discussion, differed in many points. As regards the depth of canal, he contended it would not allow vessels of much over 24ft. draft to navigate it, owing to the formation of bars in the bed, and he recommends a depth of 28ft.; that the bottom should be further dished so as to give an additional 2ft. at the centre. As regards the width of canal, it is thought 72ft. is not enough to allow two vessels to pass, of 42ft. beam and 24ft. draught, without scraping; and as to slopes, it is said it is not safe to calculate for less than 2ft. to 1ft. below top water-line. Another objection is raised to the wear upon the banks fast steamers would occasion, caused by the counterflow of water at its sides, and under the bottom of a vessel. A mile radius, which has been laid down as a minimum curvature in the canal, is said to be unnecessarily large, and it is recommended that the canal should be widened through the curve to an extent equal to the versed sine of the arc cut off by the length of the longest vessel. The provision of scouring sluices in the canals where the silt-bearing water enters is necessary, and in referring to the cutting of the rocks, Mr. Welch objects to the slope at the bottom, and says the rock below top-water should be cut as steep as possible; as regards the lock-chambers, a length of 500ft. is not considered too much for large ships. It is clearly shown that the rule of uniform lift for locks is not necessary, and that it was only applicable where there was abundance of water to use and waste in passing boats from one lock to the next; and the writer mentions a lock at Chesapeake City, which had a water-saving basin by the side of it eight times the area of the lock. A lift of 20ft. is not considered too much for the contemplated canal. Mr. Welch deals in detail with the question of filling, and other points. He proposes to face the lock with timber, as more elastic than stone, and more durable, and he advises timber crib dams instead of stone or concrete. Other speakers in the discussion speak of the claims of the Panama and Nicaraguan Isthmus routes, as also of that further north through the Isthmus of Tehuantepec, leading to the Gulf of Mexico, and we commend the discussion to the attentive perusal of those interested in the great international question; tables of the time required by the several routes are given, and the last-named route is strongly preferred for its geographical position, and the advantage it offers by a saving of over a thousand miles for European trade.

CHIPS.

At the Surrey Quarter Sessions last week, John Carpenter, a builder, of Thames Ditton, was brought up for sentence, having been found guilty at the last sessions of fraudulent bankruptcy, and was sentenced to 12 months' imprisonment with hard labour.

Mr. R. S. Ferguson, of Carlisle, has written to the Cumbrian papers, describing the discoveries of Roman work made in a field and new quarry at Maryport. The foundations of buildings, of masonry with flagged floors, have been unearthed, one of these being the base of a circular structure, 34ft. in diameter, in the centre of which was a well, and near this a mass of charcoal and burnt bones. Some heads or torsos, carved in stone, have also been found on the site, as well as an altar. Roman tool-marks on the masonry testify to the period of the remains.

A new organ is about to be placed at Norwich in the fine Benedictine nave of a priory now known as St. Andrew's Hall, by public subscription. The case will be of stained wood, in harmony with the roof of the hall, and the pipes will be diapered. The commission was last week given to Messrs. Bryceson Brothers and Ellis, of London. The cost, after transfer of present instrument, will be £1,700.

During the demolition of the "New Inn," at Eastbourne, in a street-improvement scheme, one of the main walls fell on Thursday in last week, killing one of the masons, named Robinson, and injuring another. At the inquest, held on Friday, it was shown that the work was being carefully done under the superintendence of Mr. Climpson, the contractor, and that the wall probably fell because one of the men, in the contractor's temporary absence, picked out the coigns under one of the windows, in disobedience to orders. A verdict of accidental death was returned, and the contractor was exonerated from blame.

At a vestry meeting held at the parish-church of St. Lawrence, Reading, last week, the report of Mr. Joseph Morris (of Morris and Stallwood) of Reading, as to the condition of the church tower, was read, and it was decided to restore the tower in accordance with the report "stone for stone, as it was built by its original architect, 360 years ago," at a probable cost of £1,400; and a committee was appointed to carry out the work.

A Wesleyan church was opened on the 23rd ult., at Egham. The style is 13th-century Gothic. The architect was Mr. James Weir, of London; and the builders were Messrs. Oades and Sons, of Egham.

A new roof is being constructed to the parish-church at Oulton, near Lowestoft, Suffolk. The principals are exposed to view, and are of pitch-pine. The under-side of rafters will be covered with diagonal pitch-pine boards. The whole to be sized and varnished. The roof will be covered with flat Staffordshire tiles, of a warm, grey tint, with ornamental ridge cresting. The work is being carried out by Mr. E. C. Pipe, of Oulton, under the superintendence of Mr. Edgar Goff, architect, of Lowestoft.

Mr. J. P. Spencer has resigned his appointment of borough engineer of Tynemouth, we believe, in consequence of the increasing calls upon his time as a consulting engineer and arbitrator. In his letter addressed to the town-council he distinctly expresses his approval of public officers not being allowed private practice, hence his resignation. Mr. Spencer has been active in sanitary matters for many years past, and is considered one of the leading authorities on the subject in the north of England. The appointment is worth between four and five hundred a year, and is in the hands of the urban sanitary authority; they, however, at their last meeting, declined to accept the resignation, and expressed a hope that, if it were not withdrawn, they might, at any rate, retain the services of their engineer as long as they possibly could.

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ILLUSTRATIONS.

TRURO CATHEDRAL.—QUEENS' COLLEGE, CAMBRIDGE.—HADDON HALL.—MANSION AT KIRKWOOD, N.B.

OUR LITHOGRAPHIC ILLUSTRATIONS.

TRURO CATHEDRAL.

The foundation-stone of the new cathedral church now being built for the recently-erected See of Truro, is to be laid by the Prince of Wales, as Duke of Cornwall, on Thursday next, the 20th inst. The architect engaged has produced a design of the highest order, and its merits have already been pointed out in our pages. The view which we give shows the building from the south-west, and it has been taken with the special permission of the Cathedral Building Committee, from the large lithograph which Messrs. Masters, of New Bond-street, are selling on the Committee's behalf, for the benefit of the Building Fund. These larger plates, of course, have many advantages, such as a higher tone, and greater clearness of detail, which cannot be looked for in a reduced copy, so that those desiring a more finished impression should secure one of the proof-plates we refer to. The south aisle of the old church is preserved in the new building on account of its interesting architectural character, and, as will be seen from our view, is an elaborate example of Late work. This aisle will have an altar of its own for week-day services, and a tower is introduced at its west end to give importance to this portion of the building, thus individualising it from the more extensive parts of the main structure. The central tower will internally be open at the top in the form of a large square lantern, having two stages of windows and a gallery of pierced stone running round its sides above the crossing. The crypt below the choir and chancel will, for the present, be used as a chapter-house, pending the erection of that building, and as vestries, for which latter purpose the crypt is really intended. The materials will be Cornish stone for the walls, and red tiles for the roofs. Of the competition designs for this cathedral, we published that of Mr. James Hicks, June 21st, 1878; Mr. J. M. Brydon's, Dec. 6th, 1878; and Mr. J. P. St. Aubyn's, Dec. 20th, 1878. Mr. J. P. St. Aubyn's earlier design for the enlargement of St. Mary's church, in which, as in the accepted plans, the richly-carved south aisle of church is retained, appeared in our issue on Feb. 7th, 1879.

QUEENS' COLLEGE, CAMBRIDGE.

Queens' College was founded by the two queens, Margaret of Anjou and Elizabeth Woodville. Its buildings are amongst the most interesting in Cambridge. The fine front, of which we give an illustration this week, is a particularly good specimen of collegiate architecture. A few years ago, it had fallen into a very dilapidated state, but it has been most carefully restored. Every detail was taken from remains on the building itself, or where these did not exist, as in the case of chimney-shafts, dormers, &c., the designs were taken from old engravings showing the ancient character of the front. This was done under the supervision of Mr. W. M. Fawcett, M.A., architect, Cambridge.

HADDON HALL.

These drawings illustrate Mr. T. Roger Smith's paper, which will be found on p. 565.

MANSION AT KIRKWOOD, N.B.

This house at Kirkwood has been erected from the designs of Mr. Walter F. Lyon, F.R.I.B.A.

Building Intelligence.

Bangor Cathedral.—After a restoration extending over a year, Bangor Cathedral was on Tuesday reopened in its entirety. The present restoration is a continuation of that which was completed in 1873. It embraces the renovation of the nave and transepts, the erection of a chapter and muniment-room, together with the external improvement of the building and its approaches. The old roof of the aisles and nave has been cased with panelled oak; the concrete floor has been laid with encaustic tiles, and the windows, which hitherto presented a great variety of architectural styles, have been made uniform. The curious relics found during restoration have been carefully preserved. The present works have been carried out by Messrs. Thompson, of Peterborough, under the direction of Mr. J. Oldrid Scott, the late Sir Gilbert Scott having furnished the designs.

Bristol.—The parish-church of St. George, Bristol, destroyed by fire in 1878, was reopened on Saturday last, after rebuilding at a cost of £6,000. Practically, the outer walls and the lower stages of the tower are the only portions of the old church remaining. The building consists of nave, north and south aisles, and chancel and vestry; and, like the old structure, will accommodate about 600 worshippers. The old local stone of the destroyed church has been used. The architect for the restoration was Mr. P.E Masey, of London, who gave his services gratuitously, and the contractors were Messrs Cowlin and Son, Bristol. Mr. Aaron Flook, the sexton of the church, was clerk of the works.

Butterwick.—The parish-church of St. Andrew, Butterwick, Lincolnshire, was recently reopened, after restoration. New roofs have been placed upon the church, and covered with Westmoreland slates. The walls have been largely rebuilt, that to the north aisle being entirely new, and most of that to the south. The building has been reseated in deal, and the whole surface laid with a bed of concrete, with encaustic tiles above in the passages. The 18th-century tower has had a window inserted, and an arch thrown across on nave side. The pulpit has been painted, and the handsome rood-screen has been decorated in colour and gold, on the lines of the old work, found under a coat of white paint. The font has been restored, placed upon a step, and removed to near the south entrance. Mr. James Fowler, of Lowth, was the architect for the restoration, which has cost about £1,300.

Carlisle.—The new Bishop's Throne is being erected in the Cathedral. It is from the designs of Mr. G. E. Street, R.A., and is Late Decorated in style. The base is a plinth of white Portland stone, carved on the same lines as the plinth supporting the stall. The material used for the superstructure is of oak, all the fine carved work being in English oak, and the panels in foreign oak. The lower part is comparatively plain, though the exterior of all four sides has carved tracery panels in the upper portions. Within, immediately above the seat, are "linen" pattern panels. The canopy is groined, the ribs meeting in a diamond at the centre, inclosing a quartrefoil, and the I.H.S. The exterior of this canopy has arches closed at the back, and open on either side, ending in a gable on each front and bearing tabernacle work in high relief, and above the cover is an elaborately-carved finial rising to a total height of 29ft. from the floor-line. The new throne is neither so wide nor so deep as the cumbrous piece of work removed. All the carving has reached Carlisle without damage; it is the work of Messrs. Rattee and Kett, of Cambridge, and is being erected by their workmen under the personal supervision of Mr. Creed, the clerk of works of the cathedral.

Hanley, Staffordshire.—On Monday last the chairman and members of the Hanley School Board opened the third school erected in their district, situate in Great York-street, Hanley, Staffordshire. It provides accommodation for 800 children, in three departments, viz., infants, 300 on the 8ft. basis, comprising spacious main room, babies-room, and two class-rooms. The boys' and girls' departments provide sitting or desk space for 250 places each, distributed in a main room and three class-rooms. The positions of the main room and class-rooms are such that by the aid of glass screens and glazed doors a view of the whole department can be obtained by the head teacher from almost any position. The various rooms throughout have the walls finished in plaster, with a dado 4ft. high of Marsden's patent interlocking glazed tiles (supplied by Messrs. Mintons) running round the same. The warming and ventilation of the schools has had especial attention, and each department is provided with a commodious inclosed cloak-room, lavatory, and teachers' room. There are separate asphalted playgrounds, playsheds, and latrines to each school. The buildings externally are of a plain and substantial character, almost entirely executed in red brick of two tints, relieved with moulded bricks and terra-cotta. The works have been satisfactorily carried out by Mr. J. Gallimore, contractor, of Newcastle-under-Lyne, from the designs and under the superintendence of Mr. W. A. Keates, architect, of 7, Market-square, Hanley, architect to the Board. The entire cost of the schools, together with the site, &c., will be an average of £6 19s. 2d. per head.

Longstock.—A new parish-church in the above-named village was to be consecrated yesterday. The building has been designed by Mr. William White, F.S.A., of Wimpole-street, and is built in the main of flint, with narrow bands, at intervals, of tiling, to serve as tie and bond, whilst the dressings are of Bath-stone. It consists of a nave, north aisle, chancel, organ-chamber, a north-west tower and spire, and a south-west porch. The style is Early English of a character bordering upon the transition into Decorated. The walls throughout the building are plastered, and the stone work, instead of being dragged, is merely batted over and the tool-marks left showing upon all the plain faces. Mr. Harry Hems, of Exeter, has executed the whole of the stone-carving and other sculpture upon the church generally. The building will be well warmed by Messrs. Musgrave and Co.'s, of Belfast, patent heating apparatus. The contractor for the general works has been Mr. Hammett, builder, of Andover.

Sheffield.—The New Corn Exchange at Sheffield is making satisfactory progress. The architects are Messrs. M. E. Hadfield and Son. The design of the exterior of the building is of the Late Pointed or Tudor type, the materials being thin red bricks of a quality so fine that they may almost be said to resemble terra-cotta, with stone facings from the Bolehill Quarry, near Treeton. The roofs will be of Broseley tiles. The heart of the building will be the New Corn Exchange, which will really be a covered court, with four entrances, one in each façade. It will be 150ft. long by 75ft. wide and 40ft. high, with an open roof in oak. The principal façade of the building will front the old Corn Exchange, and extend to 224ft.; the front to Broad street and the Canal Warehouse will each be 135ft. In the centre of the chief façade, underneath a tower, will be the main entrance, through which the great hall will be approached by a flight of ten steps. On each side of the chief entrance will be shops; these premises will each be 32ft. long by 14ft. wide. The whole wing facing the Canal Warehouse will form a commercial hotel, with a restaurant attached. The contractors who are carrying out Messrs. Hadfield and Son's plans are Messrs. Tomlinson and Son, of Leeds.

The *Sydney Morning Herald* contains a very favourable notice of the machines sent by Messrs. F. W. Reynolds and Co. to the Sydney International Exhibition, remarking "that in the variety and ingenuity of their morticing and boring machines, and also in their small sawing-machines, they appear at the Exhibition without a rival. Messrs. Reynolds have evidently given great attention to the design and construction of the tools they exhibit, and are also able to sell them at reasonable rates, probably from the great numbers which they make."



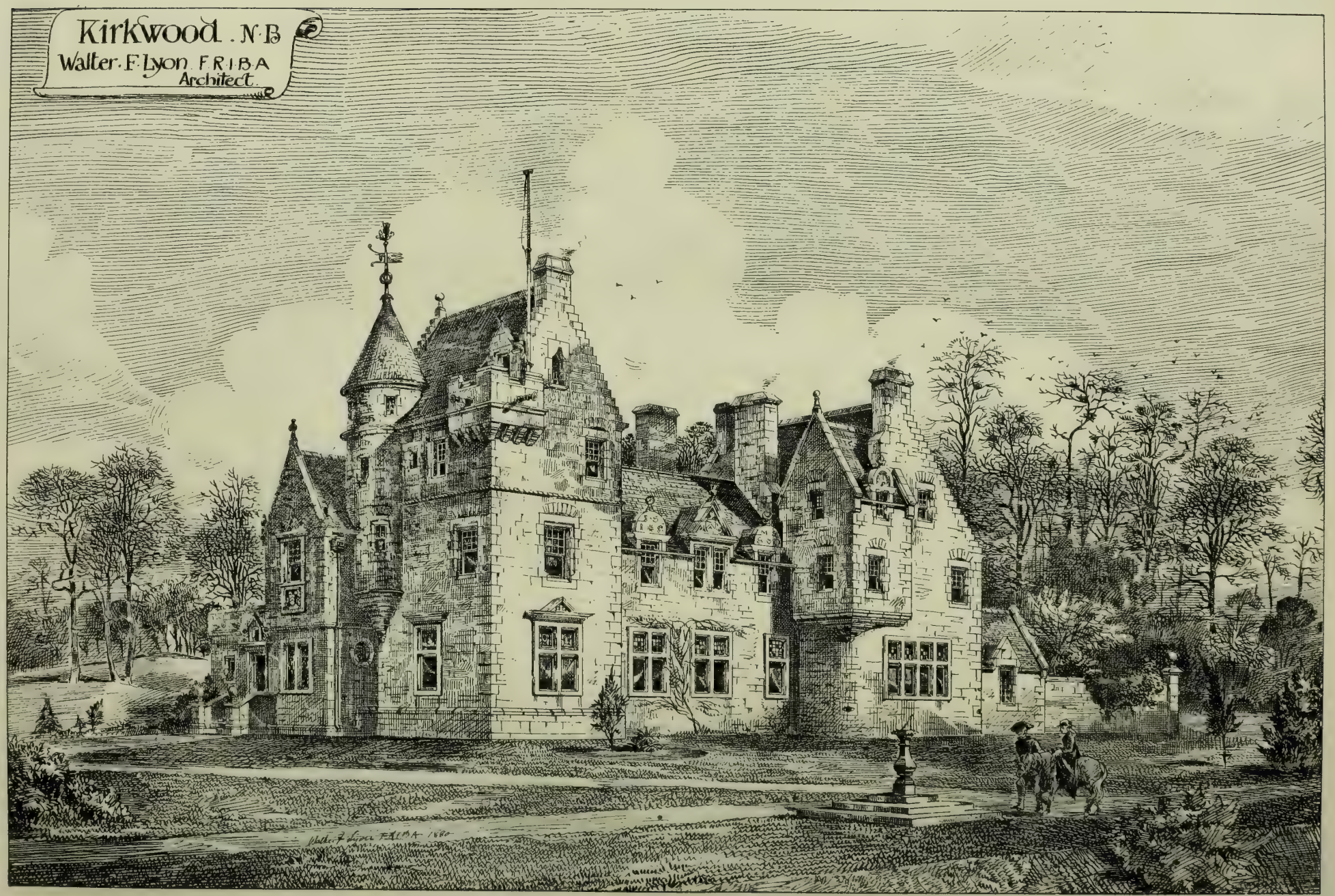


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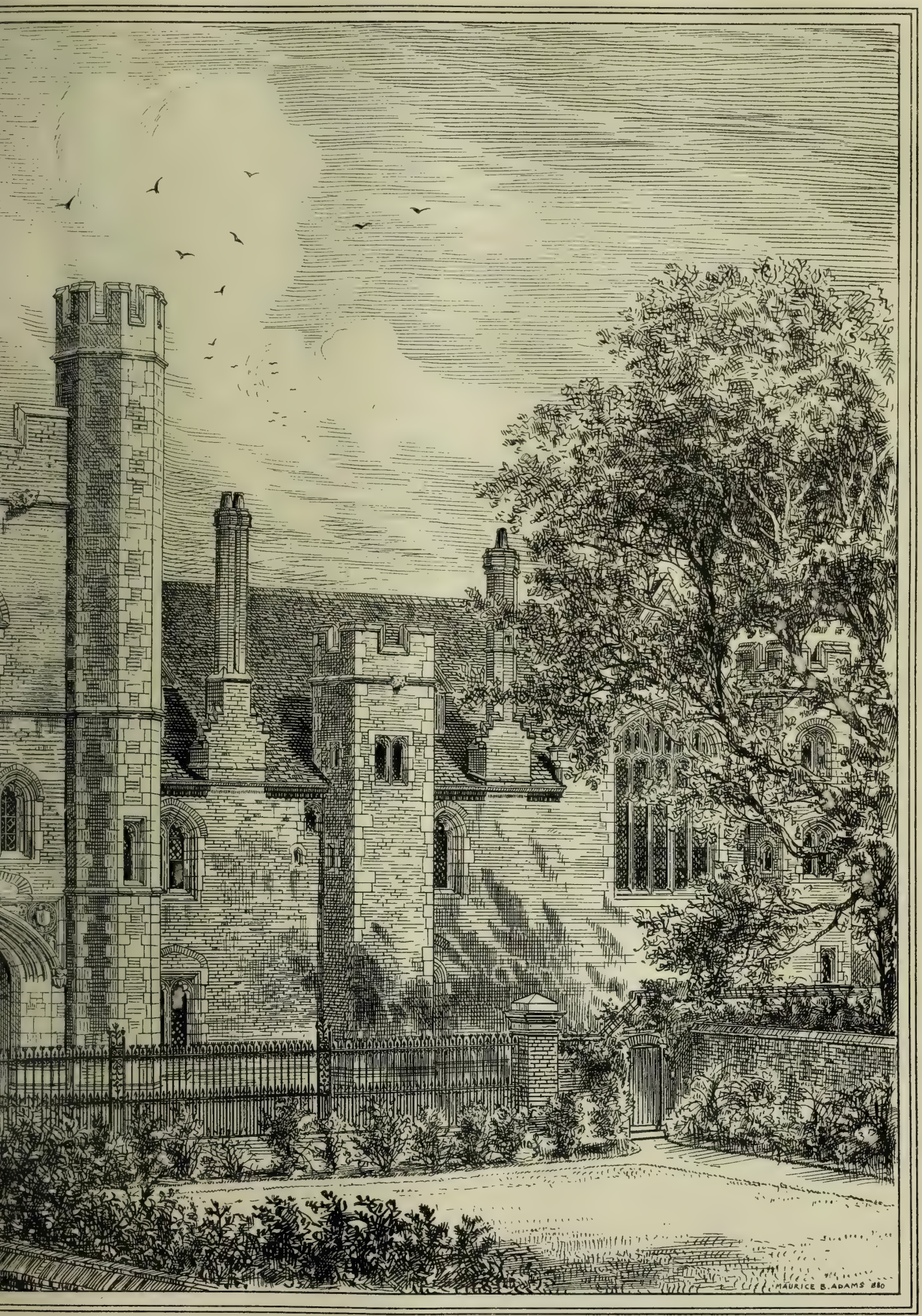
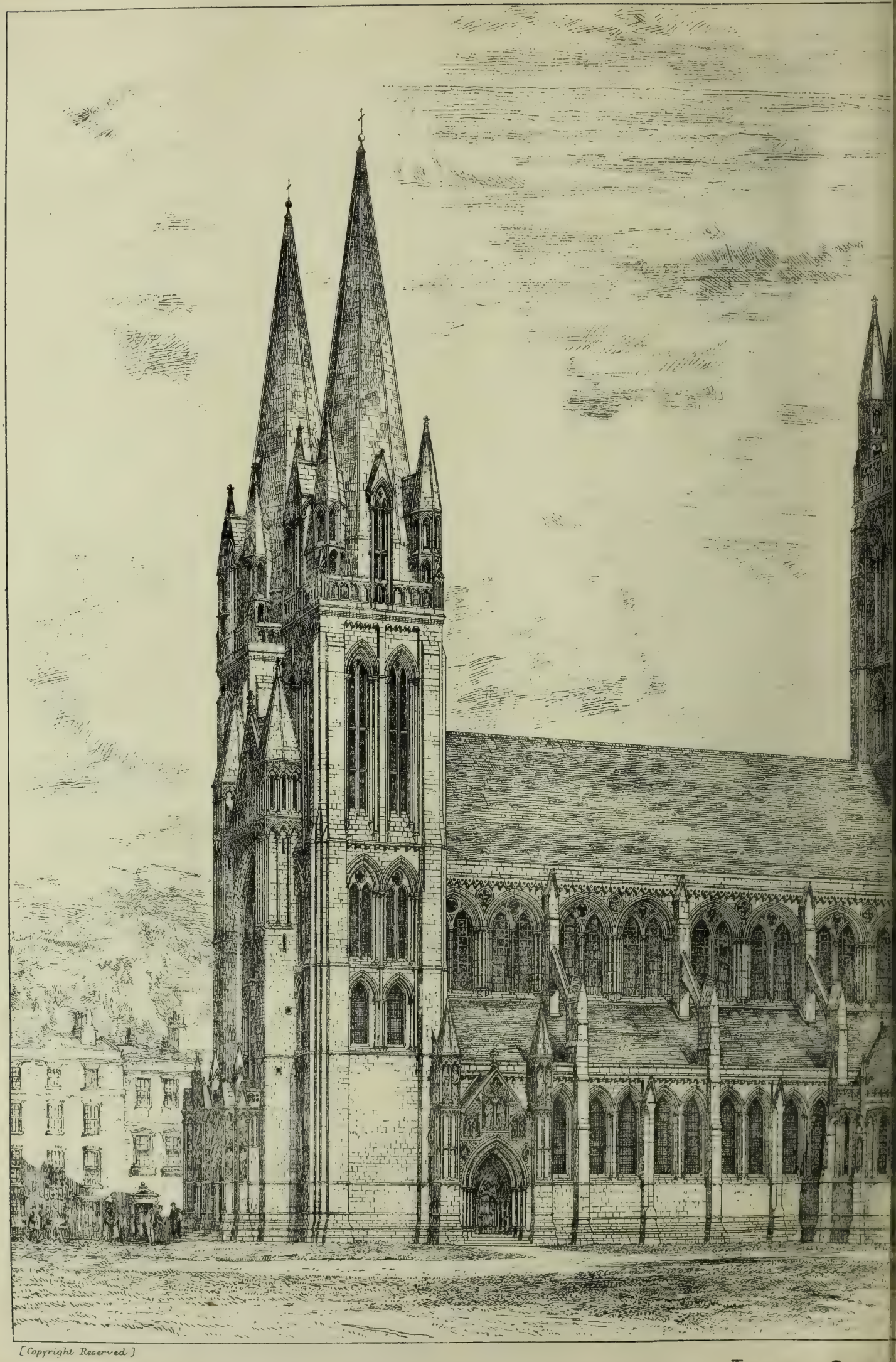


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TRURO CATH

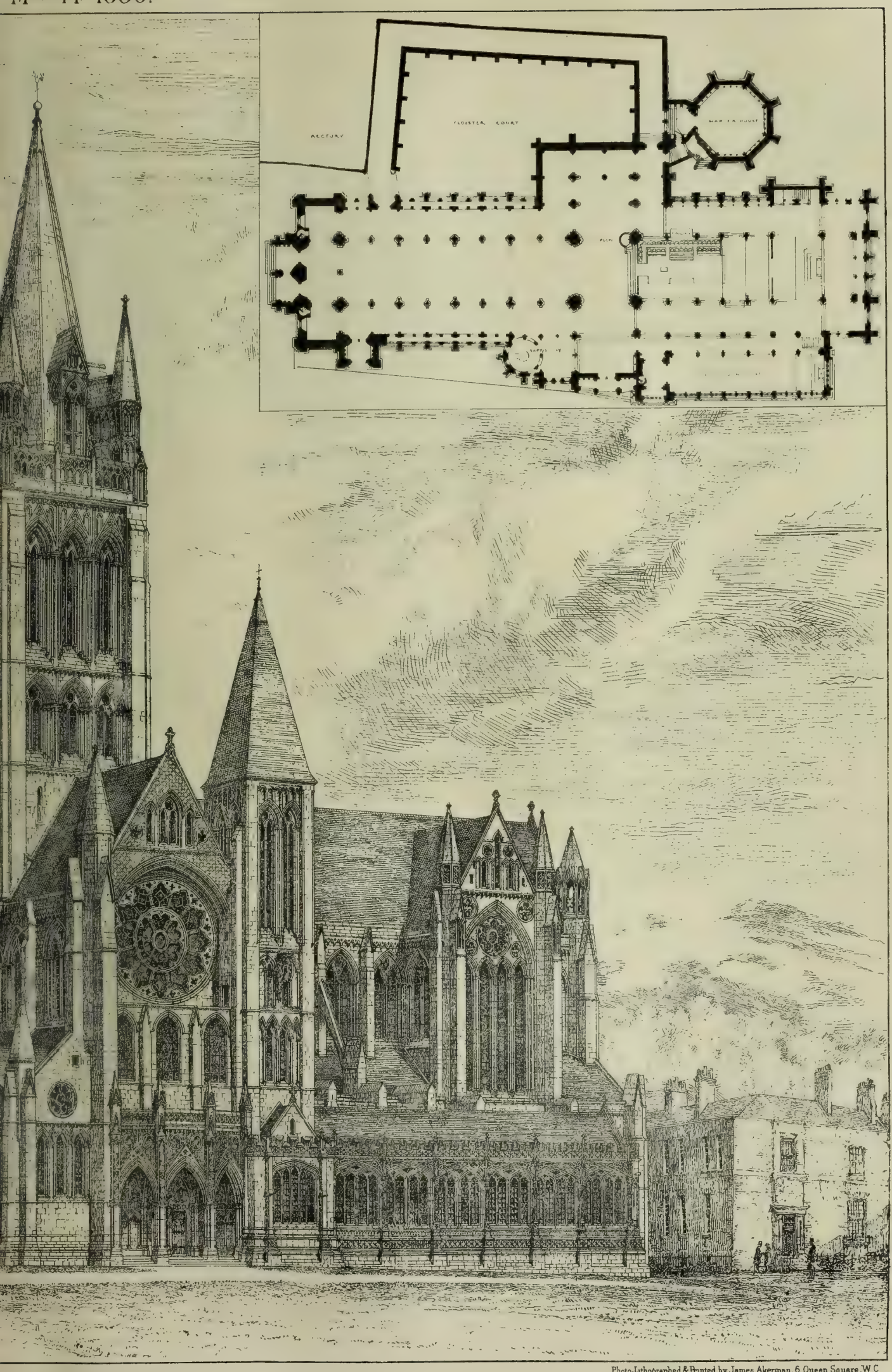
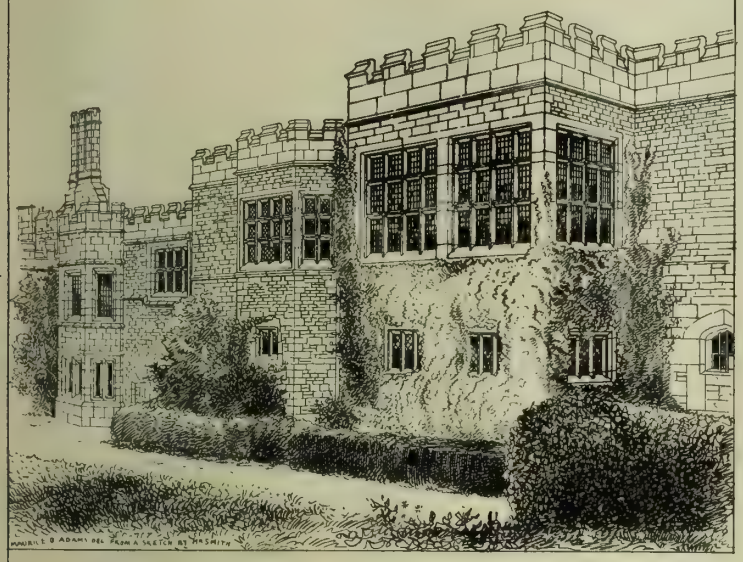
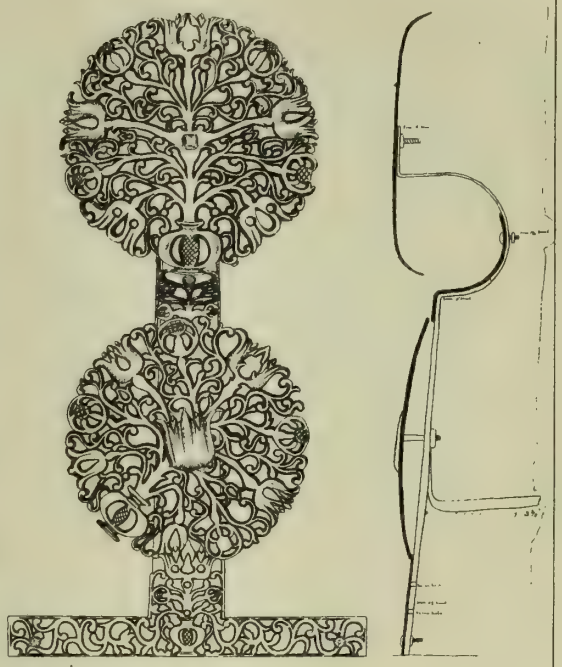


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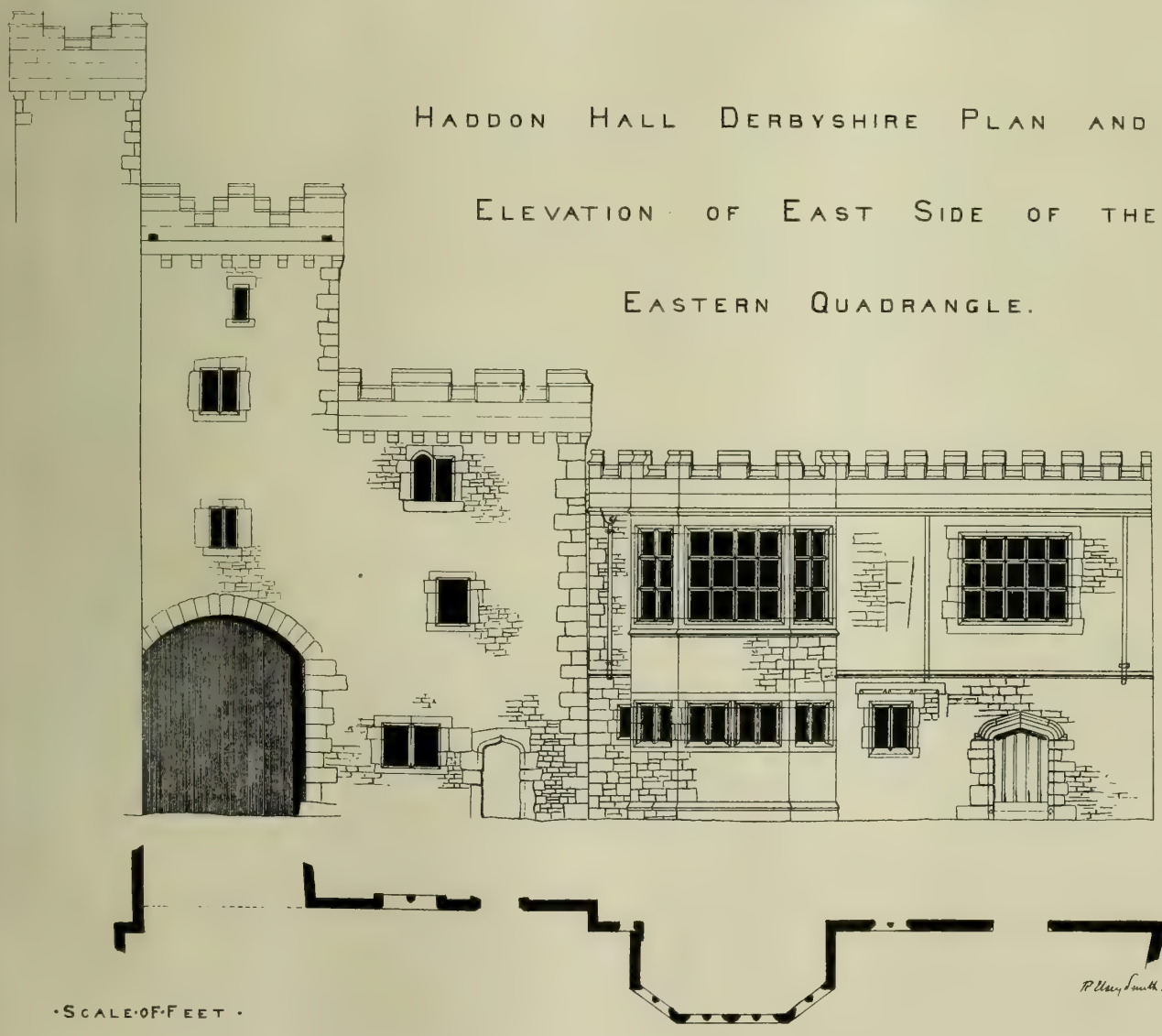
RAL, S. W. VIEW.
R.A., ARCHITECT.





FIRE DOG IN CAST BRONZE

HADDON HALL DERBYSHIRE PLAN AND ELEVATION OF EAST SIDE OF THE EASTERN QUADRANGLE.



ILLUSTRATING PAPER ON HADDON HALL BY T. ROGER SMITH, F.R.I.B.A.

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"MILD STEEL" AND ITS APPLICATIONS TO BUILDING PURPOSES.*

(*Continued from p.* 510.)

TWO matters in connection with the working of steel have demanded, and received, special attention from engineers, but the importance of both is reduced to a minimum in the cases of most importance to the members of this Institute. These two points are (1) the effect of punching upon the material, and (2) the necessity for annealing it after working. Our present experience makes it possible to say very distinctly that mild steel, which has not more than about 30 tons per square inch tenacity, is not more injured by punching than ordinary wrought iron, and less injured in the case of thin plates, say up to ⅜in. thick. With material of this quality, therefore, no special allowance has to be made for weakening by the punching of rivet-holes beyond what is made in dealing with wrought iron. With the harder qualities of steel, such as are often used for rails, having a tenacity of about 40 tons per square inch, and containing about 0·4 per cent. of carbon, there is a proportionately greater loss due to punching, and—what is still more important—the local strains induced by the operation have the effect, sometimes, of originating a fracture, which, when once started in this way, may readily extend itself. This difficulty can be got over in either of three ways, viz. (1) by annealing the plate after punching; (2) by drilling the holes instead of punching them at all, or (3) by punching the holes smaller than the intended size, and then riming them out to the full diameter. The first method has the special disadvantage that it inevitably reduces the tenacity of the steel. The second method is a complete remedy, although a somewhat expensive one. The third method is also a complete remedy, and is now very largely used, the injury done by punching being confined—as is shown by a very great number of experiments—to a thin zone of metal, perhaps 1-16in. thick, round the punched hole. If this strained zone be removed, the metal resumes what may be called its molecular equilibrinm, and the remaining metal is as strong as it would be had the hole been drilled entirely, as strong, that is, as an equal area of the solid plate. Where the material is weakened by punching, it is clearly better to rime out the punched holes in the way just mentioned than to punch them simply and then anneal the steel. The latter method destroys the local strain, and makes the material safe, but at the expense of a very considerable reduction from its proper and original strength. In cases where angles have to be bent or plates flanged, it was for a long time thought to be necessary to anneal the material after working it, but most engineers now find that their forgings are quite as trustworthy before as after annealing, and are dispensing with the process entirely for the milder qualities of steel. And now as to the strength of such steel as is available for constructive purposes. Out of the great number of qualities of mild steel which are made we may indicate two classes as being of special importance. The first of these is the very mild steel which is accepted by the Admiralty, Lloyd's, and the Liverpool Underwriters for ship-building purposes. The Admiralty limits for tenacity are 26 and 30 tons per square inch, Lloyd's limits are a ton higher, and the Liverpool Underwriters a ton higher still, or 28 to 32 tons per square inch. All three, therefore, admit steel which lies between 28 and 30 tons per square inch, the first two requiring also the ultimate extension of the piece before fracture to be not less than 20 per cent. in an 8in. length. Such steel requires practically no annealing, and is not more injured by punching than wrought iron, and, in many cases, less. The regulations mentioned all refer to steel for ship-building purposes or for boilers, where the metal has to undergo a great deal of heating and working, and the non-admission of stronger material is due to the fact that it is more difficult to work and less certain after it is worked. The second class of steel having special importance for constructive purposes is that which has a tenacity of about 10 tons per square inch more than the former, or about 40 tons per square inch. It is of course much harder, considerably less ductile, and less suitable for places where much work had to be done on it. But it can be obtained just as uniform in quality as the milder material, and its superior tenacity gives it great advantage where it can be used substantially in the form in which it leaves the rolling mill. It will extend about ten to twelve per cent. in 10in. before fracture. The requirements of the architect in the way of material are much simpler and more easily satisfied than those of the ship-builder or engineer. The ironwork used in such buildings as are not pieces of engineering rather than works of architecture, is, in general, either in the form of rolled joists or of riveted girders, consisting of plates and joists or plates and angles. The joists are used practically as they come from the mill, cut to lengths, but not generally punched, any holes there may be in them being commonly drilled. This is a case, therefore, in which the question is not complicated by any considerations as to difficulties of working, and so forth, for the material has no working to undergo. There seems no reason why the harder steel—36 to 40 tons tenacity—should not here, in many cases, take the place of iron. Its use, strength for strength, would probably be considerably cheaper than that of iron. There has hitherto been very little demand for rolled joists in steel, and there is some difference of opinion on the part of those most competent to judge as to the relative difficulty of rolling them in steel and in iron. At the present moment, however, one, if not more, of our largest firms is rolling steel joists at very much the same price as that at which firms of equal standing are rolling them in iron, a price perhaps 30 per cent. in excess of what is paid for Belgian joists. The difference of strength in favour of the steel over the latter would probably be about 80 per cent., over English (iron) joists 60 per cent. In either case there would be a large balance of economy in favour of the stronger material. The case of riveted girders is somewhat different. There we have to deal with punched plates and angles, and not uncommonly with some bending and other working. As a matter of fact I do not doubt that riveted girders of the harder steel, in the making of which all precautions had been entirely omitted, would not contain nearly such serious defects as are often found and thought nothing of in wrought-iron girders, although, doubtless, a great deal more would be heard about them. At present, however, and until the class of workmen concerned becomes more accustomed to handling the material, its use requires a good deal of judgment, and in many cases the milder and less strong steel is to be preferred. For this material Lloyd's Register allows a reduction of scantlings in all parts of ships, built under their regulations, of 25 per cent., and this does not err on the side of rashness. Compared with such material as is frequently seen in girders for buildings, a reduction of 30 to 35 per cent. would be fully justified. Whether or not this would pay would of course depend on the relative prices of steel and iron angles and plates. At present the former are about 40 or 50 per cent. in excess of the latter, but the ratio varies from time to time. The much greater ductility of mild steel than of iron has sometimes led to erroneous notions as to the relative rigidity of the two materials for structural purposes. The modulus of elasticity of a material is inversely proportional to the amount which a bar of given size extends under a given load, and this modulus is distinctly larger for mild steel than for iron. The extension, therefore, up to the limit of elasticity, is smaller in the steel than in the iron. The actual working extension of the steel will, therefore, be slightly less than that of a similar bar of iron. These extensions are very small, and only accurately measurable by very special apparatus, but are nevertheless the only extensions which ought to occur, or do occur, in practice. The difference between iron and such steel as we are speaking of, so far as rigidity is concerned, is briefly that, up to the load at which the iron begins to be sensibly stretched or bent, the corresponding distortion of the steel is less than that of the iron; that, with further additions of load the steel still remains elastic, while the iron is greatly and permanently strained, and then lastly, that at greater loads still, and long after the iron has broken, the steel continues its deflection or extension, which, before its breaking-point is reached, greatly exceeds the utmost which the iron could reach without fracture. In several cases this fact has been the saving of steel ships in cases where iron ones must have gone to the bottom. I have already spoken incidentally of the tests enforced by the Registry Societies and others in connection with the steel they permit to be used where work is under their control. No doubt in some cases the testing is irksome and causes inconvenient delays, but its advantages probably outweigh small troubles of this kind; and it may safely be said that had it not been for these tests, and the rigid way in which they have been enforced, we should still be very far from having the splendid material which is now ready to our hands. I cannot, therefore, suggest that steel should be used without testing as yet, and the question arises how best this ought to be done. The tests commonly enforced are of three kinds: (1) the tenacity of the steel must lie between certain definite limits; (2), the samples tested must have a minimum percentage of extension, in a specified length, before fracture; and (3), sample strips, heated to a low cherry red and cooled in water at 82° Fahrenheit, must stand doubling round a curve whose radius is not more than one and a half times the thickness of the strip. The last mentioned is that known as "temper test." All the tests are made upon sample strips of (commonly) from 0·5 to 1·0 square inches in sectional area, cut from the plate, bar, or angle as the case may be, the strips being generally of the same thickness throughout, having from 8in. to 10in. in the centre parallel, and being wide at the ends where held in the machine. The tests are made by preference at the maker's yard, in presence of the inspector, doubtful or special cases being sent to some independent testing machine. In the case of large orders not less than 2 per cent. of the number of plates, &c., has to be tested in this way, but not a few of our chief steel-makers test for their own satisfaction, both chemically and mechanically, samples from every blow or from every run. Granting that it is advisable to continue the carrying out of tests, and if so, also, that these tests should be realities and not mere forms, it is certainly advisable that some method of this kind should be substituted for the present plan of testing girders whole. At present it is frequently specified that a certain percentage of the rolled joists or other girders about a building should be tested up to loads equivalent to those given in Shaw's Tables (which correspond to a maximum stress of six tons per square inch in the material), and should return to their original forms without permanent set, and this deflection test is the only one carried out. When it is remembered that it is not easy to measure a small permanent deflection, say 1-10th of an inch, with certainty, on a 20ft. joist, with such means as are commonly used in the yard, it will be readily understood that this test cannot be very rigidly enforced under ordinary circumstances. But even if it were it is not a satisfactory one, for it is one which will be passed by almost any material,—very common iron equally well with excellent steel,—and affords no clue whatever to the properties of the material used. It would be much more satisfactory, and probably not more expensive or troublesome, if the tests specified were made more like those adopted by the Registry Societies. The temper test, however, can be hardly ever necessary for architects' purposes, and might be altogether omitted. It would be sufficient to specify that one out of (say) every ten joists or angles should be supplied 18in. more than the ordered length, the extra piece cut off, and two strips cut from it (one from the web and one from the flange in the case of the joist), tested for tenacity and extension. The limits fixed might be, according to circumstances, either 28 to 32 tons tenacity per square inch, and 20 per cent. extension in 10in., or 38 to 42 tons tenacity and 12 per cent. extension. There is one direction in which I am sanguine the next few years will see very great strides made, and that is in the use of mild steel castings direct from the furnace. The difficulties of obtaining sound steel castings, especially with thin metal or with much coring, have been very great, but many of them have already been overcome, and others are fast yielding to the determined attacks of the manufacturers. Even now it is possible to obtain, at a price far below that of heavy forgings, steel castings having nearly double their strength, castings which are of course as malleable and weldable as the rolled metal of which we have been speaking. In engineers' and shipbuilders'

* By ALEX. B. W. KENNEDY, M. Inst. C.E., Professor of Engineering in University College, London; a Paper read before the Royal Institute of British Architects, April 19, 1880.

work it does not require great prescience to foretell for these castings the greatest importance; for use in buildings they will probably have fewer applications. It is not unlikely, however, that they might often replace cast iron in cantilevers and brackets with enormous advantage as to strength and trustworthiness, and not a little as to appearance, on account of the very much lighter sections in which they might be used. I am not without hope that before long we may see mild steel taking its place in buildings as freely as in engineering structures, and with as beneficial results to all concerned.

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List of Subjects.—A. A mixed village school and house adjoining. Accommodation to be provided for 100 children, with class-rooms, and all conveniences. Plans, elevation, and section with sketch. Aspect to be shown. Scale for drawings, 8ft. to the inch. B. A small wooden bridge, to span a park stream, with stiles at each end to prevent the passage of cattle. Stream 15ft. wide. Plan, elevation, and sketch. Scale 1in. to the foot.

Received.—"Sagitta." Your drawing for boathouse came to hand too late. The boathouse is suitable, but we do not like the approach to picnic and dressing-rooms.

Erratum.—Mr. F. T. Dollman, with reference to our report of his paper on the Church of St. Mary Overie, London-bridge, last week, requests us to say that instead of the nave having been restored by C. E. Gwilt, it should be stated that the choir, Lady-chapel, and tower were restored by George Gwilt, and instead of the north transept having been remodelled under that architect's directions, his designs were set on one side for motives of economy, and the work as now seen was done by Mr. R. Wallace. The word "hoods," in line 27 from the top of page 555, should read "shafts."

Correspondence.

MR. MARCUS STONE'S JOINER'S WORK.

To the Editor of the Building News.

Sir,—Your representative, in his description of Mr. Stone's house, complains of the joinery as being defective. I think, when your readers are informed that Mr. Stone was working in his studio, with four coils of hot-water pipes to dry the walls, within twelve months of the time the house was commenced, and that nothing has been done to the work since then, they will at once see the cause of his complaint.

I do not know why your writer should have gone out of his way to have made the attack he has on me. I read your paper pretty regularly, and I do not remember any instance in which an individual has ever been attacked as I have been in the article I refer to. No one can object to fair criticism; but for a man to make assertions without troubling himself to ascertain whether they are well founded or not, is most unfair; your paper travels in all directions, and nothing I can now say will remove the injury the article I complain of is calculated to do me.—I am, &c.,

W. F. Lascelles.

121, Bunhill-row, Finsbury-square, May 10.

THE LONDON WATER-SUPPLY.

Sir,—The discussion which has lately taken place on the London Water-Supply, if it has done nothing else, has shown how much truth there is in our old adage, that "What is everyone's business is nobody's." For more than half a century many successive Parliaments have been tinkering away at the water question; numerous Royal Commissions have been appointed, and reported on the abuses of the water companies and the impurity of the water, only to be assigned to the place of good intentions, as very little good has ever come out of any of their many recommendations.

The first public complaint of the infamous quality of the London water was made in the year 1821, when a Select Committee of the House of Commons was appointed to consider and report upon it. The recommendation was, that the water should be placed under Parliamentary control. This recommendation was, as we know, never carried into effect. In 1828, very serious complaints were made to the Legislature, and another Royal Commission was appointed, and charged with the duty of inquiring into "the description, quality, and salubrity of the water supplied by the several water companies." The only gain to the metropolitan consumers was, after considerable delay and opposition on the part of the companies, an attempt to filter the water through sand to remove the coarser particles of dirt. The companies were also *recommended* to look for a supply of water from other sources than those of the Thames and the Lea. It is needless to say that no attempt was made in this direction until the medical profession reported, deterioration in the public health from drinking the impure water of the Thames, and a threat was made to let in a competing supply. Some of the companies took fright, and the stir drove them to remove their intake higher up the river. Notwithstanding the removal of the intake, and the pretty general employment of filtration, it was discovered that, owing to the increase of population, and the larger amount of sewage floating into the Thames, the water was rapidly becoming worse in quality, and that substances found their way into the river which no filtration could deal with or separate. The water taken by the Lambeth Company was said to be totally unfit for domestic use, and, in consequence, in 1848, the Company was obliged to remove its intake above the tidal limit. In 1850, the several companies drawing their supply from the Thames were estimated to be taking in a mass of impurities equal to 48,000 tons daily, and distributing it to their customers. The surveying officers who reported at the time upon the Lambeth intake said "that the river, at this point, holds in suspension, or solution, all the drainage of the metropolis." Loud complaints again reached Parliament, and, in 1851, another Royal Commission was issued, and in the same year, a Bill was introduced for amalgamating the companies; but this fell through, and nothing was done. Year after year, an outcry was made of the quality of the water, and Royal Commissions have reported against it during the several years 1810, 1821, 1827, 1828, 1834, 1840, 1845, and 1851, when 40,000 consumers petitioned Parliament to grant London powers to supply itself with pure softened spring water from the chalk. In 1853 and 4, as many as 3,476 consumers of the Southwark and Vauxhall Company's water (then drawing its supply from the Thames at Battersea) were officially reported to have died from cholera. Mr. John Simon, the then medical officer of health of the Government, reported that two-thirds of those attacked by cholera would have escaped if their water-supply had been like their neighbours'. He further stated that out of the much larger number of the water consumers of the Lambeth and Southwark and Vauxhall companies who were sacrificed to the cholera visitation of 1848-9, at least two-thirds would have escaped if the Metropolis Water Act of 1852 had been in force.

The Act of 1852 was passed to prevent the companies drawing water from the Thames below Teddington Lock after a certain date. A Government Commission, consisting of many eminent men, which was appointed about the same time, strongly urged upon the Government that, instead of drawing water at all from the Thames, which was only a little less contaminated above the Lock than below it, the companies should be compelled to resort to those enormous supplies of spring-water contained in the chalk strata around London, and which can be so readily and cheaply obtained at a high level. But the same persistent wrong-headedness characterised all that relates to the London water supply, and, consequently, in the Registrar General's report for the week ending July 20th, 1748, we find that "in London the high mortality of the week was due to diarrhœa, which always becomes fatal in London when the temperature of the Thames water rises above 60°. Thus, the temperature of the water, which had been 60°, rose in the last week of June to 65°. In the three following weeks it was 68°, 66°, and 67°, and the weekly deaths from diarrhœa and simple cholera, which stood at 23, rose to 78, 156, 256, and 349 in the corresponding weeks. The deaths from diarrhœa were differently distributed over the areas of the water companies. Thus, the deaths in the last four weeks were 786 in the districts supplied with Thames and Lea waters, whereas the deaths in the districts supplied with water drawn from the chalk by the Kent Company were only nineteen. Out of the same population the deaths were as in the ratio of three to one."

In the issue of the following week, ending July 27th, 1878, "the deaths referred to diarrhœa and simple cholera, which in the five preceding weeks also rapidly increased from 22 to 349, and further rose the following week to 457, of which 336 were of infants under one year of age, and 99 of children aged between one and five years." . . . .

"During the same period the annual death-rate from diarrhœa within the area supplied by the Kent Water Company from deep wells in the chalk were 1·7 per 1,000, whilst in the other part of the metropolis supplied by water from the river Thames and Lea, the diarrhœa death-rate averaged 3·7 per 1,000."

The gravity of such returns as those I have quoted speak for themselves, and notwithstanding the favourable nature of the reports made by the companies' analysts of the "wholesomeness and purity of the water," it has been placed beyond dispute that the death-rate of London is largely increased by the neglect of the water companies. The several Acts of Parliament passed in the supposed interests of the public might, too, for all practical purposes, have never been passed, as they leave the consumers almost wholly at the mercy of the companies. For instance, it is thought the sources from which each company shall draw its water is defined in the Act of 1852, but this is practically not the case. The Act, it will be seen, merely prohibits the drawing of water from the Thames at any point below Teddington Lock, while it in no way interferes with a company that chooses to resort to a "depressed subsoil" source to supplement its intake from the Thames, and which, by its own showing, it distributes to its customers without previous filtration. Again the companies are bound, under a heavy penalty, to afford "a supply of wholesome water" to the public; but subsoil water drawn from the gravel is certainly not "wholesome water"; and who ever heard of anyone taking proceedings, under the Act, to enforce so obvious a duty upon the Lambeth company? The companies are bound to provide a constant supply of pure water; but the first cost of charging and providing proper fittings is thrown upon the consumer, and which is found to vary from ten shillings to as many pounds, and by reason of a number of vexatious restrictions which it imposes, few people care to trouble

themselves about a constant supply or to abandon the objectionable plan of storage in cisterns.

By an Act passed in 1868, stringent provisions were imposed upon those companies drawing their supply partially or wholly from the Lea, for the suppy of a large portion of London; and penal remedies were provided for "pollution by sewage, or other foreign matters." Nevertheless, a number of sewage farms are permitted to pour their effluent water into this river. Major Flower tells us that "the intake of the East London Waterworks Company is at Ponder's-End, just by the Enfield Sewage-Farm," and that there are many other sewage-farms above the intake, all draining into the river; and he has found out how perfectly impossible it is to get rid of the nuisance; and is, therefore, obliged to shut his eyes to a great deal of the contamination.

Once more, in 1871, on the discussion "On the Metropolitan Water Act" of that date, Sir J. Kay-Shuttleworth moved an abstract resolution, which was carried, to the following effect, that, "in the opinion of this House, the water supplied to householders in London should be derived from pure sources." No notice of this has been taken by the companies drawing water from the Thames and Lea, although the Royal Commission emphatically stated that "No process has yet been devised of cleansing surface-water once contaminated with sewage, so as to make it fit for drinking"; and again, "The use, for domestic purposes, of river water to which sewage (even after deodorisation or employment in irrigation) gains access, ought to be avoided, ... for it has been satisfactorily proved that no possible length of flow in any British river affords any guarantee that such sewage or organic matters have been oxidised or destroyed." It was then hoped that no public body would be permitted, for any length of time, to distribute water in which the germs of cholera, of typhoid, and other fevers, were proved to be constantly present.

But the danger to the public health in these several respects is scarcely, if at all, abated, and remains pretty much the same as it did ten years ago, as will be seen on reference to the published evidence given at Kingston last month on the Molesey Main Sewerage Scheme. Amongst a number of remarkable statements made by the engineer of the Lambeth Water Company, is the following:—That, when in 1873, the company were obliged to look about them for an increased water-supply, pipes were laid along the foreshore of the Thames. The immense volume of depressed subsoil water gained upon the works so fast that pumping was obliged to be resorted to, and that, finding the water so good, it was determined to make use of it, and it has accordingly been pumped up into the reservoirs of the company ever since. The subsoil water passes through a surface of loam, gravel, and sand, and the yield averages 9,630,000 gallons a day. This water the engineer persists in calling "spring water," and upon being pressed by counsel to say whether the company had really a deep well from which the water was pumped, he was obliged to admit that the deep well was a myth, that only "an experimental boring had been made into the chalk to test the level of the chalk," but from which no water was drawn. Well, if there is no deep well, there are a number of Abyssinian pumps, and surely some of these yield spring water. "No," says Dr. Tidy, "they do not; and I am sorry you have put the question, because it involves my answering it, of course, and I must express my opinion most emphatically that if the Lambeth Company are supplying this subsoil water to the public (and I speak now with regret), they have, in doing so, forfeited the confidence of the public, and they are supplying a water which may at any time be so polluted and so impure that it may be a serious source of disease." This opinion I must emphatically endorse.

From the engineer of the company, then, we learn that a somewhat improper state of things is going on at Molesey, and the facts with regard to them are, that 4,800ft. of perforated pipes have been laid down, at a distance of only 57ft. from the foreshore of the Thames; these pipes, at the end, are turned at a right angle away from the river for 90ft. only. The engineer believes, however, that half the water comes from the Thames, and half from the subsoil, and this water he miscalls spring-water; but how 90ft. of pipes will deliver an equal quantity from the "springs" as do the 4,800ft. from the Thames, through a nauseous strip of porous soil, and under less favourable conditions for the transportation of water, surpasses human comprehension. Again, the engineer, upon being pressed by counsel to say whether, "looking at the condition of the Thames at Thames-Ditton, and the filth that gets into it, his company would be bold enough, under any circumstances, to supply this water to London," replied, with more candour than comfort to those who are obliged to drink it: "It would be a matter of necessity." "What!" quickly adds counsel, "a matter of necessity to poison London?" "No, it would not poison London," he replied. "You think it would be nothing to take to London the whole sewage that is poured in there, without any means being adopted to clarify it or defecate it, or do anything at all to it?—No, not at all."

This is not all; for it was further stated that to enable the company to lay down pipes extending from the reservoir at Molesey to filter-beds at Ditton, the subsoil water once more proved so troublesome that the engineer was obliged to put in a culvert to keep it down. This culvert, which is open-jointed, is laid for a mile on the level, and must, to a certainty, be seriously affected by the 770 cesspools of Molesey. This culvert, it appears, has since been taken into the Lambeth company's pumping sump. The statement, then, that the Lambeth company is supplying spring-water ("*pure spring-water*" say the officers) to London, is by this evidence completely blown to the winds; and it follows that all the chemical analyses made to show its purity and wholesomeness are as little to be relied upon as the assertions that the company are supplying pure spring-water to their customers. This will be the more apparent when I state another fact, that just above the intake of the company at Ditton, the filthiest of filthy streams, the Rythe, constantly pours its black water into the Thames, and that immediately opposite are the sewage works of Hampton Court Palace. This, it must be considered, is but an average specimen of the London Water Supply. It is plain, however, that the several private Acts of Parliament passed to regulate the London water-companies have become a public scandal and wrong, and a searching inquiry ought to be at once made into them.—I am, &c.,

Jabez Hogg.

1, Bedford Square, May 11, 1880.

AN UNJUST DECISION.

Sir,—I am surprised that the case, Hainsworth v. Wright, reported in the Legal Intelligence department of your publication of the 16th ult., has not called forth more observation. The fact that it is passed over in comparative silence forms a melancholy instance of the egotism of modern society, and especially of architectural society. If the observations of the learned judge are just, then is the whole system of architectural practice in this district condemned, and the acceptance, by architects, of payment for quantities from builders constitutes a kind of double dealing, or something much worse. As a practitioner in this town, I cannot admit this to be a fair judgment, and if the profession here generally allow it to pass as such, the profession must bear the consequences of its own supine selfishness, each when his own turn comes to demand adequate payment for just work.

It is well-known here that, as the defendant said, all the architects in Bradford, and indeed throughout the county, do such work as he was claiming to be paid for, and that they require to be paid for it by the contractors. Are all the architects in this county content to have it said publicly by a minister of justice that such charges are fraudulent, and such payments bribes? It is within my knowledge that the same learned judge has allowed such charges to be recovered before him—but, after this case, how can he do so again? Even if local architects afford to despise this consideration they cannot afford to have such things said publicly without contradiction, *unless they are true*. As I have many times received money so earned, I feel concerned to maintain that they are *not* true; that, in fact, in taking off quantities, I perform a very arduous labour, which is highly advantageous to my client, and to the builders, and one for which I am fully entitled to be paid. I also maintain that, after accepting my two per cent. from the contractor, I am still absolutely free to criticise and condemn his work as much as I find it necessary to do so—and this every builder knows. I believe this is also the experience of all architects in this county.

Taking the case of Hainsworth v. Wright as reported, the accuracy of the account being admitted, there was no ground for refusing judgment in the defendant's favour. He had, as it appears, done work for which he charged in a specific manner according to custom, and had been paid £5 on account of his charges—in itself, one might have thought, presumptive proof of the justice of his claim! According to the judge's views, this £5 should have been returned. Instead of ordering this to be done, he admits the custom, but denounces it as a thing that is "growing up," and fails to indicate how the defendant is to be paid for his labour. Probably the "growing" custom was fully established before his Honour ever took his seat in the Bradford County Court; and even he has not the power to overturn a settled, a locally general mode of business which is found to be convenient, however strongly he may denounce it whilst in ignorance of its operation and effects, unless he can prove it to be iniquitous. His Honour used many ugly words to convey assumptions which may be well founded in one or two isolated cases, but which are utterly baseless and uncalled for as regards the general system of practice, and which were not shown to be applicable to the case in dispute. This question of fact touches Yorkshire architects home! Let them look to it.

All judges are "learned," but it is impossible that they can know, as they often assume to know, the whole business of every man who comes before them, and such shots in the dark as the one which has induced me to trouble you with so many words are really deplorable, indeed, distressing, to contemplate. They are by no means infrequent, and it may be consolatory, but it is not remedial, to believe, as I do, that no one would more sincerely lament any such defection of justice than the gentleman whose judgment I am herein obliged to contravene. But that judgment is founded upon a number of assumptions of fact, on which the Judge used his own lights, not on evidence. He chose to regard quantities as particulars which the architect is bound to provide—which he is not. He chose to regard the money paid for them as a bribe—which it is not. He chose to say that that payment interfered with the performance of the architect's duty to his client—which it does not. He chose to consider the money as the contractor's money—which it is not, but the client's, as it is included, by prearrangement, in the amount of the contract. He chose to consider the quantities as work done for the benefit of the contractor—which it is not, but for the client. How true it is that "a little knowledge is a dangerous thing," but how disastrous when used as it is in the case referred to!

It is time that architects had a "trade-union," or, at any rate, some unity of action. Taken in detail, as they are, in one way and another, the profession sinks lower and lower day by day; but it has not yet sunk as the learned Judge of the Bradford County Court so warmly declared!—I am, &c.,

11th May, 1880. A Bradford Architect.

ARCHITECTURAL EXAMINATIONS.

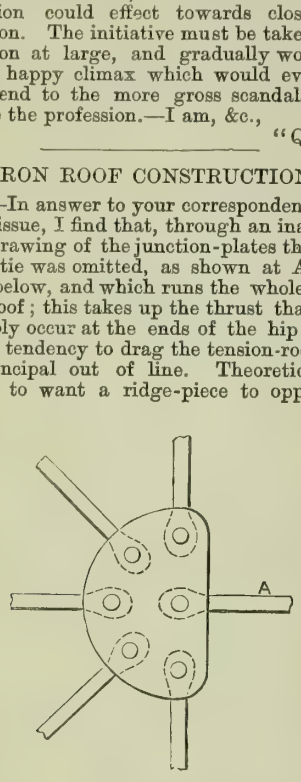
Sir,—If it is possible for the practice of architecture to be a closed profession, why does not the Institute take some active steps towards that desirable end? Why is the triennial examination, held this month, so unlike those which bar the legal and medical professions? It is divided into two sections—"Artistic," and "Scientific." Each of these presents a complete jumble of subjects. Under the artistic appears "History and Literature," and in the scientific section comes "Mathematics." Undoubtedly the latter is most essential to an architect; but does it not seem late in the day for a man to work up for an examination in Algebra and Euclid, subjects long forgotten, when he has had sufficient experience as an architect to pass the examination in "Materials," "Construction," and "Professional Practice"? The examinations might be annual, and divided into preliminary, intermediate, and final. The "Institute" and "Association" might resolve that none of its members should accept any-

one as an articled pupil or improver who had not previously passed the "Preliminary." This would at least insure that the majority of new members of the profession should be well educated. This might be followed by other steps of a similar description, and eventually the subject would become ripe for legislation. At present, when but a very small number of architects or assistants have been "in for examinations," it is difficult to see what legislation could effect towards closing the profession. The initiative must be taken by the profession at large, and gradually worked up to that happy climax which would eventually put an end to the more gross scandals which degrade the profession.—I am, &c.,

"Quid."

IRON ROOF CONSTRUCTION.

Sir,—In answer to your correspondent in last week's issue, I find that, through an inaccuracy in the drawing of the junction-plates the longitudinal tie was omitted, as shown at A in the sketch below, and which runs the whole length of the roof; this takes up the thrust that would inevitably occur at the ends of the hip rafters, and the tendency to drag the tension-rod of the first principal out of line. Theoretically, it appears to want a ridge-piece to oppose the



apparent thrust at the apex of rafters, but in practice this is found unnecessary when the purlin or slating lath-irons are secured properly in their places.

With regard to the strength of the hip principal compared with the intermediate ones, it will be found that the difference in section required is so slight that in a small roof like the one published it is of very little consequence as far as a point of economy is concerned; of course, in large structures it would become a matter of great importance, and should be taken into serious account. With regard to the ends of tie-bars, it is doubtful which is best: the cost of making is about the same, and of the two I prefer the jaw to the eye.

In conclusion, I may say the roof is erected and answers the purpose for which it was intended. Your correspondent, if he takes out the strains, will find it stronger than necessary in ordinary cases; but this is because it is erected where various acids and condensation have to be dealt with, and cause oxidation which cannot readily be detected.—I am, &c.,

F. Russell Hartley.

Birmingham, May 5.

THE REFORMED EPISCOPAL CHURCH.

Sir,—With regard to the paragraph which appeared in the Building News of the 30th April, the new church at Yeovil, recently consecrated by the Presiding Bishop of the Reformed Episcopal Church in this country, has no ornaments or decorations contrary to the Canons of the Church.

The "items of furniture" (!) alluded to by Dr. Gregg are simply ordinary corbels.

I may add that Dr. Gregg has nothing whatever to do with the new church at Yeovil; neither is it in any respect under his jurisdiction. The church officers and congregation, with their architect, have carried out their work with the greatest propriety and good taste, and in a strictly Protestant spirit.

If Dr. G. would cast his eye on his own Episcopal seal, he would see a museum of curiosities and symbolism which would delight the disciples of Messrs. Mackonochie and Tooth. He only shows how easy it is still to "strain at a gnat and to swallow a camel."—I am, &c.,

A Lay Member of the Council of the Reformed Episcopal Church.

Intercommunication.

QUESTIONS.

[6121.]—**Weight of Stone Floor.**—May I again ask the attention of some contributor to query 6081, which appeared on page 414, and which has up to the present remained unanswered?—Caution.

[6122.]—**Levels.**—Will any one inform me the best and quickest way to set out levels of roads and sewers, or any work in which it is clearly described, as I have not been able to come across the same? Simm's "Levelling" instructs the student how to take levels, but not how to set them out on the ground, or check them.—Student.

[6123.]—**Strength of Wall.**—Will any of our readers tell me what weight a 9in. brick wall, 12ft. long and 10ft. high, will carry? The foundation is good, common bricks. The wall is tied at both ends. Also what is the crushing weight per square inch for common bricks?—T. M.

[6124.]—**Church Walls.**—What is the composition of the best stucco for the interior surfaces of walls of churches, where it is intended to decorate by mural paintings in the future? Would the lime or cement ordinarily used affect the colours of the decoration if no gesso were applied before the decorations were done? These would probably be in distemper and not oil-colour. Should the usual quantity of cowhair be mixed with the rough stuff, or is it undesirable?—Pro Ecclesia.

[6125.]—**Breaking Weight of Pulley.**—Can any of your practical readers versed in ironwork give me a formula to find the breaking weight of a pulley, and also what metal and strength of arms to lift a given weight?—Shire Oaks.

[6126.]—**House Property.**—I have just sold and completed purchase of same. Am I in any way responsible for damage that may occur from any cause, through the purchaser not having had the keys, but left them with me to let the houses?—Inquirer.

[6127.]—**Bricks.**—Being desirous of making a few bricks, as in the neighbourhood they are very dear, will some practical reader give me a hint how to go about it to make about 300,000? I am told taskmasters will take the digging, &c., making, and burning right out at per ton. Will reader say what is the usual prices paid and periods of payment, and whether he would find any plant, and oblige.—Builder.

REPLIES.

[6080.]—**Crushing Weight per Square Inch.**—I am afraid my question was not quite clear to "G.H.G." (p. 559). In what position will the stock brick be placed when its crushing or breaking weight will equal 3·558 tons per square inch? Is it bedded in the solid or supported at each end? "G. H. G." says that we may imagine a cube crushed by the above weight, but is there not some slight difference between cube and superficial? To further illustrate my meaning, a friend of mine told me that he had fixed some girders which were capable of carrying so many tons to the square inch. Now does this mean square inch of surface or square inch of section, with the supports at a given distance?—Student.

[6105.]—**Book on Specifications.**—"H," if he wants a comprehensive work, had better get Donaldson's "Handbook of Specifications," published by Lockwood and Co., but for ordinary purposes of house-building the model specification found in the last edition of Wightwick's "Hints to Young Architects," by G. H. Guillaume, will be found to contain all necessary information.—Architectus.

[6108.]—**Theodolite.**—One of the best treatises on this instrument will be found in Heather's "Mathematical Instruments" (Lockwood and Co.), but the reader will find some useful practical information in "Aid to Surveying Practice," by Jackson, published by Messrs Spon.—G. H.

[6109.]—**Sunlights in Chapels.**—If "B. P." will take the trouble of going as far as Aberystwith, South Wales, he can there see a handsome Classic chapel to accommodate about 900 persons, lighted and ventilated by two large sunlights, with vertical cold-air shafts, &c., in side walls, with inlets under gallery, and two-thirds the height between gallery floor and ceiling. The foul air is conducted through a trough or tube from the sunlights into a vertical tube carried several feet above apex of gable. The process of lighting and ventilation is simple and perfect. The chapel has been built for the Welsh Wesleyans in that town, and will be opened in a few weeks. The architect is Mr. Walter W. Thomas, Liverpool and Aberystwith.—D. Williams, the clerk of works, Aberystwith, May 10.

[6111.]—**Architects' Charges.**—"J. W. C." does not say whether he prepared the first design and takes the responsibility of the quantities, but if he did I should say 4 to 5 per cent. would not be out of the way as a commission on a troublesome work of moderate cost; but so much depends on the class of work and the estimate of cost that it would be difficult to give "F. W. C." a satisfactory answer without knowing the circumstances.—G. H. G.

[6115.]—**Concrete in Iron Columns.**—I do not think the filling-in of iron columns with concrete adds anything to their strength as a support, but it does somewhat to their fire-resisting qualities. I should be inclined to use best Lias lime, as expansion would mainly take place lengthwise. The concrete should not completely fill the core by a few inches. Expansion may be calculated at about a ⅛in. for every foot in height.—G. H. G.

[6117.]—**Wood Block Flooring.**—I have frequently seen the wood block flooring used in dwellings for the working classes. The blocks are bedded in concrete, and vary in size. The smaller blocks are considered better for wear. The dining-hall and lower corridor of the North London Collegiate School for Girls, by Mr. E. C. Robins, which I lately had occasion to inspect, are laid with the system known as Gregory's, and answers admirably. The blocks are Burnettised.—G. H. G.

[6117.]—**Wood Block Flooring.**—In answer to "Yrubla," I have recently introduced an improved wood paving, having a groove about ¼in. from bottom edge. When these are laid in hot tar it forms a tongue by filling up the groove, and thus adds very considerably to the firmness of the floor. I have had this floor laid in some houses just finished, and it answers remarkably well. It is called "Walker's Imperishable Wood Paving."—R. W. K.

[6118.]—**Restaining and Varnishing Wood.**—Carson's, of La Belle Sauvage-yard, Ludgate-hill, E.C., have a liquid that removes stain or varnish entirely from wood without the slightest injury. This is from personal experience.—One who Uses it.

[6118.]—**Restaining and Varnishing Wood.**—Restaining cannot be done satisfactorily on woodwork that has been previously stained and varnished. If properly done in the first instance, it would never require restaining. I apprehend it will be necessary to remove the old varnish with a strong solution of soda to make the wood appear like new, then start again.—John Algar.

[6120.]—**Sanitation of a Small Town under a Local Board.**—I cannot give "Surveyor" a classified list of towns where certain systems of ventilation are adopted, but I am able to inform him that no one plan has found favour in all towns. In most instances I know of the sewers are ventilated by open gratings. Sometimes they are connected to lamp pillars or communicate with flues, but the former plan, if general, is probably as effective as any other. Iron ventilating grates are shown in the "Suggestions" issued by Mr. Robert Rawlinson. In these suggestions down-spouts are not recommended, and flues in walls are prohibited for sewer or drain ventilators. All pipes used as sewer or drain ventilators should be external; the joists should be air-tight, and the top should be taken above ridge level of the roof. The drain ventilator should not be less in diameter than 4in." Mr. Rawlinson observes, in a recent letter to the Building News, "Sewer ventilation should be through side chambers on the manholes and lampholes, and not directly through the covers." I may also recommend the manhole ventilating cover of Mr. W. Butler, described in this journal a week or two ago.—G. H. G.

CHIPS.

Mr. G. Chapman, the artist, died on Tuesday week of bronchitis. Known favourably to artists for some years, he appealed to a wider circle a year ago as the illustrator of the popular "Epic of Hades."

The plans for the new City of London School are in a forward state, and the foundation-stone is expected to be laid during the month of July.

A new High School for Girls was opened at Gateshead on Saturday last. The materials are brick, and there is a tower 60ft. high. The windows throughout are fitted with Elsley's patent sash apparatus. Mr. W. Lister Newcombe, F.R.I.B.A., of Newcastle, is the architect, Mr. J. Bradshaw the contractor, and Mr. L. Gaby the clerk of works.

The new lunatic-asylum, built by the City of Norwich at Hellesdon, is completed. The cost, including £1,841 for the site, has been £62,159. Mr. R. M. Phipson is the architect, and Messrs. Cornish and Gaymer, of North Walsham, are the builders.

The parish-church of Southacre, Norfolk, is about to undergo restoration, and the contract for all external work has been taken by Mr. George Jeffries, of Swaffham.

The Scarborough Town Council have appointed Mr. Henry McKinley as assistant surveyor, at a salary of £80 per annum.

A new railway goods shed was opened in Newstreet, Chelmsford, last week. It is built of wood on brick foundations, and has an iron roof; Messrs. Perry and Co., of Bow, E., were the builders.

The waterworks at Queenstown, Co. Cork, are being extended, from the designs of Mr. George Anderson, C.E., of London. A large reservoir has been erected on one of the highest points in the island, equal to the four existing ones. An engine and pipes are being set up to deliver 10,000 gallons per hour, and 8in. pipes are being laid from the reservoir into the town.

The Yeovil town-council decided, on Saturday, to rearrange the surveyorship duties, and appointed Mr. Vining, the former officer, as town-surveyor and inspector of waterworks, at a salary of £260, and Mr. W. Vining, jun., as assistant surveyor and inspector of nuisances, at a salary of £100 per annum, the son to devote his whole time to his duties.

The Woolwich High School for Girls, which has just been erected in Cambridge-place, Plumstead, was opened on Monday week. Mr. W. Tongue was the contractor for the building.

The West Norfolk Hospital, at Lynn, is about to be rearranged and improved from designs by Messrs. Adams and Son, of that town.

A new general post-office has just been opened in High-street, Chelmsford. The necessary alterations to premises have been carried out by Messrs. Elder, of Hayes, Middlesex, and Messrs. Gillett and Bland will supply a double dial public clock, with faces to the street and interior of offices.

STAINED GLASS.

CHEWTON MENDIP.—A stained-glass window has recently been placed in Chewton Mendip Church by Lord Carlingford, to the memory of his wife, the late Countess Waldegrave. The window consists of three lights, containing life-size figures of Faith, Hope, and Love, and was executed by Messrs. Heaton, Butler, and Bayne, of London.

SPARKBROOK.—A stained-glass window, the work of Messrs. Camm Brothers, of Frederick-street, Birmingham, and Smethwick, has just been placed in the west end of Christ Church, Sparkbrook. The subject is that of Paradise Lost and Paradise Regained. There are four lights, of which the first and last have reference to the first and last mention in Scripture of the Tree of Life, while the two lights between portray Balaam's prophecy and fulfilment. In the tracery above are introduced passages of Scripture, with emblematical subjects appropriate to the general intention of the work.

LEGAL INTELLIGENCE.

ARCHITECT'S CLAIM FOR PLANS.—FREND v. PRIOR.—This was an action brought last week in the Queen's Bench Division, before Justice Manisty and a Common Jury, by Mr. A. B. Frend, an architect, to recover remuneration for preparing plans for the erection of a house for the defendant at Maybury, near Woking. The defence was that the house could not be built for a sum reasonably near the limit fixed by the defendant. In July, 1878, there was an interview between the plaintiff and the defendant, and on the 18th the defendant wrote to the plaintiff and requested him to prepare plans for a house, which was not to cost more than £1,200. Shortly afterwards the plaintiff sent the defendant a sketch of a house; but the defendant did not approve of it. The parties then had an interview on the ground where the house was to be built, at Maybury, and the plaintiff's case was that he then suggested that the defendant should have a better style of house than that at first intended, and that the plaintiff approved of the suggestion. The case for the defendant, however, was that he never abandoned the limit of £1,200. Plans were then prepared, and, in answer to the defendant, the paintiff expressed an opinion that a house built on those plans would cost about £2,000. A negotiation then ensued, and the plaintiff reduced the plans. Tenders were then applied for, and the lowest tender was £1,950. The defendant than said that, as the cost was so much, he should abandon the matter. It was agreed that if the plaintiff was entitled to recover, the amount of remuneration should be 3 per cent. on the amount of the tender. The jury returned a verdict for the plaintiff.

AN ARCHITECT'S COMMISSION.—DEAR v. SMITH.—This action, heard at Lambeth County-court, last week, was brought by an architect and surveyor, of 475, Oxford-street, to recover five guineas for work and labour done. Plaintiff stated that in August last he called on defendant, in consequence of instructions from Mr. Graham, a public-house broker, and received orders to prepare plans and specification for alteration to a beerhouse in Church-street, Brixton, of which defendant was the landlord. The plans, &c., were prepared and sent to Graham in September, and in February when he sent in his bill, defendant complained of his charges, which Mr. Graham had said would amount to £2 2s. Cross-examined: Never agreed with Mr. Graham to make a charge of two guineas. The work had been carried out in substance if not in detail, and under his inspection. Frederick John Kitt, clerk to plaintiff, said he prepared the plans, &c., and that the work took him seven days, although he admittted that he did other work in the interim. His Honour (Mr. Pitt Russell) said it seemed to him that the work might have been done in about five hours. For the defendant Graham was called, and said he agreed with plaintiff to prepare the plans and specifications in question for £2 2s., and that he had had many similar transactions with plaintiff, and never paid more than £2 2s. Cross-examined: In the present case only 5 per cent. had been charged on work amounting to £120, and the claim was fair and reasonable. Geoffrey Freight, builder, of Brixton-hill, deposed that he prepared defendant an estimate of the work according to plaintiff's plans at £166; but this being considered too high, witness offered to do the work at £120 if he was allowed to carry it out after a specification and plan of his own, which he admitted he had founded on plaintiff's specification and plans. Defendant denied any liability beyond the two guineas agreed to with Graham, and his Honour in giving judgment said there seemed to be no bargain between plaintiff and defendant, but only between plaintiff and Graham. He could see nothing to fix the defendant for any charge beyond £2 2s. But taking into consideration that plaintiff gave himself extra trouble in looking into the premises while the work was in progress, he should give judgment for £3 3s. with costs, and short orders.

METROPOLITAN BUILDING ACT, 1855.—On Monday, at Marlborough-street Police-court, Mr. Newton had before him several summonses taken out under the Metropolitan Building Act, 1855, by Mr. Robert Walker, district surveyor of St. Martin's-in-the-fields. The first case under consideration is one in which Messrs. Walker summoned Messrs. Kirk and Randall, contractors and builders, for non-compliance with his notice to produce and show to him for inspection at his office the plans and sections relating to the works being executed by them at the Civil Service Stores in the Haymarket. The defendants were represented by Mr. Poland, barrister. Mr. Walker stated that in accordance with arrangements entered into, when the summons against Messrs. Dennett and Co. with regard to the same premises was heard. Messrs. Kirk and Randall had given him formal notice of the works, but they had not submitted the drawings to him, and hence this summons. Mr. Poland, replying to Mr. Newton, observed that his clients had the plans, and were willing to produce them at the works at any time Mr. Walker might please call there. Mr. Walker had no right to insist on the builders taking the plans to his office. The Act of Parliament required that, in cases of public buildings, the plans should be deposited with the district surveyor, but in the case of private buildings they were only required to produce the plans for his inspection. Mr. Walker remarked that the proceedings were taken under the recent Act, 41 and 42 Vic., chap. 32, sec. 16, which empowered the Board of Works, subject to the approval of the Secretary of State, to make by-laws. Accordingly, the Board had made an order to the effect "that, on notice being given to the district surveyor of the intended erection or alteration of or addition to any house, building, or other erection than a public building, the surveyor may, if he think fit so to do, by notice in writing require the person giving such notice to produce a plan or plans, and sections of any such house, buildings, or other erection, or of the intended alterations or additions thereto for his inspection." He had, under that by-law, given notice to them to produce the plans of 28, Haymarket, and they had failed to obey it. The notice, which was in the form of the printed form prepared by the Board of Works, required them to produce the plans at his office, and he submitted that that was in accordance with the law, because the 18th section of the Building Act, 1855, provided (sec. 98, rule 4) that "a notice, summons, or order may be served on any district surveyor by leaving the same at his office." Mr. Poland submitted that the provision just cited had nothing to do with the case, being evidently only intended to meet the case of persons who were not to be bound to serve notices personally. In this instance it might matter very little whether Mr. Walker went to the works to see the plans, or whether the builders sent the plans to his office for inspection, but in cases of very small buildings, or in cases where the works were a greater distance from the district surveyor's office, it would involve great trouble and inconvenience, besides the expense of duplicating the plans if Mr. Walker's claim to have the plans produced at his office, instead of on the works, was admitted. The by-law imposed no obligations on the builder beyond that of producing the plans for inspection, and that might be most conveniently done at the works; there was nothing said about taking them to the surveyor's office. Mr. Walker urged that that was the intention of the by-law, as was shown by a notice form prepared by the Board of Works, in which the words "for my inspection at my office" occurred. Mr. Newton: It is clear there is a distinction between depositing and producing. Plans are to be deposited in the case of a public building. Mr. Poland: This is a private building, and when Mr. Walker calls at the building, they will be produced for his inspection. Mr. Walker said he relied on the notice-form of the Board of Works to which he had already referred. Mr. Newton said the Board of Works form was not binding. If the plans were to be taken to the surveyor's office in the case of every private building it would involve, in many instances, the duplication of the plans, and Mr. Walker had no right to expect that. Mr. Walker urged that it would be impossible for him properly to inspect plans on the works, where there was no accommodation for him, and where he could not have at hand the materials for all those elaborate measurements and calculations which it was necessary for him to make in order to fill in the returns which it was his duty to send to the Board. If the contention of Mr. Poland held good he (Mr. Walker) would have to go about like a snail, with his office on his back. (Laughter). Mr. Newton was of opinion that the notice-form requiring the plans to be produced at the office of the surveyor, was wrong in law. However, the surveyor was entitled to see the drawings, and he had no doubt the defendant would do what was right.—Mr. Walker was not so sure about that. He had been to the works, and had been treated with considerable discourtesy.—After further discussion, Mr. Newton said he must discuss the summons. Mr. Walker: On the plea that I had asked them to produce at my office instead of at the works? Mr. Newton: They say they will produce them at the works. Mr. Walker: I have a letter from the builders, in which they say the architect told them not to produce them. Mr. Poland: Not at your office. Mr. Walker: I shall ask for a case. Mr. Newton: Certainly. Mr. Walker: I must report your decision to the Board, and leave them to fight it out. Mr. Newton said that while he had decided in favour of the defendants, he would suggest that, under the circumstances, and to prevent ill feeling, it might be advisable that the defendants should take the plans to Mr. Walker's office, merely for him to look at. Mr. Poland, after consultation with his clients, said they would so far accede to the suggestion as to send the plans down to Mr. Walker, instead of compelling him to come to the works to see them; but he was afraid a further question would have to come before his worship hereafter, as to what plans Mr. Walker was entitled to see, and what he was not. They would agree to send him all the contract plans, signed by Kirk and Randall. Mr. Newton: Why not let him see all the plans, without reserve? Mr. Poland: I don't know; but it may well be, he is not entitled to see some of the plans. You must remember that, under the Building Act, for instance, ironwork is excepted altogether. Mr. Newton: Why make any mystery about this matter? Mr. Poland: I don't know that there is any. Mr. Newton: There must be, if you refuse to let him see any plans. The summons was then dismissed; Mr. Walker giving notice of appeal. The same defendants were also summoned by Mr. Walker for having, contrary to the provisions of the Building Act, erected at the back of No. 3, Oxenden-street, an irregular wooden building, and omitted to raise the parapets against flat at back to south party-wall, as required by section 16 of the Act, and to make party-walls on north side of back addition, conformable to section 17 of the Act. Mr. Poland again appeared for the defendants, and said that the omission in regard to the parapets been or would be supplied. In regard to the other part of the summons, as to the erection of the irregular wooden building, Mr. Poland contended that being only an open lean-to shed or roof for the purpose of storing empty boxes, &c., it was not a building within the meaning of the Acts. Mr. Walker contended that it was, and that it was necessary for him to enforce the law in this case in order to prevent others from offending. He pointed out that under one of the sections, however, the defendants had power to make an application to the Board of Works for permission to erect the Irregular building. Mr. Newton suggested that the defendants should apply for permission now. Mr. Poland said they had not done so, because they had not thought the case came within the terms of the Building Acts. Indeed, they did not see that Mr. Walker had anything to complain of at all; they contended they were entirely within their rights, and that the building referred to was not a building at all within the meaning of the Act—it was a mere lean-to covering to protect the boxes from rain. Mr. Walker said the case was important from his point of view, because there were a number of foreigners about the neighbourhood of Leicester-square who were constantly knocking up little places with egg-boxes, &c., and who believed they had a right to do so. If he did not enforce the law in this case, he would be unable to enforce it against those people. Mr. Newton said the Act contained no definition of a "building," though it did contain one of "builder." Mr. Poland believed there had been some decisions on the subject. He suggested the adjournment of the case, and if it should be thought advisable, the defendants would apply for the permission of the Board of Works or otherwise. If on consideration it was thought worth fighting for they could come again before the magistrate. Mr. Walker agreeing to the adjournment, this suggestion was agreed to, and the case was adjourned to the 1st June.

Mr. Joseph Garven, a deaf and dumb sculptor, who produced the statue of the Good Shepherd that adorns the front of St. Saviour's Church, Oxford-street, has just finished a marble bust of the Prince of Wales for presentation to the Deaf and Dumb Asylum, Old Kent-road, S.E.

The Metropolitan Board of Works decided on Friday to grant permission to General Scott's Sewage Company, to make a small trial of their process for treating sewage at the Crossness pumping station.

The Norwich School Board, last week, discussed and rejected by nine votes to one a proposition to throw the planning of new schools open to competition, and to dismiss Mr. Brown, who at present holds the position of architect to the board, at a salary of £250 a year, employing instead thereof a consulting surveyor at £60 per annum.

Our Office Table.

THE exhibition of carriage drawings and other artistic productions of pupils attending St. Mark's Drawing and Technical School for Coach Artisans, George-street, Grosvenor-square, now open at the Carriage Bazaar, King-street, Baker-street, shows that the importance of offering the means of self-improvement to their workmen has been recognised by coachmakers, and that the workmen have tried to make the most of advantages put within their reach. Among the designs for carriages of all kinds, armorial bearings, monograms, and free-hand drawings intended to make the student ready with his pencil are specimens of the work of lads of 14 and men of 40 years of age. Some of the drawings and paintings sent in competitions for prizes by the Company of Coachmakers and Coach harness-makers are added to the drawings which represent the results of the evening studies of those attending St. Mark's Technical School. Among works of special merit the drawings sent in by competitors for prizes offered by Messrs. Brewster, coachbuilders, of New York, may be noticed. Some good working drawings have also been produced by the competitors for prizes offered by Mr. Thrupp, Mr. G. N. Hooper, and Messrs. Cooper, of Long-acre. Engravings, drawings, and photographs, too, of old state coaches, chariots, curricles, and other vehicles of a bygone time serve to remind the visitor how much the modern carriage builder has reduced the load for the horse while increasing the comfort and safety of the owner.

THE fortnightly meeting of the Architectural Association was held on Friday evening, Mr. R. E. Pownall, V.P., in the chair. A vote of thanks was accorded to Mr. E. C. Robins for meeting the members at the North London Collegiate School the previous Saturday afternoon and for offering explanations of the principles of sanitation carried out therein. Mr. Eales, hon. sec., announced that the next visit would be to the new police-courts in Bow-street, on Saturday week, the 22nd inst., at 3 o'clock. Mr. T. Roger Smith read a paper on "Haddon Hall," which will be found on another page; it was illustrated by a number of photographic views shown by the magic-lantern, and by water-colour and photo-lithographic drawings. At the close, a short discussion took place, in which Messrs. E. J. Tarver, H. H. Stannus, S. W. Kershaw, F.S.A., E. J. Hayes, and R. E. Pownall took part, and a vote of thanks was heartily accorded to Mr. Smith at the close.

WE have no very great liking for Venetian blinds, but one great objection to their use is certainly removed by the use of Carr's Patent "Ladder-Tape," a sample of which has been forwarded for our inspection. This "ladder-tape," is sold ready for use, is quickly and easily adjusted, and the cross-pieces, or straps, are woven into the broad tapes, instead of being simply stitched on, as in the ordinary manner. The results are that all risk of the laths breaking down is avoided, as the woven cross-tapes never give way, and as they are woven in patent Jacquard looms, the distances between the cross tapes are exactly similar, so that laths fitted with them always hang evenly. There is also a great pecuniary saving attached to their use.

IT is interesting to notice the rapid strides that building has made during the last few years, not only round the outskirts, but at some considerable distance from the metropolis. The rural prospects of nearly all our pretty and picturesque little villages have been more or less marred by the innovation of builders. The quaint old village of Ilford has hitherto been free from these changes; but we notice that a large and very important estate, known as "Clements," opposite the railway-station, in the very heart of the village, is to be offered by auction, in plots, by Messrs. Protheroe and Morris. We understand that the magnitude of the estate will necessitate a series of sales, and, from the advertisement which appears in our auction columns this day, the first is fixed to take place at the Angel Inn, Ilford, on Thursday, the 27th inst.

A GENERAL meeting of the subscribers to the Builders' Benevolent Institution was held on Thursday afternoon last at Willis's Rooms, St. James's, the president, Mr. F. J. Dove, in the chair, for the purpose of electing five pensioners on the funds—two men and three women. There were eight candidates, two men and six women. The poll opened at noon and closed at 3 p.m., when the scrutineers (Messrs. T. Stirling and T. F. Rider) reported the result of the voting to be as follows:—William C. Read, 2,158; Thomas Barnes, 339; Elizabeth D. Stenteford, 5,556; Martha Sidwell, 4,391; Mary Ann Hibberd, 3,323; Mary Ann Garner, 2,217; Selina Thomas, 1,426; and Ann Boulton, 828. The chairman therefore declared the successful candidates to be Read, Barnes, Stenteford, Sidwell, and Hibberd. Votes of thanks to the chairman (proposed by Mr. Plucknett and seconded by Mr. Dines), to the scrutineers (proposed by Mr. New and seconded by Mr. Richardson), and to the vote-takers (proposed by Mr. Richard Head and seconded by Mr. Thomas Stirling) brought the proceedings to a close.

CHIPS.

New public baths at Boston, erected under the superintendence of the borough-surveyor, at a cost of £5,000, were opened on Monday week.

The foundation-stone of the new church of St. John the Evangelist, at Maze Hill, Hastings, was laid on Thursday, the 6th inst. The church is Early English in style, and will be built of red brick. The complete structure will consist of a nave, chancel, crypt, sacristy, organ-chamber, and a tower with spire, and accommodation will be provided for 750 persons. Mr. A. W. Blomfield, M. A., is the architect.

The town of Sidmouth, Devon, is about to be furnished with a water-supply, from the plans of Messrs. Russ and Minns, of Westminster; a boring is to be made to the lower red sandstone, and the supply will be pumped to a reservoir above the town.

The new Church of St. John the Evangelist, at Bromley, Kent, was consecrated by the Archbishop of Canterbury on Saturday. The church has been built from designs by Mr. George Truefitt, and the contractor was Mr. Crossley, of Bromley; the cost of erection was £5,150.

Carlisle-bridge, Dublin, a prominent feature of "the finest thoroughfare in Europe," as Sackville-street has been hyperbolically called, is undergoing widening, from the designs of the new city engineer. The long-talked-of monument to O'Connell is also being commenced close by.

A new lecture-hall has been opened at the Balham Congregational Church. It is Early English in style, and faced with red bricks. The interior is 56ft. by 36ft., and is faced with stock bricks, relieved with red bands and arches. The roof is panelled and lined out in colour, and the windows are filled with cathedral glass in lead lights. Messrs. Seale, Son, and Hayes, of Ludgate-hill, are the architects, and Mr. G. Chandler, of Brixton, was the builder.

At a meeting held at Aberdeen on Friday, it was resolved to establish an art-gallery and museum in that city, and a committee was appointed to carry out the undertaking. It is proposed to utilise the old grammar-school for the project, and to adapt it to the purposes at a cost of about £1,000.

The foundation-stone of a new Congregational chapel has been built at Floore, near Weldon; it is Romanesque in style, will seat 200 worshippers, and will cost £620.

The local board of Tunbridge Wells, at their last meeting, approved plans prepared by Mr. Brentnall, C.E., for a new public bridge across the South Eastern Railway.

The Derbyshire Archæological Society had its first outing on Saturday last, when, under the leadership of Mr. Arthur Cox, hon. secretary, King's Newton hall, castle, and church, and Melbourne castle and church were visited; papers were read by Mr. F. F. Fox at the principal points of interest.

The memorial-stones of new Primitive Methodist Schools at Platt-bridge, near Wigan, were laid on Saturday. Mr. H. Wall, of Wigan, is the architect, and Mr. Johnson the contractor.

A meeting of the Sir Rowland Hill memorial statue committee was held at Kidderminster on Monday, when the selected sculptor, Mr. Thomas Brock, exhibited a model of the statue and two for the pedestal. It was reluctantly decided to omit the former group of bas-reliefs on the pedestal on account of the additional expense, and the models, which will cost £1,500 to execute, were approved. After viewing various sites, the committee decided to have the statue erected in the centre of the triangle between the Municipal buildings, the Midland Bank, and Messrs. J. Brinton and Co.'s offices.

A new chapel for the Strict Baptists has been erected in Windmill-road, Croydon, and will be opened on Monday next. Mr. Martin, of Queen's-road, Croydon, was the builder; it seats 300 persons, and cost £800.

The Yarmouth port and harbour commissioners on Tuesday week adopted the plans and estimates of Mr. Teasdel, the deputy engineer, for the improvement of the south pier, and the filling up of the Spar breakwater, at an estimated cost of £5,100, in accordance with the report made by Sir John Coode, the consulting engineer to the commission.

A system of drainage is being carried out at Port St. Mary, in the Isle of Man. Mr. Thomas Hines, of Douglas, I.M., is the contractor for the work.

The town-council of Wolverhampton decided, on Monday, to accept the tender of Mr. Arthur F. C. Bedford for alterations and additions to the Free Library, in accordance with the plans and specifications prepared by Mr. Johnson, for the sum of £3,083 11s. 5½d. Two new reading-rooms and a reference-room, each 52ft. by 26ft. 6in. will be provided, as well as a museum, 90ft. by 16ft.; a lecture-hall, 90ft. by 34ft. 6in.; lending library, 60ft. by 26ft., fine class-rooms, and patent-room,

The vestry of St. Paul's, Bath, have accepted the tender of Mr. Bladwell, of that city, for erecting a district church, at £2,750.

The opening of the Clayton Hospital, at Wakefield, recently erected from the designs of Mr. W. Bakewell, was marked on Thursday by a dinner at the Bull Hotel, in that town.

A new Church of England school for girls is being built at Stanley, near Wakefield, and will be opened on the 1st July. It is of white freestone, lined with brick, and will accommodate 130 children. The Rev. R. Burrell, the vicar of St. Peter's, Stanley, has acted both as architect and clerk of works.

The foundation-stone of a mission-room and Sunday-school, was laid at Ross, Hertfordshire, on Tuesday week. The building, which will be erected from designs by Mr. George Pearson, of Ross, will be Romanesque in style, and will seat 200 people.

An inquiry was held at Fermoy, on Saturday, before Mr. Cotton, C.E., an inspector from the Irish Local Government Board, respecting a petition from the town-commissioners, for leave to borrow £8,000, for a new water-supply. Mr. Keane, C.E., explained his scheme, which is to bring water from the Colmucky Wood watershed. An alterative scheme was propounded by Mr. Lyons, C.E., who advocated bringing a supply from Knackamanig, at a cost of £11,000; but the inspector said he should recommend Mr. Keane's plan, if the supply should appear sufficient.

The foundation-stone of a new dispensary was laid at Southgate, Pontefract, on Friday, by Mr. Childers, M.P. Messrs. Neill are the architects, and Mr. Beauland is the contractor for the building.

A builder and contractor, named Oddy, committed suicide at Brighton, on Tuesday, by placing his head under the wheels of an approaching train. The act is attributed to intemperance and reduced circumstances.

On Tuesday, the Bishop of Worcester consecrated a new church, erected at Wilden, near Stourport. The church seats 150 adults and cost £2,000.

The town-council of Gloucester received, last week, a full report from the water committee, urging them to take the opinion of Mr. Bateman, C.E., on the question of how to obtain a more adequate water-supply for the city, and subsequently decided to instruct Mr. Bateman, as recommended.

Plans have been prepared by Mr. A. Martin, architect, for the erection of Christ Church, on the site of the vacant piece of ground adjoining the Philharmonic Hall, Southampton. The building will be in the Lombardic style, with terra-cotta capitals and dressings. The walls will be of white brick, relieved by red and black; principal entrance is to be in Above Bar-street, with side entrance in the recently-constructed street, and adjoining the Philharmonic Rooms. The length of the building is to be 100ft., 48ft. wide, and 50ft. high. A gallery and class-room and vestries will be provided.

Lamplough's Pyretic Saline is refreshing, most agreeable, and the preventive of FEVERS, BILIOUSNESS, SMALL POX, SKIN DISEASES, and many other spring and summer ailments. Sold by chemists throughout the world, and the Maker, 113, Holborn Hill. *Use no substitute.*—ADVT.

Holloway's Pills purify the blood, and by this operation prevent the depressing effects of cold, damp, and foggy weather. They rouse the nervous system to a healthy standard, and give a wholesome tone to every organ of the body. Holloway's Pills present the surest means of checking all chest complaints.

THE BUILDING NEWS.

LONDON, FRIDAY, MAY 21, 1880.

THE ARBITRATION ON THE THAMES OUTFALLS.

AFTER a long and elaborate inquiry, the arbitrators appointed by the Thames Conservators and the Metropolitan Board of Works, as to the alleged banks of accumulated sewage in the Thames at Barking and Crossness, have made their award, and have decided that the case attempted to be made out by Captain Calver and the Conservators is without foundation. It will be unnecessary here to enter into the original dispute, as we have on several occasions, and recently, discussed the grounds of the complaint of Captain Calver, and the replies made to his report, and we have before condemned the needlessly long and desultory investigation that has been going on in the Westminster Palace Hotel, under the presidency of Sir Charles Hartley; but we may at once say, the arbitrators were, by the arrangement, allowed only to deal with a part, and a very small part, of the subject in dispute, namely, the effect of the outfalls upon the navigation of the river. In short, their inquiries were limited "to the origin of three particular banks, Margaretness bank, Barking bank, and Crossness bank," and they had to determine simply the formation of these shoals of mud. Not a thought has been given to the pollution of the Thames by the discharge into it of 120 millons of gallons of sewage per day, and not a word of the sanitary conditions of the river which daily receives such a vast quantity of foul matter. How the inquiry came to be limited to the question of navigation is somewhat startling in these days of sanitary congresses and investigation; but we must take the decision for what it is worth. It is even more surprising, as we have recently observed, that so long a time has been occupied about the very simple and easy question that had to be decided. It was merely the question of the quantity of sewage daily discharged into the Thames, and the amount of solids and matter in suspension: questions that ought to have been settled by the evidence and experiments already undertaken. If, as we have said, every gallon of London sewage holds in suspension somewhere about 150 to 200 grains of solid and impure matter, and we multiply this sum by the number of gallons per diem, we arrive at a vast amount of solid matter which must be deposited in the bed, or creeks, or along the foreshores. We are now told by the arbitrators that the tidal portion of the Thames contains a considerable amount of suspended matter, but that a very small portion of it is derived from the outfalls, that the bulk of it is derived from the basins and tributaries of the Thames, from the erosion of the banks, and from material brought up with flood tide from dredging operations, and from sewers outside the Metropolitan area, and belonging to the Metropolitan Board. The report further says that the three banks we have alluded to would, "near low water," inconvenience "sailing vessels of a certain draught of water," and that they "cannot make as long boards when tacking to beat up or down the river as they could before the banks came into existence;" but it also speaks of the navigation of the river as not having suffered from the outfalls; that vessels of greater tonnage and draught of water "can now steam up or down than the vessels which could pass in these manners before the dredging was executed," a remark, the effect of which is to show that the Conservators have dredged some portions of the channel deeper than others, thereby increasing the scour in the deepened portions, while the material so excavated is deposited in other parts, from which the stream has been diverted. Such is the gist of the explanation afforded; it is a little reassuring to be informed that the river Thames is not in danger of being choked up by the sewage of London; but we should still like a little more light thrown upon the ugly accumulations of mud that lie along the banks and in the bed of the river, and oscillate to and fro within a certain section of it; and we should like also to be informed with more exactness as to the sources of the deposits, and what proportion of them is due to the sewage and other matters. The three particular banks to which the arbitrators have devoted their attention are situated in awkward proximity to the outfalls. Margaretness bank is on the south side of the river, and almost opposite the northern outfall, while the Crossness bank is in front of the southern outfall. Barking bank is on the north side, and begins at the end of the first-mentioned, and extends past Bridge's Powder Magazine. But the report is less satisfactory when we regard the evidence given, and the admission that a portion of the suspended matter is derived from sewers. The question at once arises, How much? It must not be forgotten that the surveys made some years ago established the fact that a mudbank had been formed opposite Crossness outfall, of several feet in thickness, where previously there had been a depth of 17ft., and a clean gravel bottom, and that, notwithstanding the dredging operations, accumulations of sewage mud were being deposited over a considerable part of the river-bed. No explanation is apparently given of this circumstance, and the dredging operations alluded to in the Report do not satisfactorily clear up the difficulty of the peculiar composition of the sediment, and the position of the banks in other parts of the Thames, as the mud deposits at Westminster. All these evils would have been averted if the recommendations contained in the report prepared by Messrs. Simpson and Hall and Captain Galton in 1857 had been carried out, the main purport of which was the desirability of taking the outfalls to a part of the river where the sewage would discharge in a large volume of water, and be carried out to sea by the strength of the currents. The outfall then recommended was Sea Reach, seven miles below Gravesend; and the present scheme of the Board failed in not providing for the future increase of discharge, and every year makes matters worse. If we accept the figures given, the mean flow per hour varies from about a million and a half gallons to three millions, and it amounted in 1878 to more than 25 million cubic feet a day. The report of the arbitrators does not satisfy us that this discharge is carried out to sea; while they seem to admit the assertion made by Captain Calver that the deposit rolls backward and forward with the ebb and flow of the tide, gradually depositing the heavier particles in the shoals, creeks, and banks of the river.

But it is not the navigation of the river only that calls for attention; a far greater evil waits to be dealt with, about which the arbitrators have not expressed any opinion. The sanitary aspect of the case remains untouched, and the pollution of the river for miles by material that might be turned into account as a fertilising agent is allowed to continue. Such is the "irony of fate" which attends public works,—that the health of large populations is put aside to deal with the commercial question as to whether the Board of Works or the Conservators are to bear the cost of dredging, and this in spite of Clause III. of the Metropolis Local Management Act of 1858, which expressly states that the power conferred by the Act of 1855 "shall extend and be applicable as well to works for deodorising sewage," a clause clearly showing that some treatment at the outfalls was contemplated originally. In the mean time waste and pollution are being allowed in a river that flows through the most populous city in the world, although every other town is compelled, under the Rivers Pollution Act, to provide means of purification.

THE NEW INDIAN COLLECTION AT KENSINGTON.

THE Indian Museum opened last Monday at South Kensington now worthily represents the resources of Indian art and industry. Though we meet with many objects familiar to frequenters of the old galleries devoted to the productions of the East, the collection has been supplemented by numerous additions and loans in all the departments. The visitor or student interested in Indian architecture will still notice on entering the lower gallery, the plaster casts of the well-known gateway of the Sanchi Tope, and various models of pillars and fragments of sculpture, which must have previously arrested his attention; but he will quickly recognise other specimens and fragments of structures made famous by recent archæological explorations, and by the engravings in Mr. Fergusson's "History of Indian Architecture"; notably the Greco-Buddhist fragments of sculpture from Takht-I-Buhai, by Dr. Leitner, who some years ago brought home an extensive collection from this locality, which have been here arranged in cases, though hardly so systematically as could have been desired. Many of these fragments of sculpture probably were excavated from the Monastery at Takht-i-Bahai, a plan of which is given in Fergusson's "History." The fragments so collected comprise chiefly bas-reliefs of figures and sculptural ornaments in a dark blue stone, somewhat resembling slate in colour. The figures consist of deities, Buddha being a central object in a great many of them. Thus we see sculptured remains of Buddha, with attendants, and figures of the deity, in niches and in various positions, representations of votive offerings, processions and domestic scenes. Such sculptures as the fragment showing an arcade of three arches, of circular or slightly pointed and polygonal shape, with figures of Buddha in the niches, and the double-sculptured arches adorned with figures in the tympana; the terra-cotta fragments of foliage, enriched cornices with vigorous leafage, beads, and modillions, have a certain interest beyond their purely archæological character for the architectural student. The design and style of the foliage seem to suggest a decidedly Greek or Byzantine origin; the acanthus-shaped leaves and volutes may owe their origin to the types found at Persepolis, and many of the details scarcely indicate the wooden constructions that have been asserted, and with much reason, to have been their prototypes. But the question is one still obscure, and various theories have been broached, though we may take it for granted, from the Classical style of these sculptures, that there was some connection between Greek art and the remains of architecture in the Peshawur valley. The plaster cast of one of the columns at the Kutub, near Delhi, assigned to the eleventh century, is a particularly good example of Hindu sculptured detail, with its channelled and enriched shaft, its square bracketed capital, richly carved; we also pass a model of the iron pillar at Kutub, ascribed by Fergusson to the fourth century; a cast of the East gateway of the great Buddhistic tope at Sanchi, with its wealth of sculptured records, dating about 17 to 37 A.D.,

constructed from the gelatine moulds taken by Captain H. Cole; a beautifully-carved arch from the ruined city of Saitron; casts of pillars found near Agra, with shafts relieved by a kind of thickly-studded ball-flower and spirals; two richly-designed pillars from the Sultana's kiosk, or pavilion at Fâth-pur Sikri, near Agra, an example of Mogul art, and a handsome throne pillar from the private hall of Akbar Khan (sixteenth-century), remarkable for the double row of carved brackets, which form its circular capital or top, and the elaborate conventional arabesques in relief. These latter are all casts, and represent some of the glories of that splendid period of Indo-Saracenic architecture which belong to the Mogul emperors. Entering another gallery, we come to the section of Furniture and Decoration. Here we find wood-carving in sandal-wood, as a rich but over-carved chimneypiece of modern Indian design, making us feel that the Indian artist has lost a great deal of his cunning in design; it is full of detail, but does not impress. The models of ceilings at Lahore, or the beautiful star-like reticulations of panel-work so characteristic of Moresque design, painted in red and green, with floral ornament and panels of silvered glass, hardly give one a fair idea of the beauty of these ceilings. More interesting is the series of perforated screens or "jalees" of similar patterns, cut in marble and sandstone slabs from Mirzapore, and those made from lime cement, together with the splendid collection of photographs illustrating the architectural remains of India, which are hung along each wall. Here we have representations of all the grand monuments from Northern and Western India; examples of Jaina and Chalukya architecture; also that of Southern India, or the Dravidian style. The series of photographs of the rock-cut temples of Ellora, Ajunta, &c., and those showing the magnificent sculpture at Mysore, form a complete illustrated record of Hindu art of the most interesting kind. The Cawnpore Memorial, if it cannot be regarded as an architectural success, is at least a gratifying recognition of the sufferings of those victims who fell in the fearful massacre. It forms an octagon inclosure, of Gothic design, with a series of pierced arches and corner pinnacles, and is executed in Chumar sandstone. The model exhibited is of Agra soapstone. Passing various other models of tombs and houses illustrative of the modes of building and decoration, we come to a finely-executed model of the Elephanta caves at Bombay, constructed to a scale of ½in. to the foot. The ethnological collection is no less comprehensive, and comprises specimens of industrial art of even more popular interest. The carpets and rugs and embroidered work are marvellous productions of Indian weaving, design, and workmanship. Many of the choicest specimens have been lent by Messrs. Valentine, Robinson, and Co. We notice a splendid cashmere carpet, of eighteenth-century work, a silk carpet from Malabar, woollen rugs, delicate shawls, and embroidered work of rich silk on muslins and other gauzy fabrics of the most beautiful design and work. Skirts, adorned with beetle's-wings, from Dacca, Delhi, and Madras, and various gold brocades of the richest design, meet the gaze of the visitor to this department of the Museum. Even the cotton-printed fabrics exhibit a charm of design and colour we fail to observe in home productions; a quilt from Jeypore, with hexagonal pattern, printed on cotton, claims a word of admiration for the nice harmony of colours in red, yellow, green and purple; nor can the admirer of artistic-woven stuffs pass through this gallery without noting the embroidered scarves, turbans, caps and costumes, and the canopies of crimson and gold, which enlist his attention.

Ascending to the upper galleries, we find a valuable collection of figures, models, and drawings, illustrating Hindoo mythology. The cases of pith figures from Madras, and the water-colour and sepia drawings, will attract notice, especially the admirable series of drawings of craftsmen of North-Western India, sketched by J. L. Kepling. The metal-work, the chased brass, bottles, salvers, and bells, the white-metal vases, incised, engraved, and parcel-gilt, from Tanjore, our own artists may well emulate; and the display of jewellery, even more costly and elaborate in workmanship, will force the English artist to admit the superiority, in point of design, in many of the articles. We need only mention the superb "Guthrie Collection," with its boxes and trays of jade, encrusted with rubies and emeralds and crystals, set in gold; its priceless gems and mosaic inlays. What, for beauty of conventional treatment of flowers, or for the geometric design, can compare with the inlaid work from Agra and Delhi, the Lahore laquer work, the ivory mosaic boxes? Passing the armour, the visitor will find the fictile art represented by some choice pottery and tiles. From Scinde, some beautiful coarse glazed ware, with folial and geometrical decoration, must be noticed, in in which blue, brown, and buff are harmoniously blended. The jars, in shades of blue and brown on white ground, are particularly simple and effective, and Bombay contributes several good specimens of this sort of ware, designed by its School of native artists. We must not, however, forget to mention the tiles and window-screens of glazed earthenware, perforated and ornamented with borders in quiet colours from Scinde. On the walls are drawings representing Oriental figures; musical instruments form another very important section of the museum. The architectural student may, however, ponder as he descends the stairs leading to the vestibule, over the fine collection of photographs illustrating Mohammedan architecture in India. He may trace, from the earlier specimens of Buddhist sculpture, the beginning of a wonderfully luxuriant art, which sprang from a wooden origin into lithic forms about the time of Asoka, and which developed itself in pillars, rails, topes, and monasteries; he can discover the same exuberant art in the remains of the early Jaina bas-reliefs and sculptures, in the richly-sculptured temples of Southern India belonging to the Dravidian style; and, finally, see the same art further developed under the Mohammedan dynasties till it culminated, under the Great Mogul empire, in the splendid structures of Agra and Delhi. By the aid of the photographs and maps the student can collect the circumstances of each style, and form a pretty complete picture of Oriental art.

THE ROYAL ACADEMY.

[THIRD NOTICE.]

T. SIDNEY COOPER comes out this year specially as a landscape-painter, but landscape without power of colour, or good drawing, is a poor affair. No. 303, "Isaac's Substitute," a ram caught in the thicket, is altogether unfortunate. No. 480, "Clearing the Wood for the Iron," is better, because really an attempt to represent what was actually seen. The colour throughout is too pale and ashy in hue, and the drawing of the horses far from correct; still, much labour has been bestowed upon the details of the picture, not altogether without valuable effect. "The Turn of the Tide at Slaughden, Suffolk" (494), by James W. Smith, is worthy of high praise. It reminds one, with its low-lying shore being gradually worn away by the sea, and its long village stretching along the marshy lowland, of the touch of Rembrandt. Colin Hunter's "The Silver of the Sea," is good. Vicat Cole sends four pictures, all scholarly and true representations of river scenery. No. 15 is a capital view of the Thames, with its Autumn aspect—

"A watery maze; haunt of still solitude."

The reflection of the water is admirable. No. 310 is also an autumn scene on the Thames, fringed with golden beech-trees. In No. 1466 the artist describes the mist in the morning upon the Thames—half-hiding the craft on the river and the houses on the water-edge, not altogether satisfactorily. Of a very different character are Mr. H. Herkomer's two pictures of rugged and uncouth wild Highland and Alpine scenery, No. 1460, "Wind-swept," and No. 468, "God's Shrine," a small chapel in the profound stillness of the dark Alpine wood. No. 831 is a particularly good work of this artist. It is a water-colour of nearly life-size, "Grandfather's Pet," of which an excellent print is to be seen in the shop-windows. The old man, with his rugged face and coarse clothing, could scarcely have been better drawn; the girl, who nestles up to him, is rather feebler. This artist always excels in the more picturesque phases of nature. Two of the boldest, and in many respects, most satisfactory river scenes, are those by Keely Halswelle. No. 74 is "The Flood on the Thames, 1879, near Hart's Lock Wood, above Pangbourne." All is desolation; the uprooted trees floating down the dark swollen river; no life near, except the solitary heron and wild-fowl. If we have a fault to find, it is the too-extensive use of the pallette-knife. Thick masses of colour laid on in this manner, when we remember how most of our colours are made, appear little likely to retain their present effect for a lengthened period. No. 522 is equally good,

"A deep and flowing river;
Flowing onward, flowing ever,
Tarrying not, and stopping never."

A dark, mysterious stream, flowing through rush-clad banks, a lurid streak of light from the setting sun throwing into relief a clump of dark trees on the left bank. T. Faed's chief picture is of larger size and higher aim than most of his former pictures. No. 316, "Hand to Mouth," represents the interior of a general-shop, in which meet the two extremes of wealth and poverty. To the left is seated a fine lady, attended by a black servant and pet dog, while her child clings to her in fear of the rougher group on the right, though they are all harmless enough, including their little monkey, who has helped himself, while his poor master, a strolling musician, is feeling in vain at the bottom of his empty pocket to find the odd halfpenny to make up the sum to pay for the few trifling necessaries (biscuit, cheese, and candles) he has come to buy. On the extreme right his poor little tired-out daughter has fallen asleep, as she sits on a sack. There is much pathos in all of this half of the picture, and clever delineation of character, especially in the head of the suspicious old shopkeeper, looking keenly after his own interests, and that of his distressed customer. At the back of all stands a healthy young woman, pouring out whisky from a bottle to serve some idlers in an adjoining room. Notwithstanding much admirable drawing and painting, the whole effect is not altogether good; there is a want of balance and harmony between the contrasted parts that jars upon the feelings. Nos. 73 and 441 are little more than portraits of the same Scotch lass in different dress and position. In the former, she is playing with two kittens at the door of a cottage; in the other, she stands against the stem of a fine tree. Both are good specimens of T. Faed's various powers. Somewhat of the same sort of humour that we expect from H. S. Marks, who, this year,

does not exhibit, appears in W. Dendy Sadler's "Thursday," in which a number of monks are ranged by the river-side, some lying along reading their books, most of them trying to catch some fish for the Friday's dinner. The chief interest culminates in a group anxiously watching the landing of a fine trout, much to the delight of one of the holy brotherhood, who evidently would not object to a good dinner so long as the rules were observed. There is a good deal of subtlety in the various expressions given the different brothers in their sombre, uniform dresses. In weaker hands the subject could have scarcely failed to be monotonous. Humour, though of a different and easier kind, is shown in No. 349, by Gaetano Chierici. A happy, healthy Italian family are watching the first step of the last baby. No. 46, "Hunger is the best Sauce," by J. Clark; and (1415) J. G. Brown's "The Passing Show," are both amusing. Admirable for its completeness in every way is J. B. Burgess's "The Professor and his Pupil." In a finely-painted old library, the interesting old books of which are painted as carefully as Quintin Matsys, or any of the earlier masters could have done them, there sits an oldish pedagogue, poring, book in hand, over some abstruse question to be solved by examination of a huge terrestrial globe, while his despairing pupil and his friend, a fine hound, are both anxiously waiting to get into the green fields; but they may wait, for the philosopher's mind has altogether forgotten their very existence. The sympathy between dog and boy is told with much drollery. G. H. Storey shows us "The Lovely Daphne," made insensible to the passion of human love, "as some degraded thing" by Cupid's leaden dart, and so resisting the mad love of the God of Day. She stands, in sky-blue dress, under a bay tree, suggesting the transformation by which she was enabled to escape the god's embrace. A statue-like appearance is given to the figure by an exaggerated outline of unusual breadth. No. 87, "Too Late for Church" is one of the best portraits in the gallery, while "Follow my Leader" (No. 155), is a fairly successful family party in fancy dress. The wild rose and the hawthorn in full bloom form the subjects of J. Mac Whirter's chief pictures—Nos. 156, "June," and 968, "May," both charmingly painted, but with an extreme stereoscopic effect in the foreground. Charles E. Johnson's "Woodland Stream" (No. 472) is a magnificent landscape in the height and full glory of summer. The water leaps down through a bold rocky vale covered with splendid timber, looking over a grand expanse of wooded country—a lovely scene, painted with great ability. No. 578, "The Last of October," is a good study of birch, having little to do with the country beyond. R. Barrett Browning is successful in true description of picturesque common life (No. 585). With bold, free hand he has exactly placed before us an old-fashioned Belgian tan-yard, with a single workman lifting some skins from a pit. "The Pearl-stringers [or rather bead-stringers] in Venice" (No. 579) is one of the most interesting figure-pictures in the exhibition. Great mastery of colour is shown in the perfect harmony produced by the balance of violent contrasts; some of the drawing, too, is very fine. In a somewhat dilapidated stone building, poorly furnished, sits a bevy of young Italian girls, presided over by such an old hag as Italy or Greece can produce. Their employment is to thread the many-coloured beads which Venice has long been famous for. They are not so busy as to be unable to talk to their hearts' content, the less active ones finding employment in teasing their more industrious neighbours. The girl in the foreground, holding up at arm's length a hank of ruby-coloured beads which she has just finished, is one of the best figures in this attractive and praiseworthy picture. We have no space to particularise the many good portraits; but we must not omit to notice, in addition to what we have already written about, those by G. G. Ouless. No. 10 is a well-studied head of W. Dobson. No. 309 is a fine likeness of the Hon. Mr. Justice Manisty. Nothing can well be better than the most interesting likeness of His Eminence Cardinal Newman; it will rank with the best portraits of our time. We have two battle-pieces commemorating the deeds of the Duke of Marlborough; No. 453 is called "Blenheim, Aug. 13, 1704." The moment chosen is the general advance of the British cavalry. Marlborough and his staff occupy the whole of the front, while the lines to the right advance in firm order, sword in hand. The subject of the other, (No. 459) by E. Crofts, is "The Exhibition of the Trophies Collected after the Battle of Ramilies." This is by far the better picture of the two. The trophies of this battle,—which are said to have been immense standards, guns, and arms of all sorts, are heaped up in front of the great commander, and in presence of the many distinguished prisoners who grace his triumph. The whole is well-conceived, and carefully and skilfully carried out. Andrew C.Gow's "The Last Days of Edward VI." fairly brings before us a curious and painful scene. The Commons having expressed a doubt whether he was not dead, the dying King was shown at Greenwich to the people, so weak and wasted, they said it was death. And this is just what we see here. The poor young man, in the last stage of consumption, is raised to the bay window by three lords in attendance, one, at least, of them, fearing that he may expire in their hands. Of a somewhat similar character is E. Blair Leighton's "Death of Copernicus," where the philosopher is made to touch the first printed edition of his works with his hand, too weak to feel. No. 650, Michael Munkasky's "Two Families," is deservedly a favourite. The style of the surroundings is too ornate, but all is produced in a masterly manner, and apparently with little effort. A mother and three small children in a handsome room, watching the behaviour at meals of three small pug-dogs and their mother. W. Logsdail has produced a capital scene of picturesque Continental life in his "Fish-market at Antwerp." The variety of figures and quaintness of the whole scene are cleverly executed. There are many other paintings of a high order which should be noticed if our space permitted. We conclude by calling attention to No. 1565, C. B. Birch's (the new A.R.A.) fine statue of Lieut. Walter R. Pollock Hamilton, V.C., one of the heroes who fell round Sir Louis Cavagnari on the 3rd of September, 1879, at Cabul.

THE MANUFACTURE OF PORTLAND CEMENT.

No. 2.—BURNING THE SLURRY OR COMBINED RAW MATERIALS.

THE various forms in which the slurry is rendered suitable for conversion by the agency of heat in the kiln have been described, and we will now proceed to show the influence of its condition on the future stages of cement-making.

It is seldom that any very careful or exact attention is bestowed on the state of the *dried* slurry when it is passed on to the kiln. Hitherto some of the old and unscientific burners regarded slightly moist slurry as an advantage. Such preference, we believe, had no substantial foundation, but may be regarded as the practice of ancient lime-burners, who considered drenched limestone as a necessary condition of successful decarbonisation. Vitruvius even extolled that preliminary process of the lime-burner, and considered that all lime so produced was better than that obtained from perfectly dried limestone. The reason for this preference, although those who practised it were ignorant of the scientific cause, was probably because the steam generated from the moisture assisted in the mechanical expulsion of the carbonic acid from the kiln by its admixture with the heavier gas. At all events, the belief in advantage from moist stone still prevails in many outside and remote districts of lime-burning.

Any such extraneous aid to assist in the perfect burning of Portland cement is undesirable, and, as it would introduce a factor in the process of inaccurate determination it should be, where still prevailing, unconditionally abandoned. All slurry, whether converted into special forms or used in a loose and irregular shape, should be thoroughly dried before being put into the kiln. There is plenty of moisture, which cannot be profitably eliminated in the fuel, to command any advantage in the steam direction if it really does exist, which point we are, however, unwilling to concede.

Kilns are of various kinds and dimensions, from the form originally used by Aspdin to the elaborate scientifically-arranged kiln known as the Hoffman or ring kiln. The various types of kilns ranging between these two extreme points are more or less adopted, and the numerous patent kilns which never had any further tangible existence than a place in the archives of the Patent Office may be disregarded in the present discussion. We shall deal only with such kilns as have by long use acquired a reputation or position of acknowledged usefulness. Before proceeding, however, in this inquiry, we shall shortly remark on the state of the slurry, and its best condition for profitable treatment. The process of combining the chalk and clay had for its object the amalgamation of the chemical ingredients of these materials, and the heat or kiln action professes to complete and render such combination accurate and profitable.

Burning is essentially a chemical operation, and provides for the conversion of the lime and clay into perfect silicates, in which condition they are alone capable of being used for hydraulic purposes of construction. The proportion for securing such a result requires to be exact, or otherwise the desired conversion will not be reached, and the product thus imperfectly obtained cannot be relied upon for any constructive purpose whatever.

The closer, therefore, both as regards fineness and pressure, the particles of the comminuted materials are put together, the better chance of success in the ultimate result.

An imperfect understanding of this fundamental principle in Portland cement manufacture has led to much waste of ingenuity and means in devising schemes for introducing fuel into the raw mixtures. Such applications were based on the practice of stock-brick makers, who are obliged to introduce a certain amount of fuel to the clay and chalk of their carelessly concocted *mess* so that the desired partial vitrifaction may be reached. A judicious and intelligent study of the effect to be produced by the heat-action of the kiln would have disclosed to the minds of those patentees that the introduction of irregularly, or, indeed, any sized pieces of fuel would tend to prevent the desired beneficial action so desirable in the production of a good Portland cement by keeping separate the particles naturally desirous of combining together, and forming by such combination the much-desired silicates of lime and alumina, which is, practically, Portland cement. Thus much as introductory to the process of burning, which will be best elucidated by a description of the ordinary kiln.

The sizes of kilns are almost as eccentric as their forms; but the more generally-accepted design is that of Aspdin, and is simply an inverted cone to which is added a short length of parallel side which terminates at the top, on which is built a conical shaft or dome—lengths and capacities of each being dependent on the work to be performed, and the character and extent of the manufactory. The kiln, in appearance, may be likened to the well-known cupola or furnace of the glass-works.

The process of loading the kiln is by placing first at the bottom a quantity of brushwood and coal for the more easily igniting the contents when loaded. On this preliminary layer is placed a proper quantity of coke, followed by alternate layers of dried slurry and coke until filled. Such conditions of loading are not calculated to realise the best results unless the raw material is of irreproachable character, and the form in which it is used regular and free from all chances of being rubbed into dust.

The kiln being lighted at the bottom, the process of burning proceeds from layer to layer, and each course is burned and completed in turns, until the top is reached, when the charge is supposed to be perfectly converted into a clinkered mass of a dark greenish tint, and, theoretically, it is supposed that the whole of the fuel used in the operation is completely consumed. The conditions surrounding this apparently simple operation are not favourable to the accomplishments of the desired end in view. The draught of the kiln is injuriously affected by the semi-vitrifaction of the lower layers, and unless speedily and effectually burnt off, the process is prolonged and almost solely dependent on the mechanical influence of the draught of the dome for finishing or clinkering the charge.

The shrinkage of the slurry and the consumption of the coke or fuel introduces another cause of disturbance to the contents of the kiln, which requires the best care of the experienced burner to guard against imperfect action and loss of the whole or a portion of its contents. It may be said that nine-tenths of the kilns working in the London district are of the form and character we have described.

The improvements in kilns, or rather the modifications of their domes or chimneys, are those known as the Johnson and Burge principles, working in several localties on the Thames and Medway. At Messrs. Knight, Bevan, and Sturges' works at Northfleet, the plan of shutting down the domes of the kiln, and leading its waste gases under flues covered by the wet slurry has been long practised, in fact, almost since the establishment of that well-known and extensive manufactory. An original and still prevailing objection to that principle is based on the fact that kilns so closed cannot be examined, and their working assisted during the combustion of their contents. A careful burner generally examines the kiln when fire first breaks through at the top, for if the centre should proceed too fast the heat is intensified, while the contents round the sides are imperfectly burnt, besides disturbing the regularity and apportionment of the fuel. An intensely burnt central portion becomes too highly vitrified, and the side portions imperfectly calcined, both of which results are unprofitable, for the one portion is rendered glass-like in character, and the other little better than common lime. In large manufactories where perhaps 500 or 1,000 tons of cement is made per week, the absorption of occasional imperfectly burnt kilns is not of very serious moment, but to a small maker such imperfect burning may almost be looked upon as a disaster. The two kilns we have named (Johnson's and Burges,) are essentially close kilns, and during combustion their contents are not susceptible of assistance or controlment, but they have the advantage, perhaps, of lengthened chimneys, horizontal and vertical, and, therefore, less liable to defective action than the ordinary kiln, whose gaseous contents have to traverse the various imperfectly constructed flues before reaching the chimney, by and through which the burning operation is supposed to be accurately controlled.

All these kilns we have referred to are used with coke, which is placed in direct contact with the slurry, and, therefore, solely dependent on accurate draught for their profitable or efficient working. There are other kilns, however, one of which, at least, is built in the London district at the works of Messrs. White, at Greenhithe, in Kent, on the banks of the Thames. In Germany, this kiln, well known by its promoter's if not its inventor's name, Hoffman, is in good favour, although the best results obtained in cement-making in that country are reached through the old fashioned dome kilns at the works of Messrs. Toepffer, Grawitz, and Co., near Stettin. The Hoffman or ring kiln is ingenious in character, and consists of a series of chambers placed in regular order round a high central shaft or chimney, into which flues are directed, and thus connecting each chamber with the chimney. Each chamber is provided with valvular or damper arrangement, by which the heat of the compartment is controlled and regulated from the time of its first working until the final combustion of its contents. The primary object of this scientifically-devised kiln, is to secure the profitable application of the whole of the fuel, and so utilise the gases created during combustion, and thus reduce materially the cost in burning lime, bricks, and cement. Theoretically there is no waste of fuel, and practically such promise is all but accomplished. In the case of bricks, much experience has been gained in this country, and in that direction it may be regarded as a complete success. In the direction of cement-making, however, some difficulties intervene which has tended to prevent its general use in this country. It is a kiln requiring the exercise of great care in working, and no ordinary haphazard method of filling or burning its contents can be tolerated. The fuel required is common small coal, and its application must be continuous and regular, involving the employment of carefully trained, if not skilled, workmen. Care and attention requires to be incessant, and much watchfulness on the part of the burner, otherwise the results are disappointing and unprofitable.

For the use of the Hoffman's kiln, the slurry must be moulded into regular-shaped forms of the size of ordinary building bricks, and tolerably well-dried before being placed in the kiln. Each chamber is seperately loaded, and the bricks so built that the maintenance of a regular draught through its contents may be secured, otherwise the profitable action of the kiln is interfered with. The first chambers being started, the coal or fuel, passed in from holes in the top, is carefully applied, and the vapour or steam allowed to pass away into the main chimney through the connecting flues. So soon as the bricks are thoroughly dried, the gases of combustion are led into the adjacent chamber, which has been previously loaded, and thus utilised for drying the next charge or chamber of bricks. The second chamber is similarly treated, and so on, until the whole number have been used. Under such conditions all heat is rendered useful, but it is necessary to guard against the entrance of moist steam into any of the chambers, for such an occurrence would lead to a softening of the bricks, and probably a disarrangement of its carefully built-up contents.

An objection has been made to the use of the Hoffman kiln for cement-making, in consequence of the difficulty experienced in maintaining the necessary air-spaces in the carefully-arranged loads. There is much reason in this objection, more especially in reference to its use for cement-making purposes, where products of a high tensile value are desired. It is impossible to reach a high quality of cement if the required heat is not capable of profitable application, and if the temperature is sufficient to convert the slurry into a viscid mass which involves the destruction or disarrangement of the normal form of the bricks. So soon, therefore, as the lower tiers of bricks are converted into a semi-vitreous state, they are unable to support the weight of those above them, and therefore permit of the carefully-arranged air-spaces being disarranged on the accurate maintenance of which so much depends. The general practice to overcome this difficulty is to stop short of the desired high points of temperature, and so prevent the risk of failure by an imperfect and less satisfactory degree of heat. Cement thus produced is not as good as that obtained from the higher temperature, but it meets the difficulty in using the Hoffman kiln, securing all the advantages which it offers at a mimimum cost of fuel, besides the undoubted advantage of being loaded and emptied at the ground level of the works.

All the kilns used, whether on the dome or Hoffman's principle, are what may be termed intermittent, and their action involves the necessity of waiting until the kiln and its contents are cool before the charge can be withdrawn. In the dome kiln, besides the wear-and-tear of the materials of which it is built; from their expansion and contraction, a considerable amount of structural degradation arises from the action of the clinkered mass on settling down when cooling, and on its withdrawal to be ground. The same objection applies to the Hoffman kiln, although in a much lesser degree from the precaution adopted in keeping the bricks from touching the sides of the chambers when being built up.

Many attempts have been made during the last twenty years to perfect a running kiln such as is used in some lime-works; but the adoption of that well-known principle was incapable of application because the conditions by which it alone could be secured were wanting. The heat must be limited to an extent that would permit of the passage of the burnt products with freedom, otherwise the draught would be impaired and the profitable action of the kiln checked. Viscous clinker could not be run out, for if even its natural and unavoidable adhesion to the sides of the kiln could be overcome, another danger would arise from its too sudden cooling, which would result in much dusting and waste, and so prejudicially interfere with the quality of the resulting cement. These attempts at the realisation of a much-desired improvement are, for the present at least, in abeyance, although we think that some future improvements will yet result in great changes in the conversion of the slurry into a good and reliable clinker.

The duty of the kiln and the work which it is required to perform is described in the work of a well-known writer on Portland cement, who says in his last book on the subject as follows:—

"Probably, the best way to illustrate this important subject is first to consider the necessary conditions requiring accurate fulfilment in burning Portland cement. The preliminary process of selection of the raw materials and their perfect amalgamation must be regarded as a *sine qua non*, otherwise it is needless entering into further processes of any kind, for the burning or grinding cannot cure the evils of imperfect admixture.

"The required heat, through whatever agency it may be applied, is for the purpose of uniting in profitable combination the

mixed raw materials, and thus forming an hydraulic or Portland cement.

"The stages of this operation may be regarded as threefold, and are, 1st. The expulsion of the water remaining in the bricks or dried slurry. 2nd. The separation of the carbonic acid gas contained in the carbonate of lime proportion of the mixture. 3rd, and most important operation, the combination by fusing or clinkering of the lime with the silica, alumina, protoxide of iron, and alkalies, resulting in the desired product. To perform this threefold process accurately, it is necessary that each of these canons of manufacture should be regarded as separate and distinct, taking their place in due order. Thus, until the expulsion of the latent moisture, fire cannot profitably, if at all, expel the carbonic acid, and the increased heat for the clinkering is to follow and not precede the decarbonating operation. The reactions take place at different temperatures, and provision should be made for a gradual raising of the heat in the order above referred to. It is most important, however that the last and finishing stage in the application of heat for the clinkering should be capable of accurate adjustment. As the temperature required for this purpose is a high one (white heat), and converts the mass into a semi-fluid condition, care must be taken that it should neither last too long nor be excessive in character; otherwise, the product realised would be a glassy mass, incapable of being used for hydraulic purposes. . . . .

"The kiln is lighted, and the gases and products of combustion permeate into, and through, the superincumbent mass of coke and raw cement material, gradually expelling the moisture, and rendering the contents of the kiln warm. Then the coke becomes ignited, and the walls of the kiln get hot. This, the first stage, can be observed by an experienced eye when the vapour has been expelled, and all organic matter changed in character. The completion of the second stage arises when all the materials of combustion have become profitably heated, and the carbonic acid drawn off, which is about the temperature of a bright red heat. The quantity of carbonic acid thus requiring expulsion is something enormous, so much so, that for every ten tons of burnt Portland cement four tons at least of this acid was set free; so that when you estimated the weight of coke, or other fuel, and raw material put into a dome, or any other kind of kiln, and compare it with the cement produced, you can form a fair idea of the amount of power absorbed in its handling. Heat can only be regarded from a scientific point of view as so much power.

"Another loss of heat is effected through the carbonic acid which carries off a considerable amount of warmth in a latent state. After the expulsion of the carbonic acid, the products of combustion become hotter, and the final or third stage of the operation begins."

(*To be continued.*)

ST. MARK'S, VENICE.*

By G. E. STREET, R.A.

I HAVE recently been able to examine the work executed in this church during the last few years, and at the same time to form an idea from what has already been commenced of what it has been proposed to do on the western façade of the church. It was nearly three years since I had been at Venice, but I am sorry to say that in every particular I find that the statements I made at the Oxford meeting were exact and perfectly justified. As to the state of the fabric, Mr. Stevenson's letter to you of December 18, 1879, was entirely confirmatory of my opinion, and I cannot find a word in Signor Meduna's letter to the BUILDING NEWS which contradicts or in any way opposes Mr. Stevenson's statements as to the state of this part of the structure. But as to the future, Signor Meduna complains that "it was asserted by Mr. Street that the western façade was in a good state of construction, and that the alterations proposed would be detrimental to art." This, he says, is "an erroneous opinion," for that "the propositions which have been made tend in the direction of reparation and nothing more." To "reparation and nothing more," where it is absolutely required, I should be the last to object, and it was because I thought I saw evidences of a design to reconstruct and improve the west front after the manner which has most undoubtedly been pursued in the northern and southern façades that I spoke as I did. Now that I have again seen St. Mark's free from scaffolding, I am utterly unable to harmonise what every one can see already commenced with the "reparation and nothing more" of which Signor Meduna speaks. Nothing can be more exact, more neat and accurate in workmanship, or more true or level in all its lines than the new work recently executed on the southern façade. Few buildings ever erected were built with less regard to any of these modern ideas of what is excellent, and the consequence is that it is impossible to join such new work and such old work without an evident break in the system at the point of junction. Neither on plan nor in elevation does the new work already executed on the western front for a few feet in length from the south-west angle agree with the old plan or the old elevation. This is specially to be noticed in the plan. The whole façade has at its base a marble seat or step. In its former state this was continuous throughout. Signor Meduna's seat or base is already built for several feet, and at the point at which it stops it is 12 centimetres higher than the old step on which it abuts, and 15 centimetres in advance westward of it. It is difficult to conceive how this new work can have been executed by any one who only contemplated repair. What was evidently intended was to make the base straight on plan and level from the south-west to the north-west angle of the front. No other explanation of the work already executed for several feet on the western front is possible. Nor is there any way of getting over the difficulty which has been created, save the taking down of a good deal of the new work. The continuation of the work already done would actually involve the entire destruction of the whole west front! As to the ground-plan of this front, it is most important to observe that it was originally built and planned on a curved line, the centre being recessed about 25 centimetres from a line drawn from angle to angle. Mr. Ruskin, many years ago, drew attention to the way in which all the apparently corresponding dimensions of the archways and piers in this façade were varied with, as he said, "a true artistic instinct." I do not recollect whether he noticed the curvature of the plan. I had never before done so. But on trying to make out why Signor Meduna could have made his base project 15 centimetres in front of the old base I became aware of the fact. The line adopted by him was intended to be carried in a straight line from the south-west angle to the north-west angle. In not one inch of its whole extent would it have stood where the old base ever stood, and in the centre it would have been 33 centimetres (1ft. 1in.) in advance westward of the old work. If, however, this step, seat, or base is brought forward it must be assumed that the whole of the rest of the work must be brought forward also. This, of course, means that the west front must be rebuilt, in the same way as the north and south fronts, with the same hard straight lines everywhere. I turn now to what has been proposed as to the elevation. Here the base or plinth as far as the jamb of the first archway of the front has been built 12 centimetres above its old level, and the first columns of the front are placed so much higher than they used to be. The capitals of the new columns are about three inches higher than the old, the capitals of the second order of columns are about level with the old, while finally the parapet at the top is 15 centimetres (6in.) higher than the old. If the intention was not to rebuild the whole front according to the corrected and exact dimensions of the new work, I can only say that one of the most strange blunders of which I ever heard has been perpetrated. Assuming that it was necessary to rebuild the south front, it would have been most easy to accommodate the new work to the old, both in plan and elevation. Whereas now the columns with their bases and caps of the southern archway must all be taken down and rebuilt at a new level; then the next arch will be declared to be out of the level, and so on all along the front. In the same way the arcaded parapet already built must be taken down again, or the whole of the old balustrade or parapet will have to be rebuilt on the new level. It seems to me, I must say, to be less damaging to Signor Meduna as an engineer to assume that it was his intention to rebuild the whole front than to suppose that he went on year by year with the work of renewing the southern façade and south-west angle without observing that he was getting both his plan and his levels different from those of the old work which he had to effect a junction with. I venture to say, therefore, that when we told the meeting at Oxford that the "total destruction and rebuilding of the west front" was proposed, so far far from being as Signor Meduna says, "inexact" ("nothing can be more inexact" are his words), we were saying that which was the only possible conclusion from an examination of his own executed work.

Another point on which I spoke at the Oxford meeting also requires a few words from me. This is the renewal of the ancient mosaics of the baptistery. At the Oxford meeting I was able to exhibit several fragments of the old mosaics. These had been to a large extent taken down from the roof, and were lying in a heap in a chamber over the west front. This heap was seen by two of my informants. When at Venice I asked to have the door opened, and my request was refused. The old mosaic is, no doubt, still there in a confused heap, though the restoration of it is nearly complete. Now, this restoration has undoubtedly, like all the work, been most carefully done. But the result is unfortunate. The new work is done according to the fashion of the day on paper and in a shop; its surface is, therefore, much neater and smoother than that of the old mosaic. Some of the old mosaic still remains; and as it does not agree in effect with the new portions, the white plaster joints are got rid of in favour of coloured joints, and so the tone of the old work is brought up to something very like that of the new. So also in the merely decorative work the new is much harder and more exact in drawing than the old. I need hardly say that where so nearly complete a renewal of a mosaic has taken place, what is now left has no archæological value whatever, and can only be regarded as a piece of new decoration founded upon an old design.

I am bound to say that I came away from Venice entirely in despair about St. Mark's. It is a building in which no single axiom of the perfect 19th-century workman was ever regarded by the old builders and decorators with an atom of respect. The men who built it drew everything by hand, set out everything by eye, and seemed to have had an instinctive delight in curved and rounded and irregular surfaces and outlines everywhere.

The 19th-century workman does not care much about the quality of his mortar, his marble, or his bricks, but he does care intensely to have every angle perfectly square, every dimension exact, and every line straight. If you add 19th-century work and modes of work to such a building, you come of necessity at last to a fatal dilemma. Signor Meduna has done this to demonstration, and the only cure for what he has done is to take some of it down again (at least as far as the south-west angle), so as to make it possible to repair the south-western arch of the west front exactly on its old lines and levels. The rest of the front can then be left alone. If this course is not pursued, there is, I fear, no doubt but that bit by bit the anticipations which were indulged in at the Oxford meeting will be realised, and the plea will be that the lines of the façade were curved and irregular and the dimensions of the arches and the piers unequal, and that all this inexactness required cure and amendment.

Your society will, I am sure, hear with more than usual interest that the Ducal Palace is also being cleaned and restored. The weather stains are being cleaned from the exquisite capitals, and much new work is being done; but as I was unable to penetrate behind the hoarding which conceals a great part of it at present I am unable to do more than state the fact.

* A communication made to the Society for the Protection of Ancient Buildings. Dated from Subiaco, March 19.

HADDON HALL.*

(*Continued from page 567.*)

THE north side of this quadrangle is of later date than almost any other part of the building. The masonry is of finely-tooled squared limestone rubble, and the design of the elevation regular and rather formal. The parapet and battlements seem to be 15th-century ones, if not even earlier ones reset.

The feature of the west side of this court is the old external wall of the great hall, with its pointed domes, and one of its large and rather clumsy tracery windows, and some ancient gargoyles. The mullions here come to the face of the wall.

The western quadrangle, the one which is most irregular, but yet has most pretence to architectural dignity, is usually entered by the north-western tower. The archway is segmental, not four-centered, and the entrance being very oblique, a most eccentric series of arched corbels have been employed to carry the upper part of the walls of the quadrangle.

The ground rises steeply and irregularly from the quadrangle, and the most picturesque irregularity is the result. The higher, or eastern, side is mainly occupied by the hall, with its mullioned and transomed windows, with simple and coarse 14th-century tracery in the heads (rebated, by the bye, inside for shutters, and still retaining one hook and one ring), and its vast fireplace and its 14th-century porch, to which, in the 15th century, a very pretty upper story, with a battlemented parapet, was added. The opposite side of this court is of tolerably uniform Tudor character, but with and there a trace of earlier work.

In the corner of this quadrangle is the entrance to the chapel—a building making some little approach to the dignity of a church. It consists of a nave and chancel, with no break or division of any sort between the two save a screen of woodwork of very late date. The axis of the church is due east and west, consequently it is oblique with all the other lines of the building, which are not equally true to the cardinal points. There are two transepts, the north one extremely shallow, the south somewhat deeper, but each divided from the nave by two pointed arches springing from a small shaft. The north transept is filled up by light screen-work. The south aisle has four single lancet windows, and the shaft from which its arcade springs clearly was standing in the Norman church, for the pointed arches, probably thinner than the original Norman arch, spring from it, and the capital has been cut down to receive them in the most clumsy manner. Traces enough remain, however, to show that in its original state it was a basket capital with channelled sides much like the capitals at St. Bartholomew's, Smithfield. This shaft stands on a very flat, spreading, moulded base. The north shaft is octagon, and has a moulded cap of Decorated character. The arches are equilateral, and of two plain splays. They appear to be fourteenth-century work. Curiously enough there are two west windows, the lower one a very plain three-light window with lancet-headed lights, the upper one Perpendicular. The mullions of the lower window are splayed outside only, and there are marks indicating that the window could be closed inside by a shutter. The church formerly possessed a rood-screen, and the staircase for approach, and door for access, still exist. A squint exists, having been reopened in modern times, which enabled any person standing on the rood-loft to see the priest in the altar at the east side of the chapel, for an altar stood there, as well as in the chancel, and both altar-stones and piscinas remain.

The chancel is Perpendicular, so is a very pretty staircase and belfry turret appended to the church, standing north of the transept. Some fragments of good stained glass, mostly of 16th-century character, and some remnants of mural decoration exist. There is a Norman font, perfectly plain, and a cope chest, and there are against the east wall of the chancel marks of something having stood upon a single shaft, placed north of the altar, at a height of 5ft. 4in. from the floor, which I confess myself quite unable to decipher. The base of the shaft is *in situ*. The fittings of the church are chiefly high pews, and a high rail panelled below at the chancel step, all of 17th-century character, painted white, and with marks of gilding. An illustration of this woodwork, with a short descriptive account, appeared in the BUILDING NEWS for February 15, 1878.

In the north transept stands a 15th-century holy-water stoup much worn. The masonry of the exterior shows that when the upper west window of nave was added the west end was rebuilt, and probably heightened. Parapets were added at this time, and the chancel must have been brought to its present state at the same time. There are some traces of what looks like a west doorway in the south aisle. If so, this would be the door which was made use of by the villagers who came here to mass.

Leaving the chapel, and recrossing the quadrangle to enter the main porch, we find ourselves in the entrance to the hall.

The hall may be about 45ft. by 30ft. It has, and probably always had, a screen of oak across its north end. Originally it had on the south side the entrance-door, two windows, and a vast fireplace, and on the north side an exit door and two windows. One of the latter is now turned into the approach to the ball-room. At the north or lower end of the hall are four doorways, with segment heads opening out of the passage behind the screen. At the south or upper end of the hall occur the low step or daïs and two doorways—one now closed. A ponderous oak-table, with good moulded legs of apparently sixteenth-century character, occupies the daïs. As has been already pointed out, there is no bay. The screen already alluded to is of oak, with two wide openings in it, not rebated for doors, so that curtains were employed if these openings were ever closed. On this screen rests the front of the minstrels' gallery, which was over the passage. The front is of very good Perpendicular character, and apparently quite untouched. At a later period a side gallery, which very much spoils the effect of the hall, has been thrown along the east side to form a communication between the north and south sides of the house.

The old roof and the louvre (if one existed) are gone, and replaced by a Queen-post roof. The original fireplace has been replaced by a jamb and head of sixteenth-century work, but still there is so much of old character about this hall, and the lapse of time has imparted such magnificent colouring to it, when seen under bright sunshine, that its interest and beauty are of a very high order.

The kitchens, butteries, larders, and cellars, which open out of the passage northward, are not a little curious. They are extensive, and very little altered, but their interest is antiquarian more than architectural, except, indeed, the great kitchen fireplace and chimney, with the wonderful series of weatherings and little windows that belong to it, are almost, if not quite, the most picturesque and clever bit of architecture in the exterior of the whole place.

Immediately behind the hall is the panelled dining-room, with a fine oriel and some excellent wood-carving. Above this room is the drawing-room of the same size, richly decorated, and possessing some fine tapestry. Two or three rooms open out of this westward, chiefly interesting for their tapestry; and opposite the door of it is the entrance to the ball-room, or long gallery, the finest room in the house. The gallery is 109ft. long and 18ft. wide, exclusive of the bays. It has three fine bays, one square on plan and two flat octagons, and nearly the whole east end is occupied by a large window. All these are mullioned and double transomed.

The walls are lined entirely with oak, elaborately carved, and possibly, from its inferior taste and late character, rather more recent than the hall itself, the building being apparently late sixteenth or early seventeenth-century work, and the panelling looking like late seventeenth century. The great bay, the finest portion of the whole, is very effective and telling, and its vigorous proportions render it a very important feature. The ceiling of the gallery is richly ornamented with moulded ribs of light colour, slightly coved, but with a moulding to mark the top of the cove: it is very successful.

The general effect of this room is massive, thanks to the long stretches of unpierced wall, and nothing can be better than the splendid contrasts of light and shade produced by the floods of light brought in through the great bays, with the comparative gloom between them. The end of this gallery is something like an immense bay, with its vast end light, and two spacious side windows, the cills being breast high. The effect of this end can hardly be surpassed as a piece of good domestic architecture. We shall presently see that the external effect of these windows is as good as the internal.

We pass from this ball-room, through an anteroom, into the state bedroom, remarkable chiefly for its elaborate plaster chimney-piece, representing Orpheus and the Beasts, and for its fine tapestry and splendid state bed.

This may be a convenient opportunity for referring to the furniture and the tapestry. Though the general effect of the building is unfurnished and bare, yet there is a little fine old furniture of the seventeenth and eighteenth centuries scattered about; I have named the state bed and the cope-chest. There are some old presses and tables of good character in the hall, the ball-room, and one or two other rooms and in the house adjoining the present stable, formerly one of the dependencies of the castle, now occupied by Mrs. Bath, some excellent carved oak furniture is preserved. The tapestry, however, has a much stronger claim on the attention of the antiquary and the artist. A very considerable number of rooms are hung with it. Some is much more valuable than the rest, but there is very little which is not good, while in the great state bedrooms, and in one of the rooms of the north suite there are hangings, one of arabesque, which I think is Gobelins work, and the other occupied by sportive groups of amoretti, apparently Italian, that are hardly to be equalled. In the hangings of one of the rooms opening out of the drawing-room there occurs a representation, said to be unique, of hounds chasing a wild boar, and protected in a kind of scale-armour.

Passing from the state bedroom through doors which are not ordinarily open to visitors, we may wander through the upper range of rooms which form the north front, and may enter those forming the north-western tower. These rooms are interesting mainly on account of the good panelling (of somewhat late character, it is true) which some of them retain, the tapestry, and here and there the furniture. The woodwook of Haddon Hall was described and illustrated by Mr. R. Morrison Marnock in the BUILDING NEWS for April 2nd and 16th, 1875.

We will now suppose that we leave the interior, and, passing into the grounds, examine the house and terrace together. Here we find a very successful use of varied levels to lie at the root of a great deal of the charm which hangs about the building, and especially about this most picturesque and best-known portion. Perhaps there is no lesson more instructive to us in the whole of the building than the one conveyed by these terraces and arcaded steps, and the successful effects produced with simple means by this aid. The garden, fortunately, remains unaltered, as an example on a small scale of the charming formal gardens which have been destroyed by the score by ignorant landscape gardeners. A few hundred yards east of the hall on the rising ground, the inclosing walls and entrances of an old fruit orchard and garden still remain, but the garden which they surround has almost lost its charms. Not so, however, the terraced garden, and especially the famous close up flight of steps, with its arcaded balustrade, and the old yew-tree as a background. Few scenes in England have been more often sketched and painted than this, but the old staircase has not yet become so familiar as to lose its character.

Here, perhaps, it may be convenient to linger for a moment before we part, and in a few words to point out what there is to be studied at Haddon. Before doing so it is only fair, in acknowledging the great courtesy which I received from Mr. Netfield, the Duke of Rutland's agent, to say that there is no place in England where an architect or artist, going with proper credentials, is made so free to draw or paint as at Haddon Hall, and treated with such courteous confidence. This great privilege is one which I hope will never be abused. I trust every architect and every painter will consider himself for the time being one of the guardians of the monument, bound to shield it from harm.

But for this liberal kindness on the part of the Duke of Rutland and those who represent him, and the courtesy, not only of Mr. Netfield, but of Mr. Jewett, the well-known antiquary, who resides in the neighbourhood, I should, I may

* A paper by T. ROGER SMITH, F.R.I.B.A., read before the members of the Architectural Association, on Friday, May 7th, 1880.

say, have been quite unable to get together the materials for this evening's paper.

What can be here studied—in addition, of course, to the general disposition of the building, and the windows, doors, doorways, masonry, and other features which are too obvious to need enumeration—consists, first, of old joiners' work. There is no linen-fold panelling except one fragment, but there is excellent late Tudor panelling and brattishing in the dining-room and drawing-room, and framing with simple tracery in the joinery of the minstrels' gallery in the hall. The Elizabethan and later joinery of the rooms near the north-west tower, the curious, though not very beautiful, joiners' work in the chapel, the joinery of the great ball-room, and the doors generally, form a study of great value and varied interest.

Metal-work of great beauty abounds. There are not less than five or six pairs of bronze dogs at different hearths, all of them good, and at least two pairs have rich foliated roses that are at once most elaborate and excellent.* The hinges and fastenings of the drawing-room door, of some of the doors in the chapel, and in some other spots, are exquisite pieces of metal-work; and the casement-window fastenings to many of the windows in the Elizabethan parts of the house are as good as anything of the sort well can be, and all are marked by that absence of attempt to dazzle or attract notice—in short, that well-bred reserve and self-restraint which is characteristic of good design as well as of good manners.

Several very elaborate lead rain-water heads, some of them dated, exist in different parts of the building, and are well worth study. They also have been illustrated in the BUILDING NEWS for August 30, 1878. Lead lights, of a considerable number of patterns and various sizes, can also be found, and they are so largely used that it is possible to gain some indication from the different varieties of the dates of different portions of the work.

Before closing these remarks, I propose to turn to the broader characteristics of this ancient monument as a work of architectural art. First, and perhaps most eminently, it has come down to our own day undamaged by fire or by restoration. The sunshine and showers of centuries have acted upon the masonry of the old walls and the freestone of its pavements, and have imparted to them a rich, harmonious, but sober colouring, as precious and as impossible to gain, except through the lapse of time, as the patina on an antique bronze. Happily the duke keeps the place in repair in the most simple manner. Nothing more is done than is necessary to keep out the weather and prevent decay, and we have consequently an almost, if not quite, untouched domestic work of the middle and Elizabethan ages.

Next to its condition, the strikingly harmonious unity of effect in buildings erected and altered during so long a space of time deserves notice. This may be to some small extent due to accidental circumstances skilfully made use of, for there is really a wide difference between some of the external fronts; but it is only between those which stand so that each is chiefly seen alone. Still the general harmony is great. The uniform character of the battlements carried quite round the building, aids not a little in producing this harmony, a trait which should prove instructive to some of us, when we have to enlarge an old building.

The large amount of wall space compared to the window-opening helps to produce a general effect of breadth. Mr. Marnock, in his paper already alluded to, points out that with our modern ideas this cannot now be attained by the same means as were used in the older parts of the building where the windows are both small and low; but it is worth notice that almost equal breadth has been secured in the Elizabethan part, where the windows are as large as any modern occupant of a mansion can possibly ask for, by the simple expedient of trussing them into bays, and having grand unbroken wall spaces between them.

Lastly, and this is the great lesson of the whole design, the self-restraint and moderation of the various architects who have contributed each his share in building up this dignified whole is most remarkable. There is no obtrusive display of ornament anywhere. There is no breaking through the main lines either of plan or of elevation. Nothing has been introduced which is out of keeping; and if we can learn nothing else from Haddon, we can at least learn in what spirit an architect who has to add to or alter an existing building should set to work.

* One of these firedogs was illustrated last week in the BUILDING NEWS, from Mr. R. E. Smith's drawing.

AN EXCURSION TO ROME.

WISHING, lately, to take two young friends to Rome, I heard of an Easter excursion, the terms for which, including the travelling and hotel expenses, carriages and guides, were so reasonable, and the programme so tempting, that we ventured to join it, and not less willingly because it was the first attempt to make Rome easily accessible from London.

On reaching Paris a week before Easter we met at dinner a few of the party there collected, and at noon on the next day left with some very agreeable companions in the train for Turin. Travelling through the night, we saw the early sunbeams warm up the mountain-tops beyond Aix-les-Bains, in Savoy. Snow-mountains pierced by the Mont Cenis Tunnel, rugged precipices, deep gorges cut down by the mountain torrent, occasional villages of grey old houses amongst the terraced vineyards, with mere holes for doors and windows, and flat projecting roofs, covered with irregular slabs and lumps of stone—such were some of the impressions left in the mind as we ran down into the plain, reaching Turin in the afternoon, seven-and-twenty hours from Paris. Driving at leisure about the town, one was struck by its regular and modern appearance; its large piazzas with arcaded sidewalks, its outdoor statues, and long straight streets, where distant mountains or bright green hills close each view.

Early next morning we were off through the Valley of the Po, which the peasant cultivators have divided into small rectangular cornfields planted on all sides with low trees, on which they train the vine, the peasants' homestead consisting of one rather ugly building that is house, stable, cartshed, and barn combined. Then through a more cheerful hilly country of vineyards, with pink-blossomed fruit-trees, to Genoa, where we began to feel the warm sun, though the air was keen and the spring backward, even in this snug and sheltered spot.

Genoa, from what we saw of it, driving about the city and environs during a long afternoon, fully justified its title of "the superb." The black and white striped Duomo of Early Gothic; the Church of St. Annunziata—a great deal too gorgeous; the new Campo Santo, or cemetery, full of striking figures and groups in dazzling white marble; grand views from many points of the dark purple Mediterranean; the Riviera and its sheltering mountains—houses five, six, seven stories high in streets 5ft. wide, yet neither dark nor very dirty, whole streets of palaces, and, everywhere, marble balconies and terraces, where grow the cactus, the aloe, and the palm. In two hours of leisure before dinner the guide took the three of us into every important palazzo, that we might get an impression of the loggie, the vestibules, the pillared cortiles, the vast marble staircases in which a Genoese nobleman delights, and which, when he is tired of the magnificence thereof, make such capital furniture stores; then came our first great investment in photographs to preserve the memory of these noble entrances.

Leaving Genoa at midnight, we passed Pisa about sunrise, the Duomo, Baptistry, and Leaning Tower looking cold and clean in their corner of the old walled city. Then came a long day's run over flat fields, near the neat margin of the tideless sea, past Elba, and a few little old towns not specially picturesque, past Civita Vecchia, till, gaining distant views of the Alban and the Sabine hills, we found we were nearing Rome. Long necks were then made towards the left in search of St. Peter's dome, which was inconspicuous; but, on the other hand, there was St. Paul's-outside-the-walls, like a big new packing case; the Tiber, the towered walls of Aurelian, the pyramid of Caius Cestius, the tomb of Cecilia Metella, and the Appian Way, a gaunt shadow of a railway viaduct — called Aqueduct of Claudius, stalking and tumbling off into the distant Campagna, the too-much-bestatued façade of the Lateran, the Porta Maggiore, temple of Minerva Medica, wall of Servius Tullius, the railway-station, omnibus, dinner, and welcome rest.

That was the evening of Wednesday in Holy week. We were to spend the next six days in Rome; and during three of them were to have carriages, morning and afternoon, for visiting, under proper guidance, the chief remains of ancient Roman and early Christian date. I had intended to skip this part of the programme, but was better advised; so on Thursday morning we formed part of a group of about forty persons who seemed about as good as ourselves, assembled in the blazing sunshine on the brow of the Palatine hill, over against the three great arches of the Basilica of Constantine; the Forum Romanum, and Via Sacra lying nearer and below us, the Arch of Titus, and the Colosseum to the right, and the seven hills of Rome more or less in view. The remainder of the five hundred excursionists having melted away last night, as they generally did when we came to any town, we had practically the whole ground to ourselves, and were, as I found, in charge of a well-known archæologist who, with the greatest skill, tact, and kindly patience, conducted, explained, illustrated by Classical quotations, and generally, by imparting the knowledge gained through the studies of many minds, made things clear at a glance, which it would have been impossible to understand in any reasonable time without such efficient help.

The enormous constructions of successive Emperors, for public and for private purposes, with remains of still earlier date, the different ages indicated by the style of workmanship, and their magnificence shown, now by painted decorations, now by costly marbles and plaster enrichments, occupied the morning, and a similar examination of the neighbourhoods of the Colosseum and Via Sacra filled up the day, till we went to hear the Tenebræ and Miserere in the vast and but scantily-filled nave of the Lateran.

During the next three days we were free. On Good Friday, after looking over the Pantheon, we attended service in the gorgeously-enriched church of the Gesu, had a long study of the panorama of Rome from the church of St. Peter-in-Montorio, saw the big fountain of the Acqua Paolo, Sta Maria in Trastevere, the works for improving the channel of the Tiber, Sta Maria in Cosmedin, the cabbage-gardens on the site of the Circus Maximus, and a good deal more of the ancient and modern city.

Saturday was marked down for Tivoli, but heavy rain in the morning would have rendered an examination of Hadrian's villa impossible. Sta Maria Maggiore, the Barberini palace, the Capitoline Hill, and a quiet study of all we had seen on Thursday, climbing about the huge constructions on the Palatine and the upper galleries of the Colosseum, filled up the day.

On Easter Day we went to St. Peter's, whither everybody seemed to be going by carriage-loads and in streams of foot-passengers. Arrived, they perhaps filled the chancel, scattered themselves about under the dome, wandered into the handsome sacristy, and hardly disturbed the vast solitude of the nave. Strangers for the most part, one would say, in expectation of some grand festivity; but in the present condition of the Papacy the glories of Easter have faded considerably. Listening to the magnificent solo voices in the choir, we fell in with a travelling student of the R.A. and R.I.B.A., with whom we spent a pleasant day. It seemed necessary to have a long walk out towards the Campagna, chasing green lizards and getting a closer view of the great arches of the Claudian aqueduct. Wonderfully grand it is at certain points—altered and added to in brick and in big blocks of stone by different Emperors; ruined, and then cobbled up by a couple of Popes whose names surely some enemy has graven on their handiwork. Then, sheltering in an ancient watch-tower from a glorious storm, we had splendidly-gloomy views of the Alban and Sabine hills, bright gleams of sunshine striking by turns on Tivoli and all the little towns that dot their sides.

On Monday we were out again in Old Rome, learning the relation of Trojan's forum and those of Augustus and of Nerva with the Forum Romanum, descending into the Mamertine prison, seeing the arch of Janus and the ornate arch of the Goldsmiths; then to the Ghetto—the Old Jewry of Rome—where stands the Theatre of Marcellus, with its models of Doric and Ionic. Within a short space we had seen all the best known examples of the Classical orders, and these, with the enriched frieze of the Temple of Antoninus and Faustina, revived old memories

which alone were worth the journey. Then to the equally-remembered Ionic Temple of Fortuna Virilis, preserved as a slovenly church; the Circular Temple of Vesta, and the aggregation of ancient materials called the house of Rienzi. We found time for a private view of each of these objects on other days, and bought excellent photographs for permanent records. Afterwards to St. Paul's-outside-the-walls, where they are erecting, by means of ingenious scaffolding, the monolithic columns of the west front. The interior gave one a more vivid impression of enormous size than was produced by the first sight of St. Peter's. Some were even ready with exclamations of surprise on entering the transept, and before discovering the huge expanse of the five-aisled nave. Mosaics, ancient and modern; tall columns of Oriental alabaster, porphyry, granite, and rare marbles, slabs and masses of malachite and rosso and verde antique, bronze, gilding, and all that was necessary to enhance the magnificence of this rebuilt church have been forthcoming. By this time, however, we had got used to walking on opus Alexandrinum, sitting on marble, touching (if we might) columns and walls of materials so rich and beautiful that they seem more fit to be cut into small pieces and mounted in gold. One day in the church of the Ara Cœli, one of us, sated with these extravagancies, had greeted a piece of common oak as a long-lost friend!

Towards nightfall we crossed the court-yard and entered the ancient church of St. Clemente, descended to the more ancient church below, and again to the older substructures, gaining here, as in many other spots, a striking idea of the vast works of Old Rome that lie buried, with all the art that was expended upon them, beneath the visible work of mediæval and modern times. Then to the Scala Santa of the Lateran which, as it is said to have been brought by St. Helena from the house of Pilate, in Jerusalem, claims an interest of another sort. And after dark to the Colosseum which was made to shine out with red and green fires, under which aspect we took formal leave of it for this time.

On Tuesday, through a deluge of rain, in which one's infirmities of temper that seemed cured by these serener skies, revived with trans-Alpine vigour, we went to the Vatican and through the sculpture galleries, noticing the more celebrated statues, sarcophagi, tazze, mosaics; the rooms and corridors painted by Raphael, into the Sistine Chapel, before the last judgment of Michael Anglo, and so passed the short morning hours of our last day in Rome. We passed the afternoon on the Appian way, down in the rugged brown passages of the catacombs of St. Sebastian, and amongst the grand ruins of the Baths of Caracalla, surveying their vast courtyards cloistered and galleried, paved with mosaics, the Rotunda, a loftier Pantheon, noble halls once adorned with Greek sculptures, and surrounded with precious columns that with their rich capitals now do duty in modern churches, or still lie here in ponderous fragments, the massive vaultings they once carried now tumbled into ruin. When next we experience the luxury of what they call a Turkish bath, we may close our eyes and fancy we are accommodated in a lordly vase under the sparkling pictures of one of these enormous roofs, amongst a select company of sixteen hundred, who are enervating themselves in the same vaporous and perfumed atmosphere. And we can only guess how many besides once peopled the court-yard and racecourse, the halls and porticoes that over an area of a quarter of a mile cumbered the earth with their magnificence. I fancy we feel more strongly on this spot the vast scale of everything in Ancient Rome than amongst the majestic ruins of the Palatine, or before the towering arcades of the Colosseum.

By this time we had contrived to see a good deal of Modern Rome—its handsome streets, wide spaces, statues, columns, obelisks, noble palazzos with spacious courtyards, and windows closed by jealous grills. No wonder they want aqueducts where such big fountains pour forth their unmeasured streams. They say that if you drink of the biggest of all—the fountain of the Trevi, where rocks and sculptured groups and an architectural façade are ingeniously combined, you will surely visit Rome again. We had been amused and instructed at the New Post Office, converted out of an old palazzo, its courtyard decked out with fountain and flowers, the arcades around being painted with symbolic—almost comic—groups, illustrative of the quick flight of news by land and sea, and where the clerks are by strict regulations eagerly attentive and polite. We had walked on the Pincian, shopped in the cheerful Corso, bought photographs, and found out how very much of Rome was left unseen. No matter; we can answer for three of our company, who, late on their last night in Rome, stalked across the rocky basin to drink heartily at the cataract of the Trevi.

At daybreak, on Wednesday (in Easter week), we found ourselves amongst the spurs of the Apennines, with finely-placed towns, large monasteries, and farms of some picturesqueness, and had charming views of Florence and the Valley of the Arno. During two days those who might be tired of ruins had a good innings, driving in open carriages to all the chief objects of interest: Duomo, Giotto's tower, Baptistery, Churches, Public Galleries, Palazzos, real frescoes, rich mosaics, works of Ghiberti, Luca-della-Robbia, Cimabue, Orcagna, Donatello, Massacio. The afternoons found us up at St. Miniato, gaining a charming view over the smokeless City of Flowers, towards Fiesole, or in the public park, or away at the Certosa, where the few remaining monks show their empty cells and tempt one with Chartreuse and perfumes and other old-world vanities.

Leaving Florence early on Friday, we called at Pisa, and saw over that marvellous group of Duomo, Baptistery, Campo Santo, and Leaning Tower, all scraped and smartened up, a process which is now being tried on the little chapel of Sta. Maria della Spina. Then on, past Carrara—busy in marble, and Spezzia, where the Italian ironclads lay in the bay, through the eighty tunnels, between which we had charming views of the Riviera, its picturesque towns, its gardens full of pink-blossomed trees, of oranges and lemons in fruit, and vines breaking into leaf on these hot terraces, and on the other hand bright flashes of the blue Mediterranean—not of the sweet tranquil azure of Lake Leman, but beautiful, and breaking grandly on the rocky coast. We spent the night at Turin, and had time to drive to the Capuchin monastery for views of the town and distant Alps, and to visit the Royal palace and curious black marble burial chapel, and leaving in the evening, reached Paris in good time the next night.

As these excursions are likely to be repeated, I wish to offer a few hints to those who may think of joining them. With plenty of time and plenty of money, one would never think of rushing about the world at this rate. With some weeks to spare, any one speaking Italian and having a talent for bargaining, might manage the journey very cheaply, alone, or with a small party. The excursion I have described is for such as have little time to spare, desire to avoid worry, and to know beforehand the cost. We paid Messrs. Cook and Sons eighteen pounds each for everything I have described; they are no novices at this business, and they did it well. We spent on photographs, mosaics, and an extra day in Paris, two or three pounds more. By the cheap route to Paris the charge was only sixteen pounds; but we are well satisfied with our bargain. With a fair knowledge of the Orders, and a little study of such books as Wey's "Rome," Murray's handbook, and Mr. Shakespear Wood's little guide, any young man would find his future studies of Classical architecture and modern works vastly facilitated; he would get ideas of their grouping, scale, and colour which nothing else can give; and, unless with the near prospect of a leisurely tour in Italy, I should decidedly recommend to such a one the short but well-considered programme of this excursion to Rome. Thos. Blashill.

10, Old Jewry Chambers, E.C.

PORTLAND CEMENT.

At the meeting on Tuesday, the 11th of May, of the Institution of Civil Engineers, the first paper read was on "The Manufacture and Testing of Portland Cement," by Major-General H. Y. D. Scott, C.B., R.E., F.R.S., Assoc. Inst. C.E., and Mr. Gilbert R. Redgrave, Assoc. Inst. C.E.

The history of the early manufacture of Portland cement was involved in considerable obscurity, and the conditions which had rendered possible the manufacture of the cement now recognised as Portland seemed to have been arrived at only very gradually. The term "Portland Cement" first occurred in the specification of a patent granted to Joseph Aspdin, a bricklayer of Leeds, in 1824. Aspdin did not appear to have made true Portland cement, nor was his mode of manufacture identical with that which had since been generally adopted. His son Wm. Aspdin was, however, one of the earliest makers of genuine Portland cement, and had a factory at Northfleet, trading with partners as Maude, Jones, and Aspdin. Subsequently, as Robins, Aspdin, and Co., he shared with Messrs. J. Bazley White and Sons the reputation of having been the founders of the Portland cement manufacture in the London district. The elaborate series of tests conducted for the Metropolitan Board of Works by Mr. John Grant, M. Inst. C.E., between the years 1859-71, might be said to have placed Portland cement in the first rank as a building material, and it had been the means of fixing and formulating the knowledge of this material. Mr. Grant's observations had been supplemented by those of Messrs. Colson, Mann, and others, and there now existed a vast store of information respecting the use and treatment of Portland cement. Mr. Henry Reid had also thrown much light upon the manufacture and production of this cement.

The raw material suitable for the manufacture of Portland cement existed in great abundance in nature, and, with proper care, a high-class Portland cement might be produced in almost any country. The mode of mixing the chalk and clay generally employed in England for the manufacture of the cement was not so systematic as could be desired. The old-fashioned plan was to wash together, or incorporate, the chalk and clay with a large excess of water in a wash-mill. The resulting milky fluid, or wet slip, was then run into a series of shallow reservoirs or backs, where these ingredients subsided, and the clear top-water was gradually drawn off from the surface. After remaining for six or eight weeks in the backs, the slip, which had attained a pasty consistency, was removed in barrows to drying floors, where the remaining water was expelled by bottom-heat, conducted in flues. The dry slip was then calcined in kilns with inter-stratified coke, and the clinker which was produced was ground into a fine powder, and was ready for use as Portland cement.

The modern plan was to grind the chalk and clay together, with the smallest quantity of water possible, and to insure the perfect reduction of the coarse particles, either on the method of Mr. W. Goreham, by passing the wet slip through mill-stones, or, as recommended by Mr. V. de Michele, by employing a rubbing surface of metal plates which surrounded the wash-mill. In the most recently improved plan of drying, the wet slip was conducted at once into chambers attached to the kilns, and the waste heat from the calcination served to dry the next charge. This plan was invented by Mr. I. C. Johnson. Mr. de Michele had also employed the waste heat from the kiln, which involved the use of a roof over the chambers. Other plans of utilising the hot gases from the kilns had been introduced by Messrs. J. B. White and Brothers, and by Mr. R. A. Gibbons. In grinding the clinker, it was of great importance to reduce the cement to a fine state of subdivision, and to exclude all "core" or hard particles by sifting, as the hard particles might be sources of danger to the cement; at the best, they only acted as so much sand. All cement was benefited by spreading it in thin heaps on the floor of the warehouse; this operation was termed "purging" the cement.

Passing on to the subject of testing, the author stated that, strange and anomalous as it might seem, although except in rare cases Portland cement was never used neat, or subjected to a direct tensile strain, it had been the universal practice to test the neat cement by means of tension. German cement users and producers had resolved, after a general conference, to adopt a sand test, and to employ a standard testing machine. The sand test was made with 3 parts of prepared sand to 1 part of cement. The briquettes had a sectional area at the neck of 5 square centimetres, equal to 0·775 square inch. The briquettes were tested twenty-eight days after they had been made, one day being passed in air and twenty-seven days in water. The breaking-weight, in a machine of special construction, had been fixed at the rate of 113·8lb. per square inch. The mode of preparing the sand by sifting out all the coarser and finer particles was provided for, and also the

quantity of water to be employed. The authors, after due consideration of the various difficulties and objections to a change in the mode of testing Portland cement, proposed the following general tests for English cement:—1. The whole of the cement to be ground fine enough to pass through a sieve of 40 × 40 = 1,600 meshes to the square inch without residue. 2. The cement to weigh not less than 85lb. per cubic foot, filled from an inclined plane, at an angle of, say, 45°. 3. The cement tested with 3 parts of standard sand must have a minimum strength of 112lb. per square inch in twenty-eight days, during one day of which it had been in air and twenty-seven days in water.

The second paper read was on "Portland Cement Concrete, and Some of its Applications," by Mr. E. A. Bernays, M. Inst. C.E.

In this communication the author gave the results of his experience in carrying out the large works for the extension of H.M. dockyard at Chatham. When these works were commenced, in 1867, so little confidence was placed in Portland cement, that that material was not even mentioned in the contract specifications; grey stone lime, blue lias lime, and pozzolana being specified for all descriptions of mortar and concrete. Soon afterwards, however, it was found desirable to substitute Portland cement for the above materials. For all ordinary concrete, it was ascertained that a mixture of 1 part of Portland cement with 12 parts of shingle, gave a better result at the same or less cost than the concrete provided for in the specification, to be composed of one part of Warwickshire blue lias lime to 6 parts of shingle. The Portland cement used throughout the Admiralty Works had been of good, but not of a costly, character. It was specified to weigh not less than 112lb. per bushel, to be finely ground, and to bear a breaking strain of not less than 650lb. on the section of a briquette 1½in. by 1½in. In a total quantity of upwards of 50,000 tons, the mean weight was 116½lb. per bushel; the average breaking strain of a briquette, of the above section, 773½lb.; and the fineness, such as to allow not less than 75 per cent. by weight to pass through a sieve with 50 meshes to the lineal inch. The author, while admitting the superior value of fine grinding of cement, when combined with great weight, expressed a doubt whether in England, where a fairly good article could be got, at moderate cost, it was worth while to incur the increased expense of heavy and very finely-ground cement. When used in foreign countries, where the cost of freight and transport was serious, he thought that almost any outlay on the first cost of the cement, to make it go further, when mixed with sand or gravel, was desirable. The large concrete walls at Chatham had been singularly free from the horizontal and vertical cracks so often noticeable in concrete walls. The author attributed this partly to the uniform practice of turning out all cement from the bags into a shed for, at least, three weeks before using, and partly to the care taken to carry up the work in long lengths each day, instead of in great heights. His practice was to carry up the work in 18in. lifts only. Over the greater part of the works at Chatham, the walls, though mainly of concrete, were faced with a veneer of brickwork 3ft. thick, with bond-courses of brickwork 21in. thick, passing through the walls at intervals of 6ft. in height. At the eastern end of the works, however, the great depth at which satisfactory foundations were found, and the necessity of passing through 35ft. of soft mud before reaching good bottom, necessitated much greater strength and consequent thickness of walls. In order to construct these without increased cost, it was decided to omit the brickwork, and build them wholly of concrete. While it was considered that, for all purposes of strength as a retaining wall, concrete made of 1 part of cement to 12 parts of shingle was amply sufficient, it was felt that concrete so made was not strong enough to withstand the rubbing of ships' fenders, boats, or vessels. Early in 1874, the author tried the experiment of facing this common concrete with a coating, 9 or 10 inches in thickness, of superior concrete carried up simultaneously with the commoner material. This concrete was composed of 4 parts of furnace-slag broken into small cubes by a stone crusher, 2 parts of clean Thames sand, and 1 part of Portland cement. The experiment proved successful, the adhesion between the two descriptions of concrete being perfect. All the exposed surfaces of concrete walls built since that date had been so faced. The same principle had been applied to the lining of subways, culverts, penstock shafts, &c.; but, in these cases, where the face of the concrete was less liable to abrasion, broken flints had been substituted for the furnace-slag, owing to the difficulty of procuring the latter, in the locality, in sufficient quantity. For all concrete, but especially when used for facing, the author advocated a free use of water in mixing. He had never found any disadvantage from the use of concrete in a wet state. The success that attended the facing of vertical surfaces of walls with superior concrete had led to its use in many other ways. He had applied it to the horizontal and vertical faces of copings and steps, for curbs to street paving, for the areas and yards of dwelling-houses, floors of kitchens and sculleries, and to the facing of concrete blocks for house-building. For copings and steps he made use of granite spauls crushed into small cubes; but for all surfaces exposed to foot traffic he preferred small pebbles of shingle that would pass through a ¼in. mesh sieve. While for ordinary concrete, on faces or elsewhere, the author used a minimum of one-third of the entire bulk of sand; where the concrete was exposed to foot traffic he had found it necessary to wash out all sand, and to use Portland cement only as the matrix for the flint, pebbles, crushed granite, or furnace-slag. His practice was to use for these facings 1 part of Portland cement to 2 parts of the aggregate, whatever it might be. For the copings of sea-walls he applied a facing 2in. thick, but for ordinary footways or paving a facing of only ¾in. was considerably more durable than the best Yorkshire paving. At ordinary London rates the author estimated the cost of concrete walls, composed of 1 part of Portland cement to 12 parts of shingle, at 7s. 2d. per cubic yard, of 1 to 9 at 8s. 2½d., and of 1 to 6 at 10s. 3d. He estimated that the timber framing added from 4d. to 6d. per cubic yard to the cost of the walls, and the facing of slag or flint about 2½d. per cubic yard on thick walls. At these rates such walls as had been built at Chatham could be constructed, including facing and framing, at something less than 8s. per cubic yard.

The third paper read was on "Portland Cement: its Nature, Tests, and uses," by Mr. John Grant, M. Inst. C.E.

After referring to the greatly extended use of Portland Cement during the last twenty years, to the improvements which had been made in its manufacture, and the care given to the best methods of economising its use and testing its quality, attention was drawn to what had been done in Germany, more especially during the last four years. In January, 1877, a committee, appointed the year before, of four associations of engineers, architects, and manufacturers of cement, &c., had, at their meeting in Berlin, agreed upon a series of rules to be observed in the production and supply of cement. By these, the weight to be supplied in casks and sacks was determined, and certain tests established for the quality of cement, particularly as to its fineness and tensile strength. The latter was to be tested by briquettes of uniform shape and dimensions (5 square centimetres breaking area), made of cement and sand, in the proportion of 1 part of cement to 3 parts of sand. The apparatus for this purpose was agreed upon. The age of the briquettes when tested was to be 28 days. The cement was to be ground so fine, that the residue on a sieve of 900 square centimetres, equal to 72·2 per lineal inch, should not exceed 25 per cent. This was afterwards reduced to 20 per cent. The sand for testing was to pass through a sieve of 60 meshes per square centimetre, and to be retained on one of 120 meshes per square centimetre, equal to about 20 and 28 meshes per lineal inch. The tensile strength after twenty-eight days was at first 8 kilogrammes per square centimetre, equal to about 114lb. per square inch, but was afterwards increased to 10 kilogrammes per square centimetre, or about 142lb. per square inch. There could be no doubt that the standards thus established for fine grinding, and for testing the cementitious value of cement when mixed with a large portion of sand, had exercised a beneficial influence on the quality of the Portland cement manufactured and used in Germany. This result had been arrived at by a combination of the knowledge and ability of those who produced, and those who had to use, this important article. The same standard rules, with slight modifications, were afterwards adopted in Austria. To these standards all cement manufactured in, or imported into, these countries must conform. In England engineers and cement manufacturers had not been idle, and the subject was now much better known than it was twenty years ago.

A brief description was given of the more essential points in the manufacture of cement, the materials used, and the burning and grinding. Reference was then made to the characteristics of good cement, its weight, fineness of grinding, freedom from tendency to expand or blow, its time of setting and hardening, the effect of time, heat and moisture, the influence of sulphate of lime and acids, the proportion of sand used with it, the coarseness or fineness of the sand or gravel, its mineral character, and freedom from dirt, grease, clay, or soft foreign matter. The weakening effect of using too much water was pointed out, and the advisability of compressing or ramming concrete when possible. The relative advantages of using concrete in blocks, and in a soft state, and of keeping it damp till it had thoroughly set, were pointed out. The different modes of testing by compression and by tensile strain were then discussed, and the apparatus used in Germany, and in the experiments quoted in the Appendix to the Paper, were described with the modifications and improvements in the form of the briquettes and in the mode of making them. Suggestions were next offered for testing cement in a uniform manner, so as to prove its soundness, strength, cementitious value, and other qualities, and to admit of comparison with other observations. The harbour at the North Sea entrance to the Amsterdam Canal, the Victoria Docks, North Woolwich, and the docks at Chatham were mentioned as recent examples of works on a large scale made entirely of Portland cement concrete; and the numerous purposes to which it was now applied, and the economy effected by its use in the sewers and embankments of the metropolis, were alluded to.

In an Appendix were given numerous tables illustrating the different points referred to in the Paper, such as the specific gravity and analysis of different cements; the results obtained by different modes of testing briquettes of various forms and sizes, and when made with different proportions of cement, sand, and water. From these it was shown that there was great increase of strength and economy by grinding cement very fine. Some coarsely-ground cement gave high results when tested neat, but low when tested with sand. The tests proved the impossibility of ascertaining the true cementitious value of cement by testing it neat, or otherwise than with a mixture of sand, and also showed the waste involved in coarsely-ground cement. The influence of sand of different degrees of fineness, of the time which cement took to set, the strength of various limes, selenitic limes and cement, the tensile and compressive strength of the same cements, some experiments on expansion, with form of specification for cement, for mortar, and concrete, and tabulated forms for registering results of tests and experiments were also given.

CHIPS.

The memorial-stone of a new Sunday-school, to be erected on the site of the old school, at the back of the Primitive Methodist Chapel, Bradford, was laid on Saturday last. The cost of the building is estimated at £2,500. Messrs Andrews and Pepper are the architects.

It is the intention of Capt. Alfred Duncombe, the eldest son of the late Dean, and the family, to contribute £700 to complete the restoration of the south transept in York Minster, according to the estimate of Mr. G. E. Street, R.A.

The Ipswich Town Council on Wednesday week accepted the tender of Mr. Grimwood, of Sudbury, at £21,950, for the erection of a new corn-exchange on property adjacent to, and at the rear of the town-hall recently acquired for the purpose. We have illustrated in our last and present volumes the designs selected in competition, which are by Mr. Brightwen Binyon, of Ipswich.

New wards and offices forming the "Townsend Memorial Wing" are being added to Tewkesbury rural hospital. The contract has been taken at about £2,000 by Mr. Thomas Collins, of Tewkesbury

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ILLUSTRATIONS.

DESIGN FOR AN ELIZABETHAN HOUSE.—DESIGN FOR A FIRE-BRIGADE STATION.—CEMETERY CHAPEL, TAVISTOCK.—ALTERNATIVE DESIGN FOR FREE LIBRARY AT CARDIFF.—NEW GRAMMAR-SCHOOL, WELLINGBOROUGH.

OUR LITHOGRAPHIC ILLUSTRATIONS.

AN ELIZABETHAN HOUSE.

MR. JOHN D. SEDDING'S large drawing at the Royal Academy this year, is the subject of our double-page lithographic plate to-day, and although the work is not yet erected, the merits of the design are sufficiently conspicuous as to warrant its exhibition at the R.A., and publication in our columns. There is a freshness in the treatment, and a thorough feeling of style about the detail, even if exception may be taken to the way in which the central gable finishes, and the circular bays group with the tower. The plan, also published, shows how the architecture marks the interior arrangements.

"BUILDING NEWS" DESIGNING CLUB.—A FIRE-BRIGADE STATION.

THE subject of this week's design is essentially a modern subject, and most of our contributors seem to have had this idea so strongly in mind as to allow it to limit their sense of artistic spirit, seeing that nearly all the designs for this building were characteristic only for their want of style. "Edwin's" design, which we have placed first, errs somewhat on the other hand, though his plan, being in so many ways superior to those designs where the elevations appeared more strictly suitable to a fire-brigade station, left no other choice open to us, and his design is published to-day herewith.

CEMETERY CHAPEL, &c., AT TAVISTOCK.

THESE buildings have been erected for His Grace the Duke of Bedford from the designs and under the superintendence of Mr. Henry Clutton, of 9, Spring-gardens (late of 9, New Burlington-street). The chapel externally is executed in carefully-selected Dartmoor granite. The ashlaring, mouldings, and tracery, have a fully-dressed face; the beds and joints are accurately worked, and the masonry is set with a close joint, afterwards raked out. Internally, the walls, vaulting, and ribs are of Corsham Down stone. The gate-house is also executed in granite, and in every respect corresponds to the chapel. In it is included a mortuary and residence for the keeper; internally, the mortuary and entrance-archway is faced with Corsham Down stone; the roofs of both the foregoing buildings are covered with lead. Mr. Pethic, of Plymouth, was the builder. The supervision of the work was intrusted to Mr. James Lambert, as clerk of works. In a future issue we hope to publish illustrations of the lodge and gates, and details from the chapel.

CARDIFF FREE LIBRARY AND SCHOOL OF ART.

WE published the selected design for this building in our number for April 23rd last, the architects being Messrs. James, Seward and Thomas, of Cardiff. To-day we give a view of the same architects' alternative design, which, in many particulars, seems to be superior to the chosen elevation, though the plans in both designs are essentially the same.

NEW GRAMMAR-SCHOOL, WELLINGBOROUGH.

THIS building is now being erected from the designs of Mr. W. Talbot Brown, A.R.I.B.A. The accommodation provided will be for 80 day boys and 50 boarders, with head-master's residence attached. The walls are faced with red pressed bricks and Corshill and Bath stone dressings. The works are being carried out by Mr. John Watkin, of Northampton; the clerk of the works being Mr. H. Packer.

THE SOCIETY OF ARTS HEALTH CONFERENCE.

THE annual health conference of the Society of Arts will be held on Thursday and Friday, the 10th and 11th June next, at 11 a.m. in each day, the Right Hon. James Stansfeld, M.P., late president of the Local Government Board, in the chair, assisted by the members of the Executive Committee:—Lord Alfred Churchill, Chairman of Council; C. N. Cresswell; Capt. Douglas Galton, C.B., F.R.S., and others. It has been thought well that, at the Conference for the present year, the following subjects, suggested by previous conferences, should be discussed. It must be understood that neither the Council nor the Executive Committee of the conference express any collective opinion on the various points which they recommend as suited for discussion:—

I.—ADMINISTRATIVE ORGANISATION.

1. COUNTY BOARDS.—The necessity for further legislation with a view to develop and strengthen Local Government administration throughout the kingdom, especially by the constitution of county boards. [*Vide* Resolution of Conference, May 24th, 1878, *Journal of the Society of Arts*, Vol. XXVI., p. 737.]

a. That such county boards, or combinations of them, should, *inter alia*, be charged with the conservation of rivers, including the prevention of floods, and the storage of water, and be empowered to put the Rivers Pollution Act of 1876 in force upon the complaint of any local sanitary authority, or other person aggrieved, and to charge the cost of the proceedings upon the county rate, or to sanction proceedings of any sanitary authority or of any such aggrieved person for such purpose.

b. That such county boards shall appoint county health superintendents in each county.

2. SANITARY DISTRICTS.—With regard to the local authorities of urban and rural sanitary districts, that they should be constituted the local governing body for all purposes for which their area is fit, thus enlarging and elevating their functions; and by entrusting functions requiring larger areas to groups or combinations of such districts.

3. ELECTION.—Election of members by ballot instead of voting-papers.

The holding of all local elections on one and the same day, so as to minimise the trouble and economise the time of the electors.

4. LOCAL GOVERNMENT BOARD INSPECTION.—The advisability of strengthening the administrative organisation of the Local Government Board, whilst diminishing centralisation and correspondence.

a. By mapping out England and Wales into a few large areas. Each area to be under the administration of a staff of inspectors, the whole under the superintendence of a permanent head of the department, properly assisted, and relieved of secretarial work.

b. By instituting an inquiry department for the assistance of local authorities wanting information and applying for it, charged with the investigation of scientific processes, the collection of statistical data, the official record of sanitary experiments here and in foreign countries, and the publication of periodical reports upon the results obtained.

II.—AMENDMENT OF THE LAW.

1. PUBLIC HEALTH ACT, 1875.

a. Amending section 299 by omitting all the words in the first part of the section down to the words "cost or that," and enacting as follows:—"When a local authority has made default in respect of any provisions of this Act, the Local Government Board shall, after due inquiry, make an order limiting a time for the performance of their duty, &c."

[N.B.—Under this section, as it now stands, the Government can intervene only when complaint by some person aggrieved is formally made, and not upon the report of their own inspectors, however flagrant the dereliction of duty. This amounts in the majority of cases, especially where the interests of the poorer inhabitants are concerned, to a defeat of the intentions of the legislature altogether.]

b. By conferring powers and corresponding duties upon local authorities with regard to the construction of sewers, and connection of house-drains therewith, as extensive as those conferred upon the Commissioners of Sewers by the 11 and 12 Vic., c. 112. ss. 37, 38, and 46. [*Vide* Mr. Alcock's Resolution, May 24th, 1878, *Journal of the Society of Arts*, Vol. XXVI., p. 717.]

[N.B.—These compulsory powers will apply to *old* houses as well as *new*, and authorise the local authority to do the entire work of connections from the house to the main sewer at the cost of the owners by authorised contractors, after the same manner as gas and water companies.]

c. By amending section 23, and substituting one hundred *yards* for one hundred *feet*, and empowering the sanitary authority to prevent the continuance in old, and the construction in new, houses, of any drain, sewer, or conduit within the building until an outfall for emptying the same has been provided and constructed to the satisfaction of the authority, other than into any lake, pond, river, canal, or water-course.

[N.B.—*Vide* "Model Bye-laws," Part I., memorandum; Part IV. s. 88.]

d. By enabling local authorities in rural districts to construct new sewers and water-supply works for the special service of outlying dwellings, and necessary for their healthful occupation, and charging the cost of the same upon the owners or occupiers thereof, payment to be made within a period not exceeding twenty-one years, the intent of such provision being that rates for sanitary purposes in rural districts, including water-supply, should, as far as practicable, fall on those only who are benefitted by the improvements.

2. POLLUTION OF RIVERS ACT, 1876.—Amendments desirable in the Rivers Pollution Prevention Act, 1876; 39 and 40 Vic., c. 75.

a. By striking out of sections 2 and 3 the word "knowingly," as superfluous and embarrassing.

b. By striking out of sections 3 and 4 the words "solid" and "liquid" respectively, and by substituting, whenever necessary, the word "matter."

III.—SANITARY INSPECTION AND CLASSIFICATION OF DWELLINGS.

Discussion of the following Resolution:—

"That it is expedient that the Metropolitan Board of Works within the metropolis, and the County Board within each county, should be empowered by the Legislature to make provision for the inspection and sanitary classification of dwellings, upon application being made by the owners thereof; and to grant certificates of healthworthiness in different categories, for terms of years, according to the perfection of sanitary equipment and fitness for habitation of such dwellings; and to determine the scale of fees to be paid for such inspection during construction and repair, and also upon delivery to the applicant of the certificate of classification awarded to such dwelling."

[N.B.—The conditions and mode of granting these certificates would be analogous to the practice of the department of "Lloyd's" Association in granting certificates of class and seaworthiness to the mercantile marine.]

IV.—FURTHER SUGGESTIONS BY SANITARY AUTHORITIES.

An Exhibition of Sanitary and other appliances in connection with water-supply, sewage, and health, will be held during the Conference. All articles for exhibition must be delivered, carriage free, at the Society's house, John-street, Adelphi, not later than Saturday, the 5th June, 1880. Manufacturers and others desiring to exhibit should communicate at once with the secretary of the Society of Arts.

CHIPS.

A new coffee-tavern and temperance hall, at Redruth, was opened last week. The style of the building is Gothic, and over the entrance of the temperance hall there is a corner turret, surmounted by a large flagstaff. The building has been erected at a cost of about £800. The architect was Mr. James Hicks, of Redruth, and the builders were Messrs. Hodge and Gray, of the same place.

At a meeting of landed proprietors and tenant-farmers held at Portarlington last week, it was resolved, after hearing reports by two civil engineers, to apply to the Irish Local Government Board for the sum of £3,000, so as to obtain preliminary information necessary for the draining of the river Barrow and its tributaries. This work is estimated by one engineer, Mr. Hill, to cost £250,000, and by another, Mr. Mulvany, £420,000, while a third, Mr. Dillon, declared the project to be utterly impracticable on the score of expense.

The memorial-stones of a new Wesleyan chapel have been laid at Tenby. The building will be Romanesque in style, and will seat 550 persons. Mr. Ladd, of Pembroke Dock, is the architect.

The Vicar of Wakefield, the Rev. Norman D. J. Stratton, writes to the local papers calling attention to the wretchedly dilapidated condition of the well-known Chapel-on-the-Bridge, and appeals for subscriptions towards repairing the floors and roofs, for protecting the windows with wire, and for providing a stove, so as to re-establish weekly services in the chapel. The appeal is, we notice, endorsed by the editor of the *Wakefield Herald*.

Mr. Morgan, C.E., an inspector from the Local Government Board, concluded on Wednesday inquiries into proposed scheme for the supply of water to the villages of Stonehouse and Kingstanley, near Stroud, Gloucestershire.

A new coffee-tavern has been opened at Treharris, near Merthyr. It has been fitted up by Mr. John Lewis, of Treharris, under the superintendence of Mr. Cowie, of London.

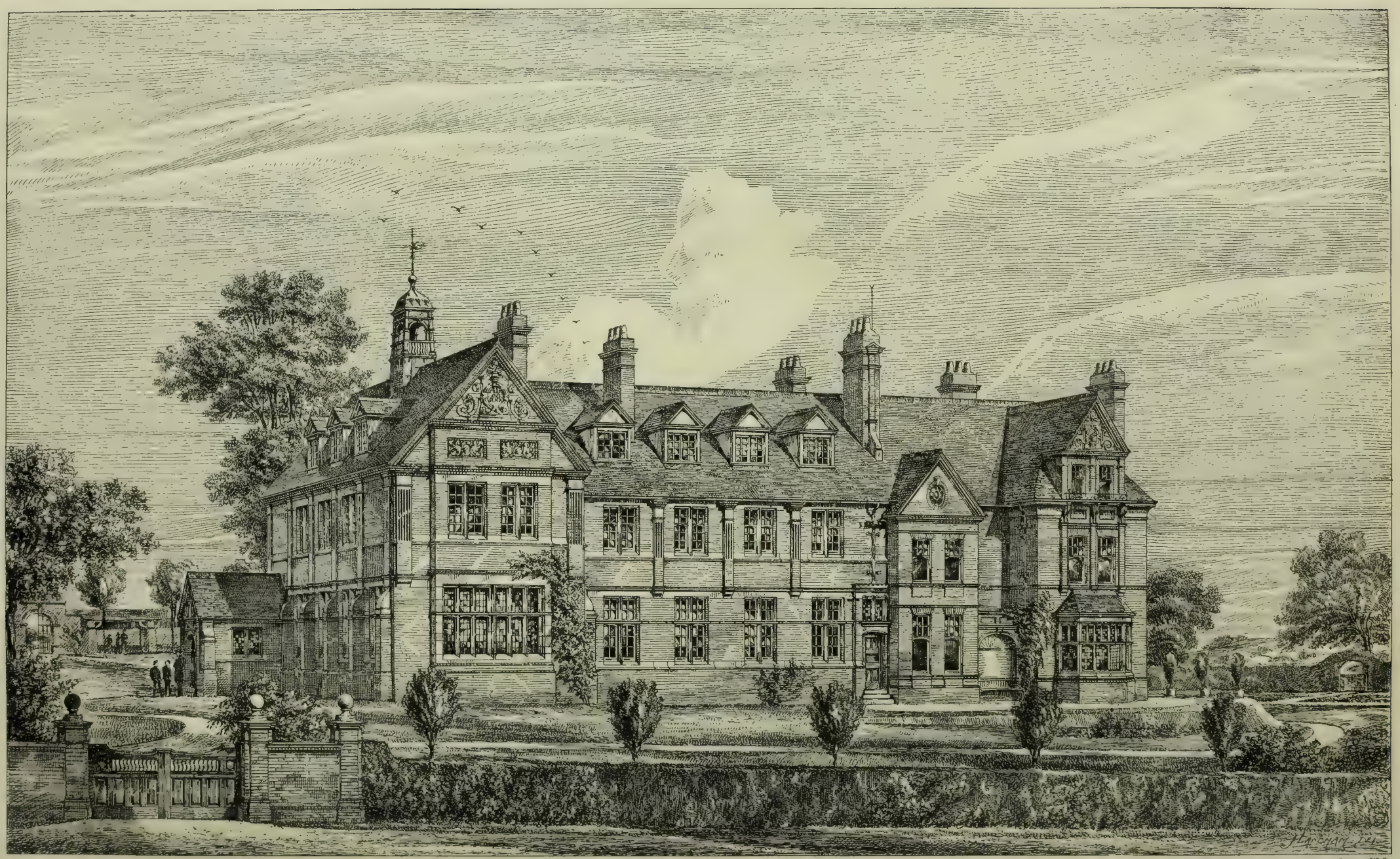


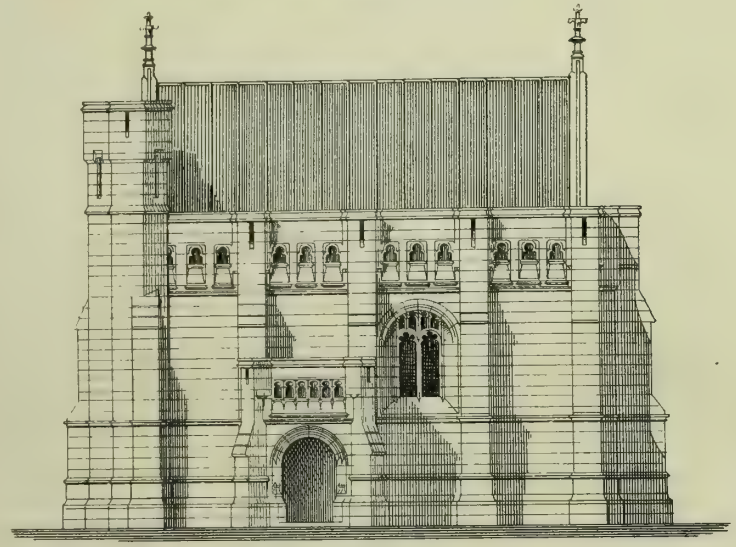
Photo Lithographed & Printed by James Akerman, 6 Queen Square, W C

NEW GRAMMAR SCHOOL, WELLINGBOROUGH.

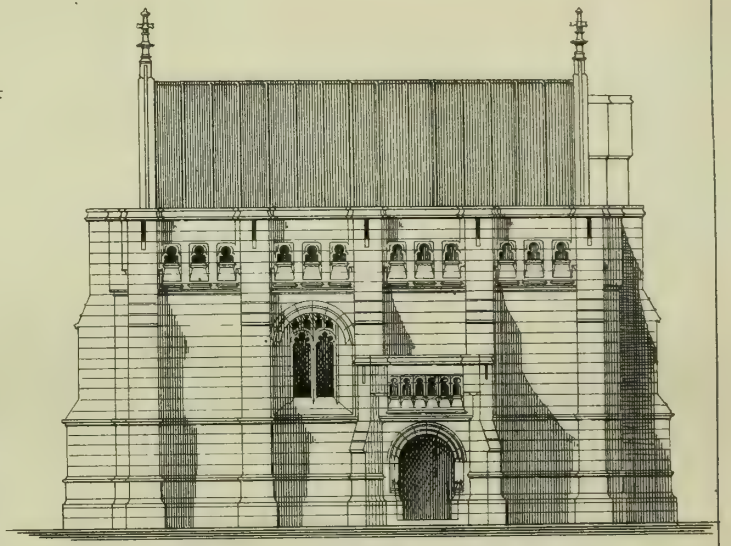
W. TALBOT BROWN, ARCHITECT.

CEMETERY ✻ CHAPEL
TAVISTOCK.

built in granite

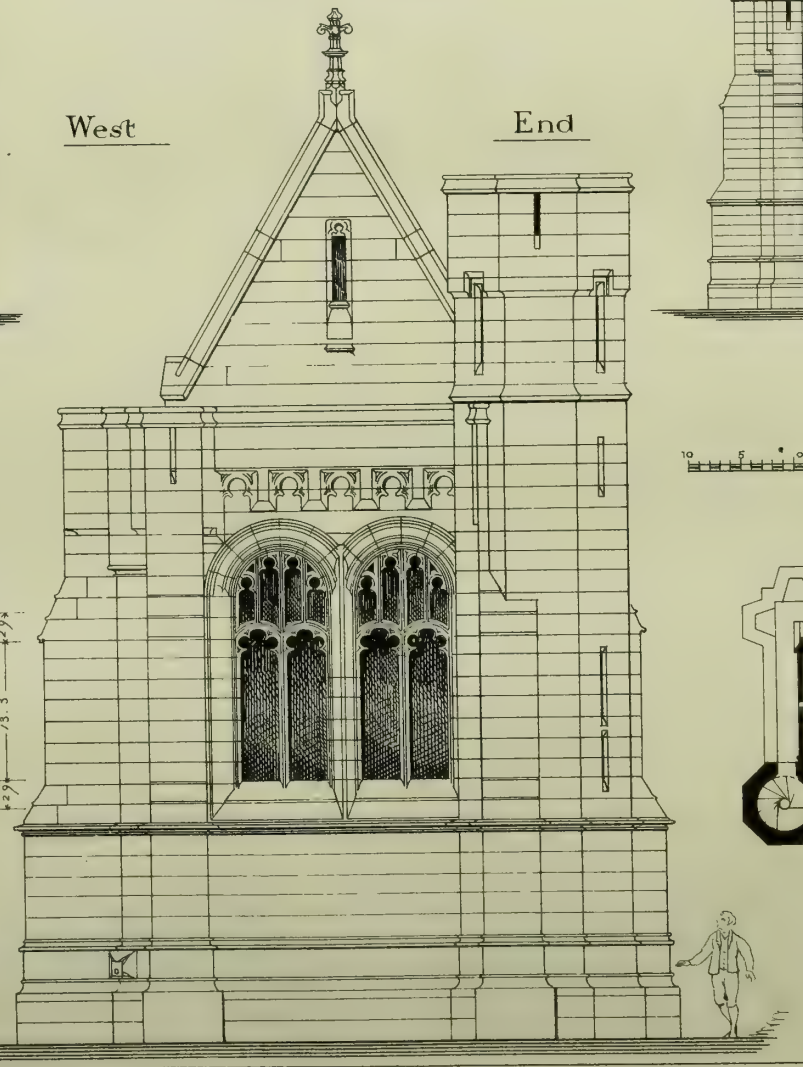


South side



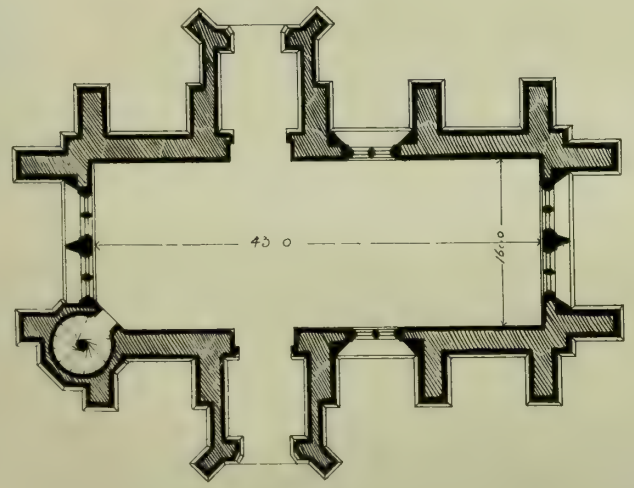
North side

West End

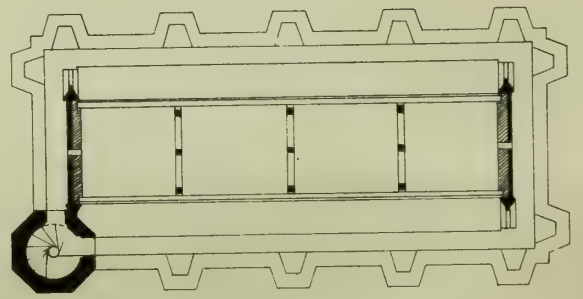


Scale of Feet

10 5 0 10 20 30 40 50



GROUND PLAN

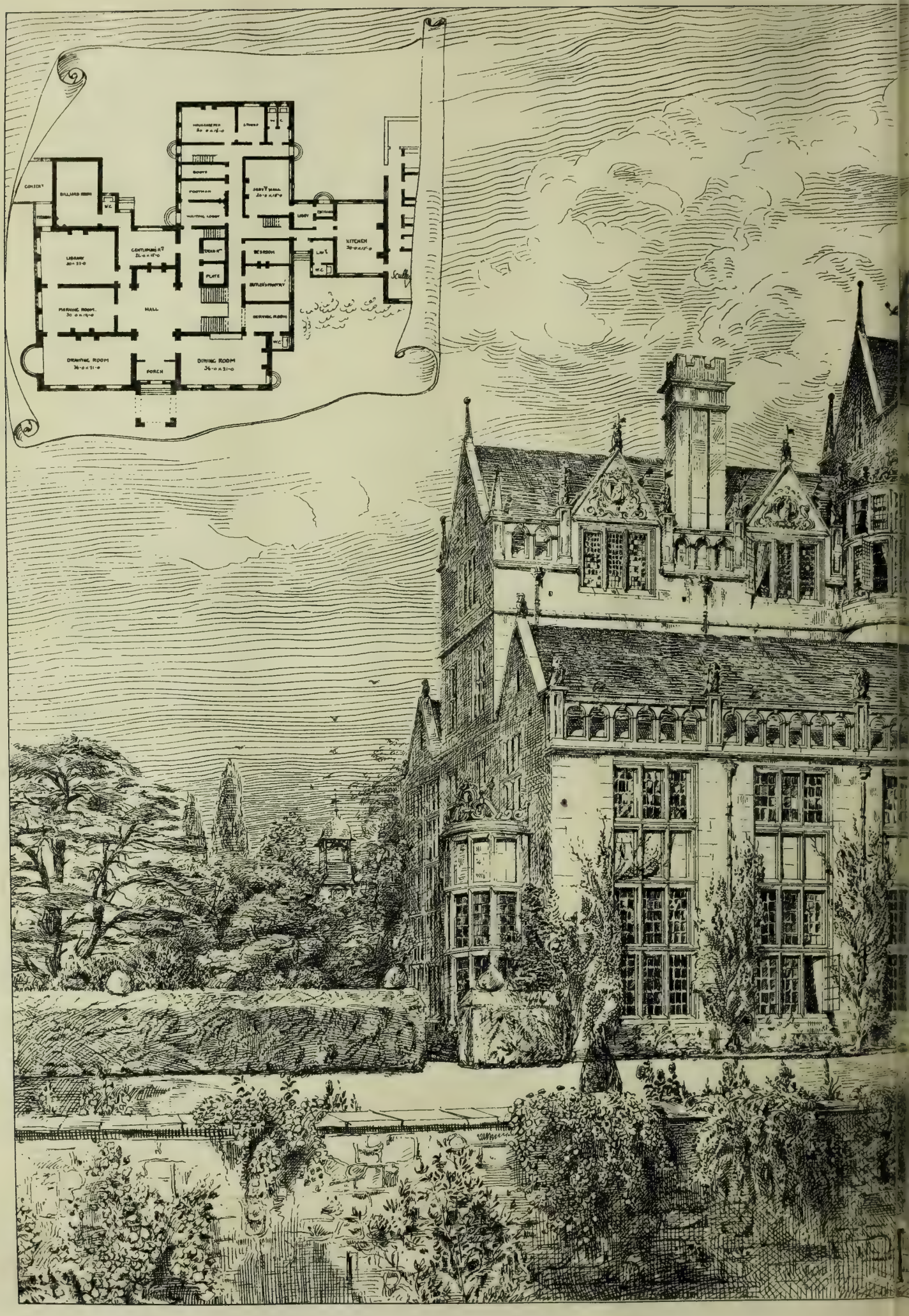


ROOF PLAN

HENRY CLUTTON
ARCHITECT

MAURICE B ADAMS DELT

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CONSERV
BILLIARD ROOM
W.C.
LIBRARY
CENTURIAN R.M
HALL
PARKING ROOM
DRAWING ROOM
PORCH
DINING ROOM
FOOTMAN
WAITING LOBBY
DOORS
PLATE
BUTLER'S PANTRY
SERVING ROOM
BEDROOM
LOBBY
KITCHEN
LIFT
W.C.
Scullery

AN ELIZABETHAN HOUSE

DESIGN BY J.D. SEDDING ARCHITECT

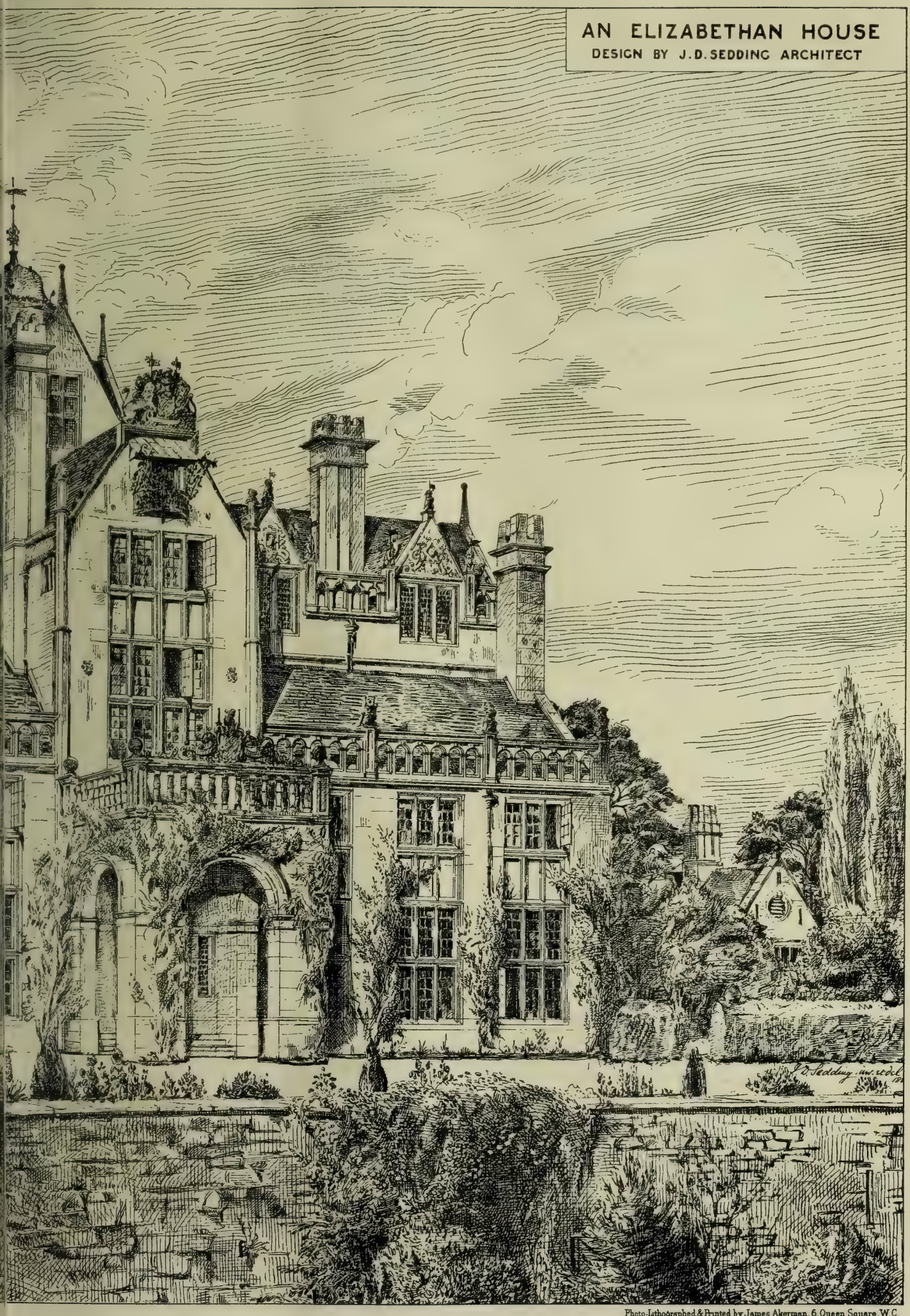
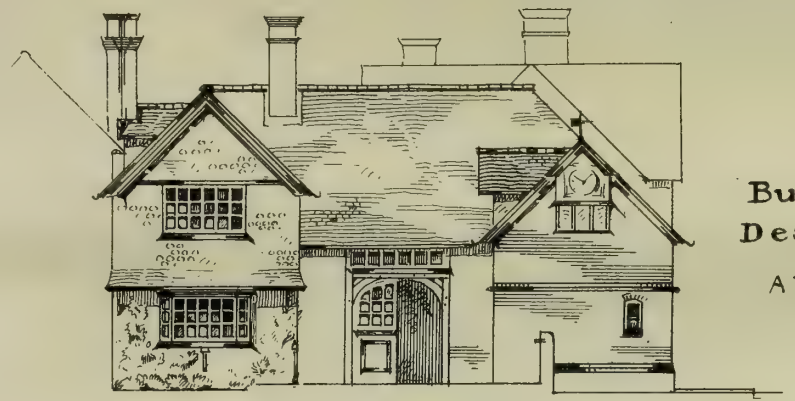


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Building News Designing Club.

A Fire-brigade Station

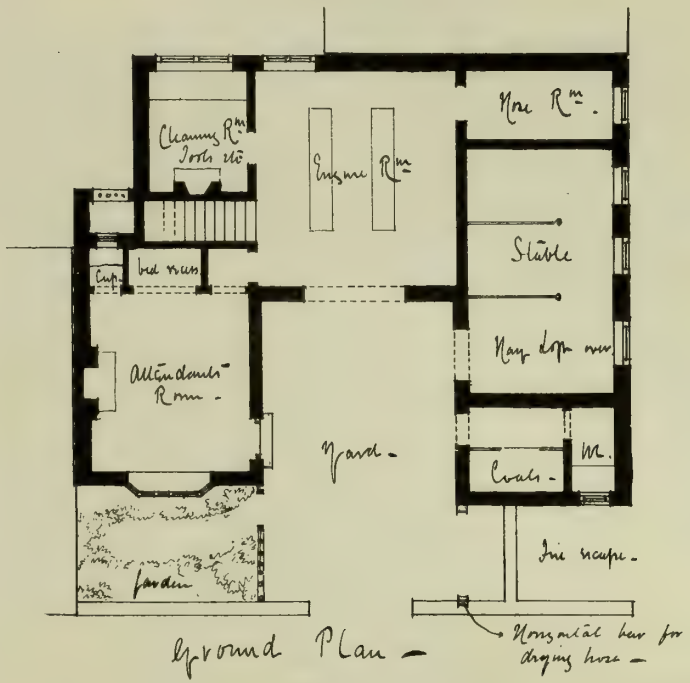
Edwin



Front Elevation

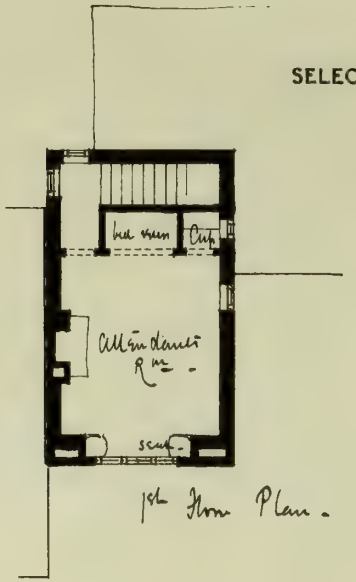


Sketch

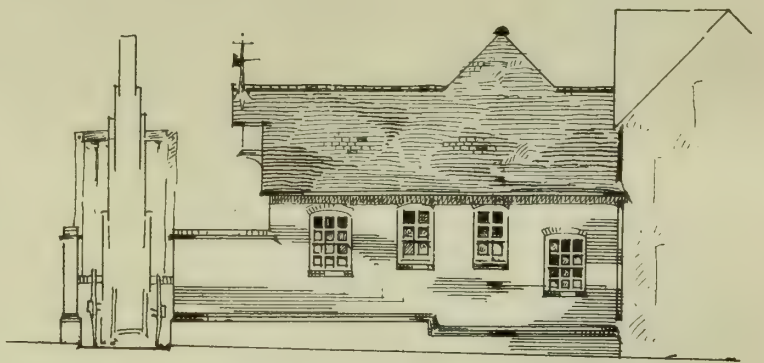


Ground Plan

SELECTED DESIGN



1st Floor Plan



Side Elevation

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CARDIFF FREE LIBRARY AND SCHOOL OF ART

MESSRS JAMES SEWARD & THOMAS' ALTERNATIVE DESIGN

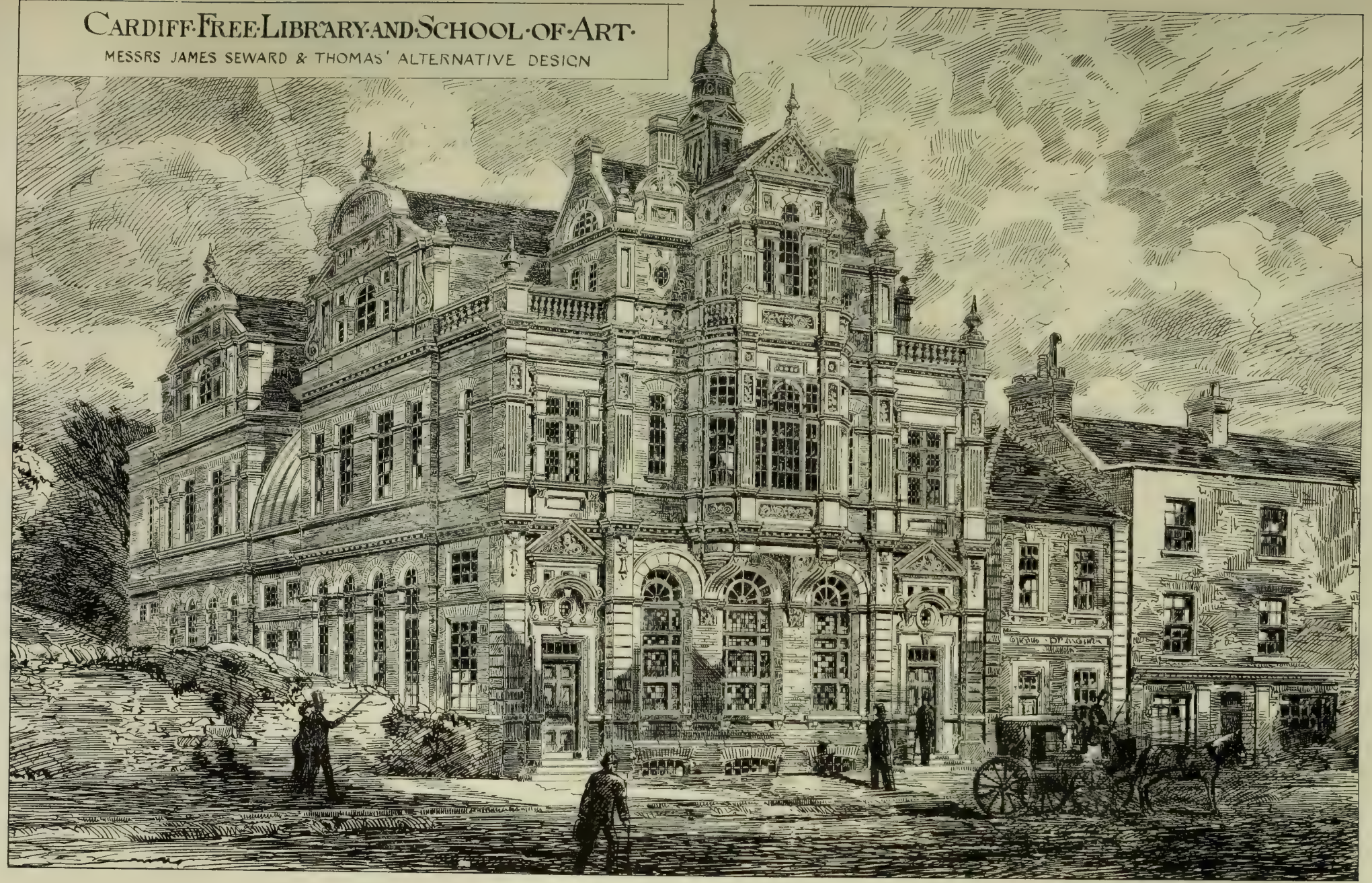


Photo Lithographed & Printed by James Akerman, 6, Queen Square W C

"BUILDING NEWS" DESIGNING CLUB.

DESIGNS FOR A FIRE-BRIGADE STATION.

(SEE ILLUSTRATION.)

IT would have been more agreeable to us if we could have seen our way to place two other designs first in this instance; but we are again obliged to award the palm to "Edwin" and "Alfred." As regards merit, it is rather difficult to balance them fairly. "Alfred's" front elevation for a fire-engine station is more appropriate in character and style than "Edwin's," but we deem the latter's plan more convenient. The engine-room is made a central compartment between the stable and attendants' room, which form advancing wings, and inclose a desirable sheltered yard for washing the horses and the engine. The cleaning and hose-rooms are conveniently placed. The engine-room is about 18ft. deep and 16ft. wide. The attendants' room opens into the engine-room at the inner end, and also has a private door from the yard; there is a bed recess and cupboard, and a stairs leads directly from engine-room to bedroom over. The fire-escape is placed in front of one wing in a walled recess. The fault we have to find with the very picturesque sketch, with tiled upper stories, is that it is not expressive of its purpose, and might be mistaken for a cottage. The archway to engine-room is too small, and should have been made the main feature in elevation. "Alfred's" elevation is in a red brick Queen Anne style, and the engine-house is gabled, and made the chief feature of the exterior, but there are a few defects in planning. The engine-room is small (it measures 14ft. by 12ft.); there is no private entrance to the attendants'-room, and anyone who required aid would probably have to call out or ascend the narrow stair at the back to fetch the attendant, whose rooms are placed above the engine and tool-rooms. The stable and stable-yard are quite independent, and are located on one side, and are kept low; the walled yard forms a rather awkward projection in front, but the design generally is simple in its parts and inexpensive. A break on the right side of engine-house is utilised as a place for fire-escape. The perspective sketch is faulty in the drawing of gables. "Sub Silentio" sends a very pleasing design in brick and tile; it might be mistaken for a small wayside inn; there is an archway below one of the attendant's rooms, leading into a square yard for washing &c., which is inclosed on two sides by the buildings. The engine-house is rather small, and is derelicted or rather squeezed into an inner corner of the yard. In running the engine out it would have to be turned round to be brought under the archway. The alternative entrance fronting it in the yard would require a corner site with two roads not always available. If the engine-house had been placed in the corner instead of the cleaning-room, the design would have been greatly improved. We think, also, one of the attendant's rooms would have been better below. "Sub Rosa" is also very simple and artistically treated in brick with stone dressings, tile-hung above, though we cannot say it meets our idea of what a fire-station should be; it is too cottage-like in its treatment. As to the plan, we cannot speak favourably; the narrow yard at the back of engine-house would have been better in front; the latter is small (only 12ft. 9in. by 11ft.) and there was no need for the stabling to be separated in the manner it is. The author places his sitting and working-room in the centre and provides two rooms over. On the whole, the plan lacks economy in arrangement. The estimate is worked out at £572 10s. "Toledo" hits the right principle in the planning; he sets back his engine-house and hose-room from the road, and provides a large yard in front with gates, and on one side he places the stable and offices in an advancing block. This is convenient, but the attendants' rooms over the engine-house, &c., and approached by a stair, is not the most desirable arrangement, and the details of plan admit of improvement. A recess for fire-escape is made in front open to the road. As an elevation, the author has followed the conventional type. "Our Praises are Our Wages" shows a compactly grouped range of buildings with a front corner yard, the engine-house being in the rear, but we see no hose or tool-room near, and the stable has an awkward approach. The reel cart-house in front would have been better used as an attendant's room. The elevation is appropriately treated, but the detail is a little feeble. "Honey Dew" shows a good general arrangement; the engine-house is made the central feature, and there is a small room for attendant at the side, with a stable of two stalls on the other side of yard, with covered washing place, but the addition of work-room over engine-room and the drying-room, &c., are not necessary for a small country station. The elevations are, as usual, drawn with much care, though the roofing of stable building is cut up by gables, and there is a want of simplicity and breadth in the external design which indicates expense. "Wasp in Triangle" is happier in his external treatment than he is in plan, which is hopelessly confused. The building is shown surrounded on three sides by a yard; the stable at back of engine-house is inconvenient, and the attendant is provided for above the latter, access to rooms being by a covered outer stair. We do not see the necessity for a tower to house the fire-escape, though as a look-out and for the purposes of drying, and as a place for the cistern, it might be usefully added. Too complex and expensive in plan is the design "Con Amore," and the author, though he has shown a pleasing front elevation, has laboured in the most unfortunate manner over the arrangement. The double stable-yard, and the position of stable and offices are awkwardly involved. "Vis."—This design shows a single-storied shed at the back of courtyard for the engine accommodation, and a separate block on one side of the yard for stabling and attendant. The details of the plan are not worked out satisfactorily, and the treatment of the buildings is a little ostentatious. "No. 90" looks like a neat school-house in elevation; the buildings form two sides of an open yard at the back, but the scheme is a trifle too expensive, and covers a large area. There was no necessity to provide two entrances into the yard. "Pupil J." has sketched an unpretending group of buildings with a centre yard, which might have been made suitable and pleasing if the engine-house had been larger, and its entrance turned towards the front. At present, the plan is confused, and the out-offices badly placed. "Clansman" shows sad want of appropriation, besides which, he occupies more ground than necessary, the yard and side-entrance to it take up a large space of frontage, and the engine-house is inconveniently situated at the back for a speedy removal of the engines. Placing the stable in front, with the hose and tool-house near the entrance, is like putting a gentleman's residence behind his stables. A like want of architectural generalship is shown by "Heart and Arrow," where the stabling is made to face the entrance; by "B." and "Stefano." "Burswell" sends a quietly-treated elevation, suitable in its main features, but the plan is wanting in compactness. The design shows a bellcot, and is simple and inexpensive, though the sketch is rather heavily shaded. Estimate £449 17s., priced at 6d. "Mot" is rather too pretentious: the hose-house and workshop are large, and the front block awkwardly, planned for access to attendant. In the extravagant schemes we must place "Gemshorn," who has gone beyond the limits of a small country town station; "Ernest," who sends a well disposed general plan. "W. F. in Lozenge," "Attempt," and "North" are rather rambling arrangements; while "Merlin" hardly grasps the right idea in elevation, and "Fogo" gives us an elaborate half-timbered front with tower.

SCREEN FOR A VILLAGE CHURCH.

We place "Alfred" first, though the design is rather in excess of the requirements of a village chancel. There is a centre-arched entrance with two open panels, arcaded and traceried on each side; the upper part of screen consisting of pierced arcading, is tilted forward over a rich notched cornice. The panelling below is close-boarded. The style is Perpendicular. "Edwin," who comes next, shows a similar treatment; the traceried heads are carried by small wooden shafts with caps and bases; there is a rail below, and the screen rests on a wall of masonry, carried across under the chancel-arch; a deep cove, boarded and ribbed, crowns the screen. "Clansman" is exceedingly simple and appropriate, but the detail is scarcely up to the mark, and the sereen is too low. In the order of their merit, we may notice the following: "D'Ewes," an elaborate panelled screen, the upper open panels being too much like windows; "Binny," light, but too expensive in character; "Burswell," a design of some promise in its idea, but the details below par; "Fleur-de-Lis," spoilt by excessive tracery to the upper panels; "A. U. C.," in triangle over-panelled, detail poor; "Boz," a stone screen too low; "Ap Adam," a queerly-designed work, in which the author has impressed a kind of Victorian or nondescript style. The proposed colouring of ground, emerald-green, and the Indian red ornaments, would, we fear, destroy all harmony in a small church.

We here take the opportunity of replying to some strictures by a member of the club who wrote to us to point out what he calls a "constructional mistake" in the published design for boat-house, recently illustrated. The writer is evidently in a fog. If he studies the design again, he will find all the upper-walls are carried on the boat-house; not merely the one between picnic-room and landing, which he particularly points to. We may ask, how else could the accommodation be obtained? All these upper-partitions are necessarily intended to be trussed, and are carried on girders, which are shown. The reflection, therefore, on our judgment in that instance is without justification.

SEWAGE DISPOSAL.*

MR. HENRY ROBINSON, Memb. Inst. C.E., F.G.S., has published a little octavo, the object of which is to indicate with clearness and brevity the "main facts which govern the question of sewage disposal." A glance through the 80 pages of Mr. Robinson's book is enough to show us that the author has satisfactorily fulfilled his task. The data and statistics will be found reliable and complete, and those who wish to post themselves up in the question of sewage disposal, and to learn the outcome of the most recent inquiries and blue books, cannot do better than procure Mr. Robinson's useful compilation. We need not tell our sanitary readers the author's views are safe and sensible; he shows how the most extravagant expectations of advocates of precipitation processes have died out, and equally exposes the loss that has been suffered from ill-advised schemes of land-irrigation; but while pointing to these failures, he advises irrigation where suitable land can be obtained, and chemical treatment where it cannot. The memoranda on sewage will be found to contain a fund of useful data and analyses: for instance, we are told that for agricultural purposes 10 tons of average water-closet sewage may be taken to be equal to 12 tons of sewage from a non-water-closeted town, showing the advantage of the water carriage over the dry system. The author speaks in favour of the separate system of sewerage in towns where the sewage cannot be got rid of without recourse to irrigation or chemical treatment. Under the head of "Filtration" the author briefly cites the experiments made by Mr. George Higgin in reference to the water of the River Plate, from which it appears that an efficient filter can be made by five layers, consisting of 6ins. of fine sand at top, the same thickness of finely pounded cinders including dust, a similar layer of fine sand, 2in. of coarse sand with 6in. layer of fine clear gravel at the bottom. The researches of Drs. Voelcker, Frankland, and Professor Way are referred to, and the conclusions of the former chemists are given at length in speaking of irrigation, and the author draws the pratical conclusion that "however well land may act as a purifier of sewage for sanitary purposes, it can only be relied on to utilise the manurial constituents of the sewage according to the requirements of the crops for the time being assimilating them, and that any excess of the supply of manure over the demand by the crops is wasted and passes off in the subsoil drainage." We observe that the Local Government Blue-book, the irrigation scheme at the Gennevilliers sewage farm near Paris, and the official reports and analyses of the sewage at Aldershot are referred to in this part. The "intermittent downward filtration" principle has not been overlooked, though the author does not add his opinion to those who are in favour of the system, and the unfavourable report of the Rivers Pollution Commissioners is quoted against it. "Chemical Treatment" is scarcely so fully discussed as perhaps the subject demands, though we find the general issues have been alluded to, and the author thinks that by a

*Sewage Disposal. By HENRY ROBINSON, M. Inst. C.E., F.G.S. London: E. and F. N. Spon.

skilful combination of the best chemical system, with filtration of the effluent through land, many towns can deal with their sewage at a moderate cost, that is, where land cannot be obtained of sufficient area. Several processes are mentioned; the lime process has a chapter devoted to it, but the author does not say much for the economy of the process, and cites the official report that the "sanitary results of lime treatment at Birmingham and Burnley are not equal to the results obtained at Aylesbury and Coventry." Though cheaper, as a precipitant, than sulphate of alumina, the sludge is more bulky than valuable, and does not produce such a fertilising compost as that obtained at Coventry, where the borough surveyor speaks highly of the manure, and where the chemicals used are sulphate of alumina, copperas, and lime. Scott's lime process, the Coventry process, the A. B. C. process are all clearly described, and the official analyses given of them, by which every reader can make himself acquainted with the principal systems of chemical treatment. On the composition of the sludge, the economic results must be tested, and here the author speaks with confidence of the sulphate of alumina precipitant, which precipitates and leaves a "trifling addition" to the solids of the sewage. The comparison of results between the different systems will have interest for sanitarians; the chapter is full of valuable tables of analyses by which ready comparison may be made. Mr. Robinson's little book is not the work of an advocate for a special process, though he expresses his opinion here and there pretty plainly; it has the merit of giving clear results, and the cream of the sanitary controversy.

MR. NEWTON ON GREEK ART.

MR. C. T. Newton, C.B., Keeper of the Classical Antiquities in the British Museum, delivered his second lecture on Greek art, on Wednesday week, in the botanical theatre of University College. Archaic Greek art was the subject of the lecture, by archaic being meant, as Mr. Newton explained, that portion of antique art which would have been accounted ancient by ancient writers themselves after the commencement of regular written history. The archaic period of art might be conceived as terminating just after the end of the Persian war, about B.C. 470. Its beginning could not be defined, because it was necessary to refer the earliest Greek remains we know to the legendary times before Homer. It would be convenient to arrange all extant remains of archaic art in three great groups—later archaic, Græco-Phœnician, and earlier archaic, which might be called pre-Dædalian or pre-Homeric. It was best to begin with the monuments of the later archaic period. The statues from the Sacred Way at Branchidæ and the fragments of sculpture from the earlier Temple of Artemis at Ephesus were the most instructive examples of this later archaic style, because their date could be approximately fixed to the range between B.C. 580 and B.C. 540. The metopes of the earliest temple at Selinus, in Sicily, and a small sculpture in relief from Samothrace, were all probably of the same period, to which might also be referred a bronze hare inscribed with a dedication to Apollo, and found at Samos; a small bronze figure, found at Argos dedicated, as the inscription on the base shows, by Polycrates. The characteristic of the sculpture of this period was a want of power to indicate organic life and capacity for movement. The seated figures from Branchidæe seemed welded to their chairs, the eyelids of such heads as were preserved to us seemed incapable of movement upwards or downwards, and the arms clung to the sides of the body. In a seated figure of Athene in the Acropolis at Athene, and in the reliefs of the Harpy tomb from Xanthus in Lycia we saw a decided advance in the style towards more varied and skilful composition of the drapery and better modelling of the nude. The progress in rendering anatomical truth might be traced by comparing the two statues of Apollo in the Archaic Room at the British Museum. The advance in sculpture might be further traced in the latter metopes of temples at Selinus, and in the στήλη found in Attica, on which was represented a warrior in armour, with many details picked out in colour. The art of casting in bronze, which was greatly developed by Theodorus of Samos about B.C. 580, was applied to the making of colossal statues such as the Apollo by Canachus, dedicated in the temple at Branchidæ, which was represented on coins of Miletus, and of which a small copy in bronze, made in Roman times, was in the British Museum. This art was further applied in the archaic period to the making of whole groups of men and horses, dedicated at Olympia early in the fifth century by the winners of the chariot-race and horse-race; and, as the sculptor learnt to represent figures in violent action, his knowledge was applied in the composition of the marble pedimental sculptures and metopes of temples. We could thus trace the progress of the later archaic style up to the time, probably about 470 B.C., when the Æginetan sculptures now at Munich were executed. These ornamented the two pediments of the temple of Zeus Pan-Hellenios. Going back from the later archaic period to that previous age which he had called provisionally the Græco-Phœnician, and which, perhaps, included the age of Homer, we found very ancient works of art in metal, pottery, ivory, porcelain, and other materials, in all of which a foreign influence could be distinctly traced, sometimes reminding us of Egyptian, and oftener of Assyrian; art. This foreign influence was explicable on the hypothesis that the Phœnicians, in the course of their traffic with the Greeks, between B.C. 900 and B.C. 700, introduced many articles of foreign art, some from Assyria or Egypt and others fabricated by themselves in imitation of the art of those countries. That mixture of foreign and native art which was traceable in extant remains was exactly what the descriptions of works of art in Homer would lead us to expect. The plates with battle-scenes and various other subjects embossed in relief, which were found at Palestrina, Cervetri, Rhodes, Cyprus, and Nimrud, and some of which were inscribed with Phœnician letters, showed such metallic works as Homer might have seen, and which, perhaps, inspired him with his conception of the shield of Achilles. There must have been at that time many specimens of metal beaten up in relief, *sphyrelata*, of which there was an interesting example from Perugia in the British Museum. In the time of Homer there was probably little statuary in the round, except small idols in wood or stone, which, like the Trojan Palladium, could be easily carried off. These idols in the pre-Dædalian period would be of extreme rudeness, like the figures in terra-cotta found by Dr. Schliemann at Mycenæ, or the little marble figures from the Greek islands, drawings and photographs of which were exhibited by the lecturer. Great quantities of these very rude terra-cotta figures were found in the excavations at Mycenæ, intermixed with ornaments and figures beaten out in metal in the rudest manner. These antiquities, and certain very primitive gems found in Greece and the Archipelago, might be referred to a remote antiquity, perhaps 1,100 or 1,200 B.C. The lions at the gateway at Mycenæ and the architectural ornaments of the entrance to the so-called Treasury of Atreus might be of even higher antiquity. They might have been the work of foreign artists, and came, perhaps, from Asia Minor and, if we believed Greek legend, from Lycia. It was necessary to wait for the result of further discoveries before coming to a final conclusion as to the remains of this pre-Homeric age.

THE ROOF-CONSTRUCTION OF THE MIDDLE AGES.*

THE Architecture of the Middle Ages has been well described as having one distinguishing characteristic, namely, that of an arch surmounted by a gable. In the more or less complicated arrangements found in groined vaulting, we have the "arch," and in the outer roof, or as Mr. Ruskin calls it the "roof mask," we have the "gable." Between the two theories as to the relative importance of these divisions, the arch and the gable, I do not pretend to decide. One theory is that "the arch" is the real roof, and that the gable is a mere outer shell or mask, to afford protection to it from the weather. The other theory is that the gable is the roof proper, and that "the arch" is a more or less elaborate ceiling, rather than a roof. One thing is certain: that the roof in the abstract, at all events in the architecture of Northern countries, is the most important part of the building, if one may not even say, the building itself, the walls being as much roof supports as screens or weather protectors themselves. Taking the first division of our subject, we find almost every conceivable variety of arrangenent from the plain barrel vault to those elaborate wonders that afford fresh delight whenever we enter and look around a great church or cathedral. The plain cylindrical or barrel vault has been understood and built from very early times. Layard found examples during his excavations at Nineveh, and others are still in existence, to show that the ancient Egyptians were acquainted with the principles of the arch. In the works of the Romans it is that we first see the groined vault rapidly advancing to full development, and a foreshadowing of the flying buttresses, that became ultimately such a feature in the roof-construction of the middle ages. The first departure from the plain cylindrical vault is found in the introduction of cross vaults, either of the same or different spans. In this, the usual way is to first draw the principal vault as a semicircle, and then the elevation of the smaller or cross vault is found by drawing a semi-ellipse, with the span equal to the width of the cross vault, and the rise to the crown equal to the radius or height of the main vault, and the curves are then found by means of ordinates. Another way was to stilt the small vault until the crown was on a level with that of the main vault, but this gave a waved line of intersection, instead of a straight one, as in the former case. The centering was apparently obtained by making that for the main vault perfect in itself, and then planting or building on as much as was required for the cross vaults, so that these centres really were without provision for diagonal ribs of any sort. The earlier vaulted roofs in this country, chiefly found in Norman work, were built on this principle, but this massive plain rubble vaulting soon gave way before the introduction of what is now commonly known as "rib-and-panel work," and for the solid vault of uniform thickness was substituted the skeleton of stone ribs, filled in with slabs or thin stone panelling. In the ordinary way, the diagonal rib was now first drawn, and was made semicircular, the diameter being, of course, the length of the rectangular space intended to be covered by the vault, and then the transverse or square rib became a pointed arch, the span of which was the span of the main vault, and the rise of which equalled the radius of the diagonal rib. On the other hand, if the square rib were made segmental, the diagonal rib was elliptical, with a rise equal to the radius on the square rib. The difficulty in this case was that the line of intersection of the vaults did not exactly agree with the curve of the diagonal rib, and this was met by packing up the back of the ribs until a bearing was secured for the vaulting. This difficulty was met by the early builders on the Continent by giving up the principle of the level crown and cylindrical main vault, and curving the surfaces of the groins. The result obtained was what is known as the domical vault, the point of intersection of the diagonal ribs being at a higher level than that of the square ribs, in proportion as the space to be covered is long as compared with its width. The English builders, on the contrary, stuck to the principle of the level crown, a notable example of which you will see in Exeter Cathedral. The difference between these systems is, that in one case the ribs are curved to follow the surface of the vaulting-surface, the line of every joint of which is level in the direction of the main vault of the vaulting-surface, and in the other the ribs are first designed as required, and then the surfaces or panels are curved to fit the lines of the ribs, each rib and each panel being designed without reference to the others. The earliest plan of vaulting adopted in the Middle Ages was that of plain ribs and panels, sometimes with transverse and diagonal ribs only, and afterwards with intermediate and ridge ribs as well. This was either quadripartite vaulting, in which each bay was spanned by a complete pair of diagonal ribs; or tripartite vaulting, when one pair of diagonal ribs spanned two bays, the intermediate columns carrying simply a transverse rib. This can be seen to perfection at Amiens, Canterbury, and some other cathedrals of the same date. Then came the gradual introduction of intermediate ribs, and the effect of this plain ribbed vaulting is nowhere seen in greater perfection than in the roof which extends unbroken from the west end to the east of Exeter

* A paper read by C. H. REW, architect, before the Civil and Mechanical Engineers' Society, April 22, 1880.

Cathedral. Here not one, but three intermediate ribs are introduced, and at the intersection of every rib with the longitudinal or transverse ridge ribs is an elaborately-carved keystone or boss. Next came the introduction of short ribs or liernes, which merely served the purpose of ornament in forming kaleidoscopic patterns at the crown of each bay. In some cases these ribs were structural, but usually they depended on the actual ribs for support, and were of no use in carrying the panelling. The Mediæval builders having now succeeded in covering the panel surfaces with elaborate patterns in the way just mentioned, and shown in doing so the most accurate knowledge of what they did in the way of planning and projecting their work, now reverted gradually to the solid vault again, and carved all the ribs, or rather formed the ribs by sinking panels. The final stage of vaulting was brought about by the introduction of Fan vaulting. In this all the ribs are struck with the same radius or curve; there is consequently no diagonal rib, as a star-like space is left at the crown of the vault, and this was filled in with an arrangement of ribs and panels almost at a dead level. And instead of the rectangular form of section obtained in the early vaulting, the horizontal section now given is everywhere semicircular. The change from rib and panel vaulting to fan vaulting was not effected at once—but in some cases the upper portions only were executed in solid groining, while the springing and lower parts were still made of ribs and panels. The best examples of fan vaulting exhibit a most marvellous care and knowledge of geometry in the setting out of the different stones. There is one given by Professor Willis in his book on "Vaulting," from Peterborough Cathedral, where the stones are dovetailed, and fitted to each other in a manner that could hardly be improved on. We need not go far to see one of the most perfect specimens of fan vaulting, for in the roof of Henry VII.'s chapel we have the climax of the art. This is constructed throughout of solid stone, and has in addition to the main system of fan vaults rising directly from the walls, a second series springing from pendant corbels—these really hang to arches partly shown and partly concealed—and however beautiful as specimens of stone-cutting they may be—they certainly are not perfect as examples of sound constructive masonry. Within a very short time the Classic revival had set in, and the principles of groined vaulting were neglected and gradually forgotten. In the 13th and 16th centuries the great architects of Italy produced the magnificent domes of Florence and St. Peter's, at Rome. In ordinary rib and panel-vaulting, the ribs are worked to the desired curve, and form really short portions of a cylindrical arch. They resemble the ordinary window sash-bar, the angles of the soffits being more or less moulded, and the upper side or back rebated to take the edge of the panel. They are either *transverse ribs*, which span the vault at right-angles; *longitudinal* or *wall ribs*, which are half-ribs, to carry the edge of the panel which came against the wall; diagonal ribs which carried the vault at the intersections of the different vaulting surfaces; *intermediate ribs*, which, as I before pointed out, were sometimes formed of a curve to follow the vaulting-surface, and at others, were real ribs carrying separate panels; *ridge ribs*, which usually go with intermediate ribs, for in the earlier examples we find only transverse and diagonal ribs, the panel-surfaces simply intersecting on the centre line of the vault. Where intermediate ribs are introduced, the ridge-ribs further serve the purpose of struts to keep them in position until that is finally done by the completion of the panel. On the other hand, there is the difficulty to overcome that the ridge-ribs themselves have a tendency to drop if they are made to a true level. And this was obviated by making each length of ridge-rib an arch in itself, with the bosses at the intermediate ribs for skewbacks. There is a very good instance of this in the aisles of Christchurch Priory, in Hampshire. These are the necessary ribs, the liernes in the later style being, as I said before, merely ornamental adjuncts, and, except in few cases, not forming a weight bearing part of the structure. Their introduction also involves the use of a regular system of boarded centering, instead of the narrow centres or turning pieces of sufficient width to carry the ribs, which are alone required in rib and panel vaulting Supposing we require to design a simple vault, we should begin by settling the form of the transverse ribs—which we make, say, an equilateral arch *a b c*—then, by making the diagonal rib a semicircle or less, depending on the relative length and width of the vault, we get the main lines of the structure complete; but it will at once be seen that by this plan the crown of the vault at the intersection of the diagonal ribs is higher than at the intersection of the transverse ribs. Now, if we wish to keep the ridge at a level or nearly so we must, instead of a semicircular arch for the diagonal ribs, use a three-centered one, striking the lower part with the same radius adopted for the transverse rib, and fitting in a segmental arch of such a radius as will give us the height of crown required. Or we may begin by making the diagonal ribs semicircular, and then striking the transverse ribs with such a radius as will give a rise equal to the radius of the diagonal rib. The form of the wall-rib can be determined by making the arch in the same proportion as the transverse rib, or by using the same radius and stilting the arch until the crown is at the desired height. The form of the intermediate ribs is easily found, as well as the height of the ridge-rib, and the radius of the transverse and diagonal ribs. The separate stones forming the ribs are first worked on the two sides which are, of course, parallel planes, then the curve of the soffit is marked, and the centre line of the rib marked on each end; the template showing the mouldings is then also marked on them, and also the rebate for the panelling; and the stone is then worked in the usual way, ready for fixing. The lower part of the vaulting that is immediately over the vaulting shaft, up to the point where the ribs are complete and separate, is worked in regular courses of stone, called springers, on which the mitering of the rib mouldings is worked, and the top surface of which forms a series of small skewbacks for the real ribs to spring from. The keystones which occur at the intersections of the ribs are worked with true faces or joints, to butt against the top end of each rib. The soffit mouldings of the ribs are then worked on, and lose themselves in the boss of ornamental foliage, or other sculpture. When the panel is filled in with thin slabs, or small courses of masonry, the direction of the joints is determined by making them intersect the ribs forming the panel at points level with each other. I will conclude this part of the paper by giving the heights and widths of some of the finest roofs: — Westminster Abbey, nave and choir, is 103ft. high, and is the highest of English churches. The vaulting of Amiens is 130ft. high and 33ft. wide, and the choir and transepts of Beauvais 153ft. high and 35ft. wide. The timber roofs of the middle ages are to be arranged in two classes, those which are above vaulted groins and are framed for the work they have to do, without regard to appearance; and the open timber roof, where there is no vaulting, but the roof timbers are wrought, arranged, and decorated with the full intention of deriving from them the internal architectural effect. The simplest form of roof for small spans is either A-shaped or with two diagonal ties set half-way across the height; these were adopted for small churches, and were composed wholly of rafters similarly framed. Sometimes in rather larger roofs principal rafters with collar beams were introduced at intervals; they were still rafters only, and not roof principals—for they were of the same internal elevation as the ordinary rafters and did not carry purlins. Two wall-plates were laid along the wall on the outer and inner sides, and to these short blocks or sills were dovetailed or halfened on. To these sills the rafters and struts were mortised and secured by oak pins. Sometimes the rafters and struts were mortised directly to the wall-plates. There is a timber roof over the hall of the Bishop's Palace, at Auxerre, which is an excellent example of roof-construction. It is about an equilateral triangle in elevation. It has a main tie-beam and two collar-beams, a king-post, and a system of curved braces, and while it looks light and elegant is framed so as to get the greatest strength in the materials used. To prevent the tendency of the tie-beam to deflect, it was sometimes framed with a decided camber; this also prevented the tie-beam from having the appearance of deflection. Then came the gradual departure from the tie-beam plan of roof-framing, and the builders of the Middle Ages have left us many examples of how large timber roofs may be framed and kept from spreading by properly-arranged systems of collar-bracing. A very simple specimen consists of one collar-beam, short struts, and long collar-braces or knees securing each of the angles. The backs of these braces were formed into a series of tenons, which fit into corresponding mortices sunk in the soffit of the principal rafter and collar-beam. The purlins are often moulded, and supported by collar-braces or struts, moulded and cusped on the soffit. This system of bracing also gives great lateral stiffness to a roof of any great length. One peculiarity of the framing of rafters is the absence of the ridge-piece, for instead of the framed ridge now in common use, in old roofs the rafters are simply halved to each other and secured by an oak pin. The last great feature in open timber roof construction is the hammer-beam, and of this we have not far to go for a splendid example, for as the culminating point of elaborate stone groining is to be found in Henry VII.'s Chapel, so in the roof of Westminster Hall we have about all that can be done in the way of the highly-decorated timber construction. M. Viollet-le-Duc, in speaking of it as a specimen of carpentry, says as far as one can judge without taking down the timber-work, the framing and tenons are cut with a rare precision. It is to the grace and purity of execution, and again the quality of the wood employed, and also the goodness of the system, that the carpentry of Westminster Hall is preserved to this our day. The hammer-beam is really a cantilever, or bracket, on which the roof principal rests. The span of Westminster-hall is little under 70ft., and the height from the stone corbel to the ridge coincides almost exactly with the span. The principals are about 18ft. apart. The hall of Hampton Court is covered with a roof of somewhat similar construction; it is 40ft. span, and rises nearly 34ft. from the corbel. This room is seven bays in length, and the principals are connected by three tiers of arches, or, constructionally speaking, "trussed purlins." Another good example of similar construction, but of a somewhat smaller span, is the roof of Knapton Church, Norfolk. This roof remains perfect to this day, without sign of settlement. It is just 32ft. span. In regard to general principles of construction, it will be seen that the principal trusses of timber-roofs correspond to the main ribs of stone groining, both conveying the pressure to points where the thrust or pressure could be met by abutments of sufficient strength; but there can be no doubt that in many cases the Gothic carpenters relied too much on the sizes of the timbers, and strength of the timber used, rather than on strictly scientific construction, with the result that the beams have, more or less, sagged.

WIND PRESSURE.

IN the recent work on the "Principles of Graphic Statics," noticed lately in our pages, a few remarks on "Wind Pressure" will be found. To those engaged in the contruction of roofs where forces of this kind have to be considered the observations may be of practical use. The writer says, "the maximum pressure of the wind in England has been variously taken at 40 and 50lb. per square foot of surface perpendicular to its direction. The usual direction of the wind is probably nearly horizontal, though it is possible that in occasional gusts this direction may make a considerable angle with the horizontal, becoming, in fact, normal to roof-surfaces of high pitch." It is very easy to draw a stress diagram to determine the pressure for normal wind pressure, and the author gives illustrations of a method. If the wind pressure is horizontal in direction, a single diagram is sufficient, or the pressure may be resolved into a horizontal and vertical component, with stress diagram for each. According to the angle of roof, of course, the wind exercises varying degrees of pressure. Hutton's formula, deduced from experiment, gives the normal pressure on any plane surface in terms of the pressure on a surface perpendicular to its direction. If i equals the angle of inclination of that direction to the plane, then the

$$\text{Normal pressure} = P \sin. i,$$

and the angle of inclination, in fact, becomes, when the wind acts horizontally, the pitch of

the roof itself. A table is easily calculated from this formula, giving the values of the pressure for different angles. Hence, by knowing the pitch of roof, the total normal pressure is soon found. If the trusses are 10ft. apart, and each supports half the adjacent bay, the total wind pressure supported by the rafter is its length × 10ft. × by the tabular number. If the rafter is 20ft. and the pitch 30° long, the pressure is 20 × 10 × 26·4lb. If there are two intermediate purlins, the pressure at each end of rafter equals one-sixth of wind pressure, and the pressure at the purlins one-third at each point. When the pressure of wind is thus supposed normal to the roof surface, the stresses due to it can be read off from the diagram drawn for the normal pressure of a horizontal wind by simply varying the scale.

BOOKS RECEIVED.

A Handbook to the Public Picture Galleries of Europe, by Kate Thompson (London: Macmillan and Co.), is the third edition of a most useful book, much improved by the introduction of about 200 small outlines of some of the most typical works. ——*Hints to Young Architects*, by Geo. Wightwick, edited and enlarged by G. H. Guillaume (London: Crosby Lockwood and Co.), is another edition of a manual which is known to all youthful members of the profession, and should be placed by his parents or guardians in the hands of every young man intended for an architect. ——*Politics and Art*, by T. Hall Caine, is a reprint of a recent lecture. Mr. Hall Caine always writes well, but his present theme strikes us as a barren one—at any rate, so far as the interests of art are concerned.——*The Gas and Water Companies' Directory* and the *Gas Works Statistics*, both for 1880, edited and published by Charles W. Hastings, are exceedingly useful books of reference — indispensable, in fact, to all gas and water engineers and many others.——*Practical Boat-Building for Amateurs*, by Adrian Neison, C.E. (London: *The Bazaar* office), is a new and revised edition of what is, in all probability, a reliable text-book.——*B. T. Batsford's Catalogue of New and Second-Hand Books* (London: B. T. Batsford) is really a list of bargains, and should be obtained by any one wanting books on any scientific or mechanical subject.——*The Water-Supply of the Metropolis, and the Proposed Transfer of the London Water Companies to a Public Authority*, by Joseph Quick, jun., M.I.C.E. (London: E. and F. N. Spon), will be read with interest just now, and deservedly, for it is full of information on a most important subject.——*Handbook of House Property*, by Edward Lance Tarbuck (London: Crosby Lockwood and Co.) has reached a second edition, and is a very useful guide, being practical, comprehensive, and accurate.——*Real Property Handbook*, by Geo. H. Larmuth (Manchester: John Heywood), can also be recommended, and has, like the last, attained a second edition.

ARCHÆOLOGICAL.

The Ancient Cities of Troy and Pergamos.—A lecture was delivered on Thursday evening, by Dr. Phené, at a meeting of the Society for the Encouragement of the Fine Arts, in their rooms at Conduit-street, on "Travels in Asia Minor." Without going into the question of Hissarlik being the site of that city, Dr. Phené said it must, in any case, have been one of the towns belonging to the Dardani. The remains near Buonarbashi agreed more with the rain-proof porches to walk in and with the separate chambers for Priam's sons and sons-in-law, referred to in Book VI. of the "Iliad." The foundations at Buonarbashi, when compared with the oldest remains in Italy, were found to be of the type called Pelasgic. They were carefully, it might almost be said royally, constructed, while those at Hissarlik are carelessly put together. The impression of the lecturer was that the ruins of Hissarlik represented the Acropolis of ancient Troy. After alluding to an ascent of Samothrak—the lecturer saying he believed he was the first person who, in modern times, had seen the plains from this summit—the ruins of Pergamos were discussed. This town had been built on a levelled peak in the manner already mentioned. That there had been such levelling was made certain by the summit having been allowed to stand and form a cone. In the operation, material was provided for the construction of buildings. It had been founded in remote ages, further back than the time of Lysimachus; but in more artistic days the rude materials would only be used in the defence walls, while the newer buildings would be built in a more costly manner. The walls were still so perfect that their embattled appearance made it difficult to believe that at the foot of the mountain there lived a people at peace with it. The place was strewn with blocks of fine marble, broken columns, pieces of friezes, entablatures, and so forth. Reference was made to the remains brought thence to Berlin; but many art treasures, it was said, were still concealed. The sculptures at Avignon in France, it was pointed out, much resembled those in the museum at Berlin from Pergamos. After saying that there must have been a great school of painting there, the lecturer proceeded to describe observations he made in the neighbourhood of Smyrna.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

British Archæological Association.—At the meeting of this society, held on Wednesday evening, Mr. H. Syer Cuming, F.S.A, (Scot.), vice-president, in the chair, the secretary announced that the annual summer congress this year would be held at Devizes, within reach of Stonehenge, Amesbury, Salisbury, Avebury, and other places interesting to archæologists and antiquaries. A paper was read, by Mr. Bradley, on the measurements of Ptolemy, applied to the southern coast of Great Britain, in reply to one read before the association by Mr. Gordon M. Hills. A paper was read by the Rev. S. M. Mayhew on the foundations of a Roman villa, near Brading, in the Isle of Wight, lately discovered by Captain Thorpe. A sketch of one of the tesselated pavements was exhibited. From the remains which have lately been laid bare, it is evident that this villa is of much larger size than most of those which have hitherto been discovered. It was stated that Captain Thorpe had also found the position of two other Roman villas. A paper by Dr. Stevens, on "Pre-historic Flint Implements Found in the Reading Drift Beds," was next read; and Mr. Loftus Brock, F.S.A., exhibited several Roman relics which had been discovered in London-wall, including a bone holder of Saxon date, for steadying parchment while in the hands of the transcriber. Among the other articles exhibited were some specimens of jadeite, and also a 14th century ring. A paper was read by Mr. Loftus Brock, in the absence of the author, Mr. C. W. Dymond, F.S.A., upon the subject of some curious British masonry works in the neighbourhood of Weston-super-Mare, Somerset, on the banks of the Severn estuary. It was announced that the splendid Roman pavements, at Woodchester, Gloucestershire, would be opened by the Rev. F. Smith, if the state of the funds permitted, and an announcement was also made of the discovery of a Roman villa at Castor, in Northamptonshire.

COMPETITIONS.

Hereford Baptist Chapel Competition.—The committee received 36 designs in response to their advertisement, and selected for further consideration the designs submitted by Mr. John Johnson, 9, Queen Victoria-street, London; Mr. George Cowley Haddon, 36, Bridge-street, Hereford and Great Malvern; and Messrs. Bromilow and Cheers, Liverpool. The committee desired Mr. Johnson and Mr. Haddon to act as joint architects, which having been agreed to, the work will be carried out as early as possible.

At the old parish-church of St. Nicholas, Great Yarmouth, four items of restoration were unveiled on Whit-Sunday. These were the Churchwardens' memorial window (Joshua, Samuel, and David), the Sunday-school window (Moses, Aaron, and Miriam), the completion of the structural part of the pulpit, including book-board, gas-fittings, doors, canopies, staircase and panels, and four figures, and the new reredos.

The town council of Ruthin have reduced the salary of the borough surveyor, Mr. Goodman Jones, from £100 to £80 a year, in consequence of the letting off the road repairs by contract.

Building Intelligence.

Metropolitan Board of Works.—At the weekly meeting of this board held on Friday, a deputation, headed by the Duke of Westminster, attended to present a memorial on behalf of the Kyrle Society, asking that the board should acquire and open to the public the gardens of Lincoln's-inn-fields. The matter was referred to the works committee. It was announced that the Prince and Princess of Wales had consented to open the bridges at Hammersmith, Putney, and Wandsworth, as soon as the arrangements are completed, for freeing them from toll. The election took place to the office of district surveyor for St. Mary Magdalene, Bermondsey, and St. John, St. Olave, and St. Thomas, Southwark, rendered vacant by the death of Mr. Hesketh; and Mr. T. Williams was appointed. The other candidates were Messrs. H. H. Bridgman, C. W. Brooks, W. J. Buxton, E. Carritt, A. Conder, D. R. Dale, J. S. Edmeston, G. Elkington, jun., J. M. Ferguson, W. Grellier, F. Hammond, R. L. Hesketh, E. R. Hewitt, P. Hunter, J. W. James, L. Karslake, W. A. Large, W. H. Lees, G. McDonell, T. E. Mundy, W. Hilton Nash, F. C. Notley, R. E. Pownall, J. S. Quilter, W. Smallpiece, A. R. Stenning, F. Stone, T. Stone, E. Street, A. T. Taylor, F. Todd, and W. Waine. It was reported by a committee that the Chelsea Suspension-bridge required strengthening, and they recommended that certain firms be invited to tender for the work in accordance with the plans prepared by Sir J. Bazalgette. An amendment was proposed that open tendering be advertised, but after a discussion the report was adopted. It was agreed to pay the entire cost of the award made by the arbitrators, as to the alleged formation of sewage banks in the Thames, the Thames Conservators having declined to take it up. It was decided to erect a new fire-brigade station at Lower Norwood, and a committee was instructed to obtain a site for the same.

Plymouth.—The College for Engineer Students, at Keyham-yard, overlooking the Hamoaze, is now completed. The style of the building is Renaissance, and the main structure is three stories in height and 200ft. frontage. In the centre is an entrance tower, brought slightly forward, and carried to an additional story in height, and finished with high Mansard roof, with iron cresting. The same style of roofing is carried throughout the building. The walls are faced with limestone from the Pomphlett quarries, and are backed with brickwork; the dressings are of Portland stone. Teak is used for the staircases, and the flagging in the lower passages is of York paving. The plan is ⊥-shaped, the frontage being arranged as residential quarters, study, and recreation-hall, while the rear block in centre consists of mess and lecture-hall and kitchen-servants' quarters. The study and recreation-hall at the extremities of the buildings are each 57½ft. by 26ft., and 13ft. 9in. high, are lighted by bay windows, and warmed by Manchester grates. The lecture-hall is lighted by five mullioned and transomed windows on each side, dormers in the lofty circular roof, and a three-centred segmental window at the rear; the roof is carried by moulded timber ribs, carried on carved corbels. The hall is heated by hot-water pipes, and fitted with Howarth's Archimedean ventilator, inclosed in a spired flèche. The dormitories are partitioned off into cubiculæ, each 10ft. by 5ft. 6in., and 66 to each floor of a block. The height of the first floor is 11ft. 9in., and of the second, 13ft. 9in. The officers' quarters are arranged in the entrance-tower, the upper portion being utilised as the infirmary. The kitchen has been fitted up by Messrs. Benham and Sons, of Wigmore-street, London, and the baths and lavatories have been laid with Claridge's asphalte. For the lift, Waygood's automatic check is introduced, and the sash-fastener of Mr. Brenton, of Plymouth, is fixed to each window. The plans for the college were prepared in the Admiralty Office, Spring-gardens, under the direction of Col. Pasley, C.B., R.E., and have been carried out by Mr. John Pethick, of Plymouth, under the superintendence of Mr. Tinkler, the Admiralty clerk of works. The naval estimates show the cost of the buildings, which will be occupied at Midsummer, to have been £30,000.

SHOBROOKE. — The parish-church of St. Swithin at Shobrooke, some two or three miles from Crediton, Devon, was reopened on the 5th inst., after restoration, by the Lord Bishop of the diocese. The building consists of nave, north and south aisles, chancel, a south-west porch, and a goodly west tower. The style of architecture is Perpendicular, save the doorway in the porch just alluded to, which is of an interesting Norman character. Prior to the present restoration, the church was not only in a ruinous, but in an absolutely dangerous, condition. The present south aisle is an addition; it is 52ft. by 12ft. and will give an increased accommodation in the building from 280 to 302. The whole structure has been re-roofed; the nave and north aisles with cradle-roofs of the ordinary West-Country type, and the chancel roof—a continuation of that of the nave—with additional ribs and carved crestings, there being a separating rib, giving the line of demarcation between nave and chancel, resting upon angel corbels. The south-aisle roof is of tie-beam construction. All the intersections of ribs and purlins are covered by carved bosses, the wood-carving throughout being by the late Mr. William Sendell, of Exeter. The chancel arch, with its richly-panelled soffit in Beer stone, has been opened out and made good, and the western windows have been restored. It is proposed to rebuild the upper part of the tower, but at present funds do not permit this. The pillars in the northern arcade (4 bays) have been inserted, and there is one new arch; the south arcade is altogether new. Portions of the walls of the chancel have been rebuilt, and the east window has been raised and kept well up, to give room for the lofty reredos beneath. The reredos in question is of Bath stone, and, in the main, consists of three recessed and canopied compartments. The upper parts are richly carved, and the whole terminates with an ornate pierced cresting. This reredos has been made by Mr. Harry Hems, of Exeter. Messrs. Brawn and Co., of Birmingham, supplied the altar standards, &c. The works have been carried out at a cost of between £2,500 and £2,600, from the design of, and under the immediate superintendence of, Mr. Edward Ashworth, architect, of Exeter.

SILVERTON, DEVON.—The parish-church of St. Mary, restored generally under Mr. Edward Ashworth, of Exeter, in 1863, has had further additions made to it, and reopening services took place thereat upon the 1st inst. The work has been done under Mr. Ashworth's supervision, and embraces a newly-painted east window, of three lights, by Messrs. Hughes and Ward, of London, representing the Annunciation, Crucifixion, and the Women at the Sepulchre above, with the Last Supper in its lower portions; a new organ-chamber, an organ, and western screen. The chamber harmonises in character with the rest of the church; it is on the north side of chancel, and has a flat roof and an embattled parapet. The dressings are of Bath stone; the roof is panelled, the intersections of the timbers being stopped by bosses. There is a western screen, of oak, into which is incorporated an old existing parclose screen. The organ is by Messrs. Walker and Sons, of London. It faces south, towards the chancel. The screen bears the following legend:—"In memory of Jane, Countess of Egremont, who died on the 18th of December, 1876." The contractors were Messrs. Dennis and Short; Mr. R. Mitchell, of Exeter, did the masonry, and Mr. Harry Hems the stone-carving. The total cost of the present works is about £800.

STEEPLE BUMPSTEAD.—The parish-church of St. Mary, Steeple Bumpstead, near Halstead, Essex, a building of the time of Henry III., was last week reopened after restoration. The rough cast coat has been removed from external walls, revealing the flint and pebble work. An organ-chamber has been added on north side and the vestry rebuilt. The chancel has been re-roofed at a higher level, the clunch masonry restored, the incongruous modern east window replaced by one more in character with the building, and filled with stained glass, representing the Crucifixion in the centre, with the Resurrection and Ascension in the side-lights. There is no reredos, but the sanctuary wall is covered with dossal hangings, and the new altar consists of a skeleton oak table. A new pulpit and eagle lectern in oak are provided; the nave is seated with pitch-pine benches, and lighted by oil lamps, and the tracery in the nave windows has been renewed. The works in the chancel, which cost £500, have been carried out from the designs of Mr. Ewan Christian, of Whitehall-place, S.W., and those in the nave from those of Mr. F. Whitmore, of Chelmsford, at an outlay of £1,100. Mr. Runnacles, of Halstead, was the contractor.

WINDERMERE.—A new Congregational church has just been completed from the designs of Mr. Robert Walker, of Kendal. The church is designed in the Early English style, and is built of the local stone with freestone dressings from Hexham. The floor of the aisles is laid with a special form of parquetry, recently introduced and improved by the architect. The church measures internally 61ft. by 33ft., without choir, and is ceiled at a height of 30ft. from the floor: it is heated with fresh warm air, special attention having been paid to the ventilation. The roofs are covered with local slate, and are boarded throughout and lined with thick felting to maintain an equable temperature.

YORK.—Premises at the corner of Parliament-street, York, which were some time ago burnt down, are undergoing extensive alterations and additions. A new shop-front, fire-proof floors, are being done by Messrs. John Curtis and Son, of Wade-lane, Leeds. The exterior windows and entrance-door will be executed in ornamental terra-cotta by Messrs. Wilcock, of Leeds. The other parts of the work are done by local builders. The architects for the whole are Messrs. William Lewis and Son, 46½, Stonegate, York.

CHIPS.

At a vestry meeting held at Bury St. Edmunds, last week, it was decided, by a large majority, to take down the south gallery and restore the south window in the parish-church of St. Mary, one of the finest and largest Perpendicular churches in the county, and the principal of the two great churches standing side by side in the Abbey grounds at Bury.

The St. Mary Church local board, Devon, on Thursday, raised their surveyor's salary by £10 a year.

The Hastings school-board decided, last week, to build new schools at Mount Pleasant, from the designs of their architect.

The little moorland church of Stourton, near Bridestone, Devon, was reopened, after restoration, on Whit-Monday. A new roof has been placed on the nave, and the walls have been repointed; the church has been newly pewed and floored, and the five bells have been rehung. Mr. Harris, of Okehampton, was the contractor.

The court-room in the new portion of the town-hall, Ashton-under-Lyme, was opened on Monday week. It is faced, externally, with masonry. The room itself measures 40ft. by 30ft., and 16ft. high, and is panelled, ceiled, and fitted with pitch-pine.

The Shire-hall, at Woodbridge, East Suffolk, has just been restored and renovated, and was reopened on Wednesday week. Mr. Nunn was the contractor.

New schools are about to be built at Woolston, near Southampton, for the St. Mary Extra School Board, from the plans of Mr. W. H. Mitchell, of Southampton.

The Local Board of Brotton, in the Cleveland district, have instructed their surveyor, Mr. Downie, to prepare plans for the sewerage of the districts of Brotton and Skelton.

A new coffee-tavern has just been opened at Cardiff. It is of white brick with red bands, and terra-cotta dressings on the external elevation. Over the coffee-shop is a smoking-room, and above this a meeting-hall, while, at the rear, is a large hall, 48ft. by 18ft. The Adelphi coffee-tavern has been built from the designs of Mr. Harris, of Cardiff, at a cost of £1,100; the terra-work was supplied by Mr. Doel, of Ewenny, Bridgend. Mr. Robbins was the contractor.

A Primitive Methodist chapel is about to be built at New Normanton, near Derby, and memorial-stones were laid last week. It faces Dale-road, and will measure 42ft. by 30ft. Mr. E. Fryer is the architect, and Mr. Wagg is the contractor.

The parish-church of Soham, Cambridge, was reopened after restoration, on Tuesday, by the Bishop of Ely.

At the last monthly meeting of the Shepton Mallet local board, plans and estimates, prepared by Mr. Catley, the engineer to the board, for the new sewerage works, were approved, and it was resolved to apply to the Local Government Board for a loan of £10,000 in order to carry the same into execution.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

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"BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED.—Clansman, No. 9, Better Late than Never, Con Amore, Mustapha, Binny, Ernest, Palmam qui meruit ferat, Our Praises are Our Wages, W. in W., Edwin, Alfred.

ERNEST. (The drawings for the next subjects are to be submitted 28 days from to-day, Friday.)

Correspondence.

ARCHITECTURAL COLOUR AND THE TREASURES OF THE EARTH.

To the Editor of the BUILDING NEWS.

SIR,—The question of colour having been much discussed since the reading of the papers by Mr. Edis and Mr. Seddon, I shall be glad if you will allow me to invite attention to the wealth of our national resources in coloured materials for external architecture, which are absolutely durable even in our City atmosphere.

Mount Sorrel, Leicestershire, yields a deep red syenite and porphyry; North Wales a green stone and grey lava; Cornwall a dark red and a green serpentine, and, according to Borlase, a yellow granite; Scotland, rose, white, blue and grey granite; Clee Hill, Shropshire, a black basalt.

Here is a wealth of native coloured material sufficient for the utmost demands of decorative art applied to external architecture, and capable of producing the most splendid effects when applied by an accomplished architect.

As you said in your own remarks, colour should be used to emphasise construction, and in a building in which colour may be the chief attraction, carving and moulding will doubtless be almost entirely abandoned, both on account of expense, and because flat burnished surfaces exhibit the beauty of coloured materials to the greatest advantage.

Giotto's Chapel at Padua, the exterior of the

Duomo at Monreale, San Miniato, the Cathedral and other buildings at Florence, and structures at Tunis, Cairo, and Northern India may be referred to as examples of this mode of treatment. The freedom from carving in these buildings seems to me to recommend them as good models for city architecture; our present style and material appearing to be adapted in the best possible manner for absorbing soot and catching dirt.—I am, &c.,

HENRY JARVIS.

South Penge Park, S.E.

THE HAYMARKET STORES.

SIR,—May I ask you to correct an error in the otherwise accurate report in your issue of last week, of the proceedings at the Marlborough-street Police-court, against the builders who are erecting the Stores in the Haymarket?

Mr. Newton, the magistrate, intimated that he should dismiss the summons against the builders for not producing the drawings at my office, in accordance with the regulations prepared by the Board of Works; but upon my proving the facts, and asking for a case in a superior court, he then *strongly advised* the defendants to submit the plans to me at my office according to the Board's form, suggesting that I should withdraw the summons. This I consented to do, and Mr. Poland, who appeared for the builders, pledged himself that the plans should be produced at my office; but I regret to say that Messrs. Kirk and Randall have not yet complied with the pledge given by their counsel, and I have not yet seen the plans — why, I cannot imagine; and, like the magistrate, I am rather surprised that there should be "such a mystery" about producing plans of a building for the district surveyor's inspection.

I may state that the reason I insisted on the plans being submitted in the present case was, that when I inspected some few which I saw in the foreman's office, I was told they were not the correct plans, and the only way in which I saw a chance of getting the proper working plans produced was by insisting that the builders should formally submit them to me.

The law is perfectly clear in throwing the responsibility of producing the plans on the builder; and common sense, convenience, and all other proceedings under the Act, as well as the forms of the Board, which were drawn up by counsel, prove that such production should be at the district surveyor's official place of business.

The plea urged by counsel that, because there are no regulations specifying the thickness of iron in the Building Act, that therefore the district surveyor has no right whatever to see o examine the drawings of the internal iron construction, is an illustration of the way in which these matters are discussed before police-magistrates, and a proof that the new by-law as regards the production of plans is practically of no use whatever for the protection of the public.—I am, &c.,

ROBERT WALKER,
District Surveyor of St. Martin-in-the-Fields.

21, King William-street, West Strand, W.C., 19th May, 1880.

WEAR BAY ESTATE COMPETITION.

SIR,—Some time last January architects were asked, through an advertisement in the BUILDING NEWS, to send in designs for villas to be erected on the above estate. The trustees, or whoever has the management of the estate, keep the drawings for nearly four months (for what purpose I cannot say) without anybody hearing anything of the matter until the other day, when I received my drawings back without any intimation as to who has been the successful one, or even any thanks for one's trouble.

I think it very right that this should be mentioned, as some explanation is due to the competing architects.—I am, &c., COMPETITOR.

TRURO CATHEDRAL.

SIR,—We all admire your view of the new cathedral that is to be at Truro. There was a legend about St. Mary's Church, which has, or had, a very poor tower, that in the days of wonderful things, a gigantic cart or carts brought the stones from the eastward for erecting a tower commensurate in style with the elaborate south aisle, which it seems is to be preserved in the new edifice. By accident, or device of the Evil One, the cart or carts broke down at Probus, and so there the tower was erected and stands, that ought to have graced the chief church of Truro. Probus town looks very well on paper, but its details (Late Perpendicular) are very coarse, and will rather disappoint visitors.—I am, &c.

Exeter, May 15. EDWARD ASHWORTH.

AN UNJUST DECISION.

SIR,—Referring to a letter which appeared in your last issue signed "A Bradford Architect," and headed "An Unjust Decision," I am desired to say that the matter referred to has not been overlooked; but that, on the contrary, this association has considered the matter, and having appointed a committee to communicate with other societies on the subject, has, at a further meeting specially called, adopted the resolution of which I append a copy. Of the societies communicated with, the only one which has not acknowledged the communication is that at Manchester.—I am, &c.,

THE HON. SEC. AND TREASURER OF THE BRADFORD SOCIETY OF ARCHITECTS AND SURVEYORS.

[COPY.]

"That this Society, having heard the report of its committee upon the recent statements of Mr. Daniel, Q.C., during the hearing of the case 'Hainsworth v. Wright,' in the Bradford County-court on the 9th of April last, is of opinion that, although the statements referred to were for the most part erroneous, and made without any sufficient knowledge of the facts (so far as they referred to the question of 'quantities') and were, therefore, unwarrantable, the *ipse dixit* of a judge on a question of this kind, and under these circumstances, does not carry sufficient weight to require correction; and looking also to the fact of the insignificant character of the case itself, that it is not expedient to take any further action in the matter at present."

STAINED GLASS.

LAUNCESTON.—The south aisle of Launceston Church has received a memorial window which has four lights, containing six subjects, illustrating our Lord's Word in St. Matthew, c. 25, while one larger group of figures in the lower part represents the duty of hospitality in connection with the text—"Be not forgetful to entertain strangers," &c. Above is a figure of the Lord seated in majesty as the rewarder of his saints, with angels on each side in adoration. The window is from the studio of Messrs. Lavers, Barraud, and Westlake.

WATER SUPPLY AND SANITARY MATTERS.

EAST DEREHAM.—An inquiry was recently held at East Dereham, by Major Hector Tulloch, with reference to an application from the Local Board for a provisional order to put in force the Lands Clauses Consolidation Act with reference to lands in East Dereham and Scarning, required for the purposes of sewage disposal. The proposition is to drain the town proper within the lighting area, consisting of about 200 acres, by direct gravitation to meadows at the west of the town, the sewers to be of glazed stoneware, and of the following dimensions:—Outfall length, 440 yards, 18in. internal diameter; intercepting sewer, 346 yards 15in., 447⅛ yards 12in., 789 yards 10in., and 3,927 yards 9in. internal diameter. The entire system of sewers will be laid in straight lines, with manholes at the intersections of streets, and the gradients will be such that they will be self-cleansing. The greater proportion of the storm-water will be carried off through the existing drains, and excluded from the new works. The sewage will flow to the disposal area by gravitation, and will be applied to the soil—which is of loose clay and sand—by intermittent filtration. Mr. Nankivell is the engineer, and the inspector spoke in high terms of the character of the plans.

METROPOLITAN WATER SUPPLY.—A deputation from the City Commissioners of Sewers had an interview with Sir W. Harcourt, the Home Secretary, last week, upon the subject of the future water-supply of the Metropolis, and the course to be pursued by the Government in the shape of legislation. It was asked whether in the interval pending a definite settlement the Water Companies would be prevented from raising their assessments. The Home Secretary said he would be glad to be supplied with further information as to the wishes of those concerned in the question; and the deputation, having promised to supply that information, retired.

A new Primitive Methodist chapel is about to be built at Stanwick, near Ripley, Derbyshire, from the plans and designs of Mr. Wills, of Derby, at a cost of about £700.

Intercommunication.

QUESTIONS.

[6128.]—**Shop Blinds.**—Any intercommunicant who could impart information to render these abominations less unsightly and unmanageable would confer a boon on the public at large. Amongst the major evils is the difficulty of keeping them anywhere in a wind. Cannot some locking process of the arms be devised? The primitive method of attaching a cord and weight, or simply anchoring to the footpath "as they do in London," can scarcely be admired. Again, if a crown mould or bed mould is drawn out as a front piece to the blind, what will prevent it assuming the customary drooping or festoon appearance?—F.

[6129.]—**Valuer's Licence.**—Can any of the readers of the BUILDING NEWS inform me if it is necessary for a building surveyor to have a valuer's licence, as he has frequently to value artificers' work, for which no price has been agreed upon, and to estimate work for one or the other of the contracting parties?—B. D.

[6130.]—**Architects and Assistants.**—On the 24th January, 1880, my employers verbally engaged me for another twelve months, having been with them for the past thirteen months, and at the same time raising my salary from £2 15s. to £3 10s, promising some day to make out a written agreement to this effect. For various reasons of their own, I suppose, this agreement was never written, for which I am to blame, no doubt. Same day of this agreement, 24th Jan., 1880, they gave notice to another of our assistants to quit, telling him their arrangement with me as above, and as an excuse for parting with him; this arrangement was also well known to the office generally. Work unexpectedly falls through for the present, and they intend vitiating their contract with me as above, and ask me to look out for another appointment when only 3½ months of the twelve have passed over. Main question is, Would their having told this assistant who left us their arrangement with me at the time be sufficient with me to substantiate their contract with me without the aid of the written agreement which they proposed making out, but failed in doing so? And can they dismiss me against my wish before the twelve months are up? This is the main question, but I have a great many more in my favour. If they can (dismiss) do so legally, say Yes; if they cannot, say No.—F.

[6131.]—**French Cistercian Abbeys.**—Would some student of Cistercian architecture give me an account of the abbeys of Citeaux and Clairvaux, in France? Are any remains existing? Where could I obtain views, plans, or further information? Any assistance would be of great value to—CISTERCIAN.

REPLIES.

[6080.]—**Crushing Weight per Square Inch.**—In reply to "Student's" last remark, I now more clearly understand his original question, which is how the crushing weight per square inch is applied to a specimen. In the example of the stock brick, the 3½ tons would appear to mean the weight that would crush the specimen confined laterally, so that it could not yield in any other way. In all experiments for ascertaining the crushing weight of materials, the specimens are supposed to be so short compared with their lateral dimensions as to be crushed without flexure, though I believe in many cases the latter element has entered. Hodgkinson's experiments on the shorter specimens of cast iron were conducted so as to prevent any lateral yielding, and for this purpose a hole was made in a block of iron and the specimen was crushed between two steel bolts which just fitted the hole and made perfectly true at the end, so that the resultant of the compressing force passed through the axis of the specimen, which was kept within the aperture. The conditions of crushing are considered met when the height of the specimen is equal to the diameter or side of base as in the case of a cube. In short specimens crushing takes place by a sliding or shearing action of one part on another, the angle of fracture being in the plane of least resistance. When the specimen is less than a given height determined by this plane it yields by breaking into two oblique parts, so that no actual gain is got by increasing the height above the cube. With reference to the second illustration given by "Student," I should think the meaning was that the girders were capable of carrying so many tons per inch of upper flange, a certainly very inaccurate mode of expressing the load upon a girder, which is generally said to carry so much per foot run. "Student's" friend might have meant so many tons per inch of section of girder; but this is not a customary mode of describing the strength of beams. The illustration, however, does not bear upon the question.—G. H. G.

[6108.]—**Theodolite.**—"G. H." refers, on p. 586, to Mr. Jackson's "Aid to Survey Practice" as being published by Messrs. Spon, whereas it is published by us.—CROSBY LOCKWOOD AND CO., 7, Stationers' Hall-court, E.C.

[6123.]—**Strength of Wall.**—"T. M.'s" query is rather vague. Does he mean the capacity of the wall to carry a uniform load over the 12ft. of its length, or only at a certain point? Of course it would not do to place anything like the crushing weight upon a wall 10ft. high of the thickness specified. The ordinary strength of brick is estimated at from 20 to 30 tons per square foot. Supposing the weight to be distributed and perfectly vertical and steady, the wall might safely carry a weight of 2 or 3 tons per foot run of wall as the pressure of a floor. If piers are introduced, the wall would sustain considerably more.—G. H. G.

[6123.]—**Strength of Wall.**—In answer to "T. M.," his 9in. wall will bear any ordinary weight he can get on it, and would bear probably as much as 40 tons equally distributed without vibration. The crushing weight of common red brick masonary (ordinary work) is from 800 to 5001b. per square inch, hard bricks from 2,000 to 4,3601b. per square inch, and hard bricks (common) 4,000 to 8001b. per square inch. I tested two ordinary Staffordshire (Oldbury) brown bricks for crushing strength, and they stood 80 tons, or 1·97tons per square inch before being fractured past all use.—F. RUSSELL HARTLEY.

STATUES, MEMORIALS, &c.

EDINBURGH.—A monument has been erected in Canongate Churchyard in memory of the soldiers who have been buried there within the last two centuries. It has been executed in polished rose-coloured granite by Messrs. James Wright and Sons, Aberdeen, and is Byzantine in design. The dado of the pedestal is 3ft. square, with moulded corners, and is supported by a large plinth. From the pedestal there rises an elegant shaft, hewn from a single stone, 10ft. in height, and ornamented with incised bands of fretwork; and this again is surmounted by a cross, which carries the erection up to a total height of 26ft.

THE BYRON STATUE.—This morning the statue of Lord Byron will be visible in Hamilton-place-gardens. The pedestal of the statue is of temporary material. The Greek Government have made a grant for cutting the marble in the *rosco antico* quarries near Cape Matapan, but the directions given were understood too amply, and the immense size and weight of the blocks quarried made carriage with the resources at command almost impossible. Hence the necessity for reducing the size of the intended pedestal, which now awaits shipment to this country. Mr. C. Belt is the sculptor of the memorial. The casting has been successfully executed by Messrs. Cox and Sons, of Southampton-street, at their foundry at Thames Ditton. The colossal sitting figure of Lord Byron, which if erect would measure about 11ft. in height, will look towards Hyde Park almost in the direction of the Achilles statue. The poet, whose head is slightly inclined towards the left, is seated on a rock. His chin rests upon the outstretched fingers of the right hand. He has the manuscript of "Childe Harold" on his knee, and wears the dress of a yachtsman. By his side crouches his favourite dog, Boatswain, looking up into his master's face. In modelling the poet's head the sculptor has been guided by Philip's portrait and Davit's medallion, and has also been assisted by the study of the well-known portrait by Westall.

LEGAL INTELLIGENCE.

ARCHITECTS' CHARGES.—At the Yeovil County-court on Thursday, the 13th inst., the decision was given in the case of Benson v. Maurice, which was referred from that court in March last. The plaintiff, Mr. Charles Benson, is an architect practising at Yeovil, and the defendant the Rev. L. H. P. Maurice, is Vicar of Northover, Somerset. Plaintiff claimed £22 balance of account for plans and superintendence *re* restoring Northover Church. The defendant brought counter-claims to the amount of £43 16s., alleging that the work was improperly done. Mr. J. Sparks, of Crewkerne, was appointed referee, and having carefully heard the evidence, gave a verdict for the plaintiff for £18 9s., defendant to pay all costs.

METROPOLITAN BUILDING ACT.—At the Marlborough-street Police-court, Messrs. Frank Kirk and Joseph Randall, contractors, were summoned before Mr. Newton by Mr. Robert Walker, district surveyor of St. Martin's-in-the-Fields, for that they being engaged in doing certain work to and upon the premises, Nos. 27 and 28, Haymarket, did make an opening in the party-wall thereof, contrary to sec. 28 of the Metropolitan Building Act, 1855; and further, that they did omit to separate, by fire-proof construction, the various portions of No. 27, Haymarket, which are in different occupations. Mr. Besley, barrister, defended. The district surveyor explained to the magistrate that the object of this summons was to compel the defendants to put fire-proof separations between the portions of No. 27, in the occupation of the Civil Service Stores, and the ground-floor of the same premises in the occupation of Mr. Hudson, a chemist. Mr. Besley objected that two offences had been included in one summons, and urged that that fact rendered the summons bad on the face of it; but Mr. Newton overruled the objection. Mr. Besley then, in regard to one of the points embodied in the summons—that, namely, which called on the defendants to make fireproof separations between the premises in different occupation—said it was premature to take these proceedings, because the plan of reconstruction provided fully for obeying the statute in that respect. It would be seen by the agreement, which he produced—(the agreement by which Mr. Hudson leased to the Civil Service Stores the whole of No. 27, except the ground floor)—that four of the openings which had existed in the old party-walls were to be stopped up entirely in the new party-wall; and that, in regard to the two remaining openings—viz., one on the ground floor, which had been enlarged, and one on the basement—provision was made for the erection of fireproof doors. This would not only be done in accordance with their agreement with Mr. Hudson, but also in compliance with the conditions of the insurance company. The fireproof doors were already on the premises, and when the building was sufficiently advanced they would be fixed in. Mr. Walker pointed out that the buildings being in two occupations, the defendants had no right to unite them. The Act said that no buildings should be united unless they were in the same occupation. Mr. Besley, on the contrary, pointed out that, by sec. 28, rule 3, openings in party-walls were permitted on condition that "such opening shall have the floor, jambs, and head formed of brick, stone, or iron, and be closed by two wrought-iron doors, each ¼in. thick in the panel," &c., and that condition the plans of the building in question made provision for complying with. Mr. Walker still contended that, by rule 1 of sec. 28, buildings should not be united at all unless they were wholly in the same occupation. Mr. Besley replied that the buildings were practically in one occupation. The stores had no connection with the ground-floor occupied by Mr. Hudson. Mr. Walker, in reply to the magistrate, said he would be satisfied if the defendants would put a fireproof separation horizontally between the two occupations, or brick up the openings in the party-wall. At present, if a fire broke out in Mr. Hudson's shop, say by a man dropping a bottle of chemicals, there would be nothing to prevent the fire spreading to the part of the premises occupied by the stores. Mr. Besley argued that the meaning of the Act was that when any two buildings were united they should be in one occupation, as was the case here, and the Act provided that when they were so united there should still be a party-wall, and that as regards the openings, they should, to secure safety from fire, not exceed a certain size, and should be protected by fireproof doors. Subject to those limitations there was no power whatever to say that a person like Mr. Hudson might not retain in his own occupation a portion of the building the bulk of which was taken away from his occupation and united to the adjoining building. If Mr. Walker's theory were to be acted on, Mr. Hudson would not be able to deal with his property as he liked. As it was, he contended that the law had been strictly obeyed, for by the agreement the stores were prevented from going at all on to the ground-floor, which Mr. Hudson retained in his own occupation. Mr. Newton: But Mr. Hudson permits them to go into the cellars underneath. Mr. Besley: He has leased to them the whole of the building except the ground-floor. It is ridiculous to say he may not carve out one floor to himself and let the remainder. If not, what is the meaning of the boast that a man may deal as he likes with his own property? Mr. Newton: But he must respect the Act of Parliament. Mr. Hudson, you must remember, is not summoned, neither are the Stores. I understand you to say that the Stores and Mr. Hudson are the occupiers of No. 27? Mr. Besley: No, I do not; I distinctly affirm the contrary. I affirm that Mr. Hudson occupies a piece of old building, No. 27 being the ground-floor thereof, and that he has a separate tenement, separate rating, separate occupation, and that there is no joint occupation. He has leased not only the cellars, but the first and second floors to the Stores. That is No. 27, and that being an old building this statute does not apply to it. If a new building is let out in flats the Act requires it to have fireproof floors, but the Act does not apply to old buildings which were in existence before 1856. Mr. Newton: For whom do you appear? Mr. Besley: For the Civil Service Supply Association. Mr. Newton: But they are not cited here. Mr. Besley: Then I appear for their builders. Mr. Newton: Then I decide in Mr. Walker's favour. Mr. Besley: Then I shall certainly carry the case further. Mr. Newton: You do not appear here. Mr. Besley: I do. I appear for the builders. Mr. Newton: No you do not; you at first said you did, and then you corrected yourself. Mr. Besley: I shall take care to have your decision reviewed. It is simply too ridiculous to argue about. Mr. Newton: Thank you for the compliment. Mr. Besley: I must have the evidence properly taken. Mr. Walker was then sworn and said: On the 1st March I inspected the buildings, 27 and 28, Haymarket, at which Messrs. Kirk and Randall are doing work. The upper portion and the basement of No. 27, as well as the whole of No. 28, are in the occupation of the Civil Service Stores. The ground-floor of No. 27 is in the occupation of their landlord, Mr. Hudson; part of the ground-floor is also in the occupation of the Stores. These various occupations have been united in the premises, No. 28, Haymarket, in violation of Sec. 28 of the Metropolitan Building Act. Notice was served on me by a registered letter, of which I produce the copy. Mr. Besley: I produce the original, so you shall not give secondary evidence of that. Mr. Walker: You admit it, then. Mr. Besley: I put it in, sir. Mr. Newton: You will put it in when the time comes, I suppose? Mr. Besley: I put it in because it is the best evidence. Mr. Newton: You have no *locus standi* here. Mr. Besley: I beg your pardon; I appear for the builders. Mr. Newton: Will you be quiet, sir? Mr. Besley: I must object to secondary evidence being given when the original document can be produced. Mr. Newton: Go on, Mr. Walker. Mr. Besley: Surely, sir, you will have proper evidence given? Mr. Newton: I am having the evidence taken down which I believe to be proper. I rule here that nobody else be cross-examined. You can put the original in if you like. After some further altercation, Mr. Walker proceeded with his evidence. I served a notice on the 13th March on the builders by registered letter. I have since inspected the premises. Nothing has been done to comply with the law, and I now apply for an order for the works to be done in accordance with section 46. Mr. Besley cross-examined the witness at some length, and witness admitted that four openings which existed in the old party-wall before it was reconstructed had now been filled up. The old party-wall was condemned as a dangerous structure. Mr. Hudson's house, No. 27, was in existence prior to the passing of the statute. He could not say positively that, before the reconstruction commenced, there were no means of getting into Mr. Hudson's ground-floor premises from the Stores, No. 28. There was a doorway, but he never saw it open: it was locked up. Mr. Besley: Do I understand you would be perfectly satisfied if fireproof floors were put in? Mr. Walker: Fireproof floors do not satisfy the law. Mr. Besley: Attend to my questions. You want to be a lawyer; but, thank God, you are not.—(Laughter.) Mr. Newton: He is a skilled witness. Mr. Besley: He is not a skilled witness in plans. Mr. Newton: He is a skilled witness. Mr. Besley: I did not know you wanted a skilled witness on the law in this Court.—(To witness): Will you be satisfied with fireproof doors? Witness: No.—Mr. Besley: You charge us with making openings in the party-wall contrary to sec. 28. Do you mean to say these openings did not exist before the old party-wall was pulled down? Witness: The whole building has been pulled down, and this is a new structure. I cannot say if the openings in the basement and ground floor are in the same spots as they were in the old party-wall. They are so, judging by the plans. Mr. Walker's evidence being completed, Mr. Besley expressed his regret if he had manifested any undue warmth, and Mr. Newton said he was quite willing to accept that expression of regret, and no more need be thought of it. Mr. Walker, in reply to the magistrate, said he wanted the door leading from Mr. Hudson's shop to the ground-floor of the Stores to be bricked up. Mr. Newton thought that was reasonable; would not Mr. Besley agree to it? Mr. Besley said No, because that would break up the only communication they had between Nos. 27 and 28. They had no separate entrance from the Haymarket to No. 27. Mr. Walker said there was a great difficulty in getting over these joint occupations. He would be satisfied if the defendants would place joists with a layer of concrete over the floors, sufficient, in case of fire, to prevent the flames spreading during the half-hour or so that might elapse before the arrival of the fire-engines. He wanted the concrete over and under the ground-floor occupied by Mr. Hudson. Mr. Newton: Why will not iron doors do? Mr. Walker: Because iron doors are to unite the buildings, and the law is that if they are not in the same occupation they are not to be united. Mr. Verity (architect to the Civil Service Stores) contended that the Act allowed them to unite under conditions, which conditions were being observed in this building. Mr. Walker, after further discussion, said his reason for prosecuting in this case was that after the three great fires which had recently occurred in connection with chemical establishments, he could not take the responsibility of leaving unnoticed any neglect of the requirements of the law. Mr. Newton: Yes, I see your point; what do you say should be done? Mr. Walker: I would put a layer of concrete or fire-proof material on the top of the ground floor, and on the staircase. Mr. Verity said this was not practicable; and Mr. Besley pointed out that it would be calling on the builder to rebuild Mr. Hudson's flooring, whether Mr. Hudson liked it or not. Another long argument ensued, and Mr. Newton said he saw no alternative but to make the order asked for by Mr. Walker, unless the parties liked to come to an arrangement. Mr. Besley declined to advise his clients to give way to Mr. Walker in this matter; he called Mr. Thomas Verity, the architect, who proved that Mr. Hudson had an entirely separate occupation of the ground floor of No. 27, and that in the old party-wall before it was condemned there were four openings, of which, in the newly-constructed party-wall, two were closed by licence (produced) from Mr. Hudson, the lessor, the other two—one on the ground-floor and one on the basement—remaining in their old positions, and these two were to be closed in by fire-proof floors. The whole of the premises, 27 and 28, were in the undivided occupation of the Stores, with the exception of the shop at No. 27. Mr. Newton then made the order asked for by Mr. Walker; and Mr. Besley gave notice of appeal.

Our Office Table.

The Society for the Protection of Ancient Buildings has found a fresh windmill to run a tilt at in the rail and gates of Worcester Guildhall. Mr. Newman Marks, in a letter addressed on behalf of the committee of the society to the town council of Worcester, has dwelt in enthusiastic language on the value and beauty of these gates, which in an indirect manner he ascribed to "a school of smiths fostered and encouraged by Sir Christopher Wren," and expressed concern that they should be entrusted to a smith for renovation; the practical results would, he predicted, be that almost all the foliage and scroll-work would be replaced by new, and that only the comparatively worthless bars of framework would be preserved. He urged that new gates should be procured, and the present ones preserved in the local museum. Considering the curious circumstances which marked the restoration of the Guildhall itself, and the controversy occasioned thereby three or four years since, it is not surprising that the "Anti-scrapes" should arouse themselves at the mere mention of renovation in connection with any adjunct of the Guildhall, especially in view of the comparatively recent demolition of the unique Guesten-hall in the same city; but once more the committee have erred—this time in over-estimating the age, and perhaps the character, of the ironwork. The town clerk of Worcester has replied, mentioning that the gates were forged so recently as 1745, by which time any pupils of Sir Christopher Wren's school must have attained a respectable maturity. At the town council meeting the society was snubbed, but the correspondence has been forwarded to Mr. Letheren, who has taken the contract, and who will doubtless appreciate the complimentary allusions to the intelligence and skill of modern ironworkers.

A deputation waited on Tuesday upon the Lord Mayor to ask him to grant the use of the Mansion House for the first public meeting of the City Church and Churchyard Protection Society. Mr. Wright, the honorary secretary, briefly stated the work the society has done since its formation in 1879, and that its members include many members of both Houses of Parliament, the Poet Laureate, the President of the Royal Academy, heads of Houses at Oxford, the Dean of St. Paul's and many others of high position. The Lord Mayor at once granted the request, and the meeting will be held on 23rd June, when a paper on City Churches will be read by Mr. Scott, written by his late father Sir Gilbert Scott. Several well-known speakers are expected to address the meeting.

Last Tuesday a loan exhibition of art was opened at Fleet-road, South Hampstead, with a short ceremony, the object of which exhibition is to bring before the working and humbler classes of the neighbourhood treasures of art otherwise inaccessible. The club has been recently formed, and includes working men and honorary members. Among the numerous exhibits are a Roman lamp in yellow marble, some choice inlaid work by Thomas Jacob, which received the Society of Arts silver medal and prize, a series of Indian puppets illustrating dress, statuary, Sèvres porcelain, with a part of service belonging to Louis Philippe, and some excellent bronzes. Of the few more interesting works we may mention a large Prayer-book of Queen Anne's reign, showing the opened page of the office for "healing," formerly used when people were touched for the king's evil. Mr. Streeter, of Bond-street, lends an inlaid Japanese tea service; there is an antique mirror of interesting design, dated 1697, with tortoiseshell and silver frame, and various models, inlaid cabinets and carvings. In another department are to be seen a few good pictures by Turner, David Cox, Birket Foster, &c., and not a few works by self-made artists of local reputation, especially a view of a lane at Hampstead, by a policeman named Blatchley. Musical performances enliven the other attractions, and the exhibition will remain open till this (Friday) evening.

The Exeter Town Council, on Wednesday week, considered a report, presented with reference to the conduct of Mr. Donald Cameron, assistant surveyor. It was stated that Mr. Cameron, who was debarred by the council from taking private practice, had prepared plans for the drainage of Marazion, West Cornwall, in the name of Mr. Kerle, one of the clerks in the surveyor's office, and that he had gone down to Marazion, and appeared before the Local Authority, and the Inspector of the Local Government Board as Mr. Kerle, in consequence of which the inspector had declined to hold any communication with him in reference to a scheme for Budleigh Salterton, which he had prepared. Mr. Cameron now read a written explanation, in which he admitted the main facts of the charge, and stated that he had handed over the plans to Mr. Kerle when he found he could not take private practice, and went down into Cornwall as his representative, adding, "when at Marazion, when addressed as Mr. Kerle, I answered to the name, as I considered it unimportant, but I never said that was my name." The Committee to whom the matter had been referred, considered that Mr. Cameron had not infringed the regulations as to private practice, and that the council need not take any notice of the matter. At the town council meeting a long and warm discussion took place, in the course of which several members expressed themselves strongly on Mr. Cameron's conduct, but no resolution was passed, the chairman closing the controversy with the remark that Mr. Cameron had admittedly committed an indiscretion, and that he would, doubtless, take care to keep strictly within the rule in future.

At the meeting of the Liverpool Engineering Society, held on Wednesday, 19th inst., a paper was read by Mr. Window, assistant surveyor to the West Derby Local Board, entitled, "Remarks on the Construction and Maintenance of Highways." The author treated his subject rather as a discussion than in a partisan point of view, commencing with a sketch of the highways of Great Britain previous to the renewal of the art of road-making. The first great road-makers were the Romans, who laid down their vias in the rigid foundations, employing both hand pitched stone and lime concrete substructures, the latter chiefly in France. These roads were so admirably constructed that they have in many instances defied the ravages of 15 centuries. Their peculiarity was the straightness, arising from the fact of their being suited to the vehicles of those times, which were without movable axles. After giving instances of the dangerous and neglected state of the roads till the advent of Telford and Macadam, the author went on to say that the state of things described was not even yet quite a matter of history, citing as a proof some private streets in a large borough town where he had seen, previous to their being taken over by the Corporation, mud in the ruts to the depth of 18in., and alluding to the state of the tram lines in Clapham-road last Christmas time after the thaw. The various methods of constructing roads, including the use of lime concrete foundations, were next commented on. Of materials, for road metal, Guernsey granite, Penmaenmawr, and Clu-Hill-Dhu stone were recommended, and for footpaths, where stone was not cheap and easily obtained, the use of concrete flags, which have been found to answer very satisfactorily in towns where they have been laid down. The preparation and laying down of compressed and natural asphalte was explained, Val de Travers and Limmer and Sapsal being real or mineral asphaltes, and most others artificial compositions. As regards wood pavement, it was stated that Henson's appeared to have given satisfaction. Finally, the author insisted on the paramount necessity of thoroughly hard foundations for all roads, except when they crossed marshy districts, the early failures of the Improved Wood Company's pavements being chiefly attributable to mistaken ideas as to the advantages of elasticity in distributing the weight of the traffic, and giving an easier traction surface.

A meeting of ladies and gentlemen interested in providing additional means for bringing the influences of Literature, Science, and Art, and particularly Music, into closer relation with the life of the people during their leisure time, was held at 27, Upper Bedford-place, W.C., on Saturday last, under the presidency of Mr. W. Coupland, M.A. The chairman, in opening the proceedings, read the circular which had been issued convening the meeting. Mr. Mark H. Judge proposed the following resolution:—"That an association be now formed, under the title of 'The Sunday Evening Association,' to bring together all persons who, estimating highly the elevating influence of Music, the sister arts, Literature and Science, desire, by means of meetings on Sunday evenings, to see them more fully identified with the life of the people." Mr. Godfrey Shaen seconded this resolution, which, after a long discussion, was carried unanimously. Mrs. Anna Perrier then proposed, and Mrs. Edward Berry seconded:—"That the management of the association, until May, 1881, be intrusted to a general committee, to be now appointed, with power to add to its number; and that the committee report to a general meeting of the association in May, 1881." The committee was then appointed, and Mr. Edward Berry undertook to act as honorary secretary until the first meeting of the committee. Votes of thanks to Mrs. Berry, for allowing the meeting to be held at her residence, and to Mr. Coupland, for presiding, brought the meeting to a close.

CHIPS.

The School Board for Northowram last week considered the appointment of an architect for an enlargement of schools, and the motion being equal in favour of Mr. J. Drake, of Queensbury, and of Mr. R. Horsfall, of Halifax, the chairman gave his casting vote in favour of the latter gentleman being appointed.

The first brick of a new gas-holder was laid at Louth, Lincolnshire, last week. Mr. W. Nicholson is the contractor for the work.

A chapel for the Methodist New Connexion was opened at South Featherstone, near Wakefield, last week. The building is of brick, and is 38ft. by 18ft. 6in., seating 130 persons. Mr. J. Shaw gave 4,000 bricks, and Messrs. Seal and Son, the whole of the stone required.

The east window and another on the north side of chancel in Cheltenham parish-church have been filled with stained glass by Messrs. Lavers, Barraud, and Co., of London, and were formally unveiled on Wednesday. The former window is in five lights, and has been given by the Freemasons of the town; the main lights illustrate incidents in our Lord's life and Passion, while saints from the Old and New Testaments are ranged below and above, and Craft and Royal Arch emblems are introduced into the window.

The Bakewell Rural Sanitary Authority, at their last meeting, elected a surveyor and deputy-surveyor under the new Highway Act for the whole district, comprising an area of 80,000 acres. There were 18 candidates, and Mr. Scott, surveyor to the Baslew local board, obtained the chief appointment, and Mr. David Roberts, jun., of Bakewell, that of assistant-surveyor and inspector of nuisances.

The tender of Messrs. Bulling Brothers, of Ollerton, has been accepted, at £3,075, for the erection of a new grammar school and master's residence at Spalding, by the governors. Messrs. Bulling Bros. have just completed the erection of new board schools, and are now engaged in the construction of hospital buildings, all in the same town.

Sir Joseph Whitworth has just had the roofs of his works at Openshaw glazed on Mr. W. E. Rendle's patent combination system. The area covered is 100,000ft. super.

A stained-glass three-light window has just been placed in the north aisle of St. Margaret's Church, Canterbury. It represents three of the earliest episodes in the conversion of England—St. Gregory the Great meeting with Saxon slaves in the market-place of Rome; the interview between St. Augustine and King Ethelbert; and St. Augustine receiving the title-deeds of Longport-by-Canterbury from Ethelbert. The work has been executed by Mr. Alexander Gibbs, of Bloomsbury-street, London, W.C.

A great fire occurred, on Wednesday afternoon, in Walworth, on property belonging to Mr. W. Downs, builder, of Hampton-street, Walworth-road, destroying the whole of the workshops, saw-mill, and timber-stacks, and clearing the area occupied by the works with the exception of a chimney-stack and some tottering walls.

The landscape and historical painter, Michael Wittmer, died on Sunday week at Munich, whither, though settled at Rome since 1828, he had of late repaired every spring to execute a series of frescoes in the church of Illmunster. He was 78 years of age.

The Middlesborough school board last week adopted plans prepared by Mr. Blessley, their architect, for the enlargement of Denmark-street and Fleetham-street schools. In the discussion it was stated that the former schools cost less than £7 10s. per head, and that the extension was estimated at £2,000.

THE BUILDING NEWS.

LONDON, FRIDAY, MAY 28, 1880.

THE FUTURE OF CONSTRUCTION.

THE lintel and the arch have played a by no means unimportant part in the history of architecture, and it may be worth the inquiry how they have been modified by recent constructive expedients, and to what extent they have influenced architectural style. By these terms, in an extended sense, we may designate not only the covering of openings in walls, but the covering of areas; not merely the mode of opening a doorway or window, but the roofing of buildings as well. Of course, the lintel is typical of all forms of trabeate construction that ever existed, from the trilithons and dolmens of prehistoric times, to the perfect structures of Greece; so the arch may be said to represent every form of construction, in which the principle of abutment exists, as when the stones are made to abut upon each other, instead of simply reposing upon the walls. The principle of the arch was known to the Egyptians, as we see by the huge abutting stones over the entrance to the Great Pyramid of Gizeh, and the pointed-shaped ceiling to the sepulchral chamber of the Third Pyramid, which simply consists of large stones strutted against each other, and the underside slightly curved to a pointed form; but the arched system was the system *par excellence* of the Roman and Romanesque and Mediæval builders, and it is to these developed forms that we generally look for an illustration of its construction.

In short, it may be regarded as a fact that every style has been the outcome, more or less directly, of the lintel or the arch. If we go back to the original forms of arched buildings, we find even a modification of the lintel; the wall at Tiryns, near Mycenæ, and the Treasury of Atreus are rather instances of corbelling, or a succession of horizontal layers of stone covering the opening. They show certainly that the ancients had no clear idea of the real arch, as we now understand it. The above structures are specimens of horizontal arches, such as are met with among all Pelasgic races, in India, and in central America, and it is an interesting matter for speculation whether or not this form of arch in Greece and in Asia Minor owed its origin to wooden construction, as it undoubtedly did in India and America. In Buddhistic structures, and in latter forms of Hindu architecture, the corbel, or bracket, and the three-stone arch are common features, and the last is a simple compromise of the arch and lintel, which led in time to the more perfect arch of many radiating voussoirs, the top cross-piece becoming the keystone. Important results naturally followed from the discernment of the mechanical principle of the arch; it led to the vigorous but restless architecture of Western Europe, the grand churches of Provence and Aquitania, and the finely-equilibriated structures of the Middle Ages. But the architect of the Renaissance used both forms indifferently, and it is from this condition all modern architecture has been developing. We must not omit to mention here the introduction of another system of supreme importance in construction, combining both the elements of the lintel and the arch—we mean the truss. As all ancient architecture has arisen from the two former, to the latter we must look for any new outgrowth, and we consider it to be one intimately related with the future of iron. In the discussion upon iron at the Royal Institute the other night, there was, as we anticipated, a decided disavowal of the capabilities of iron among the leading architects. Mr. White and Mr. Street both disclaimed any sympathy with its use, and we may take their sentiment as that of the school of architects they represent. But, while they openly reject iron as a material, they would probably acknowledge its value in combination with other materials. It is significant that many of those gentlemen who have protested against it have employed it in their buildings. As a matter of fact, its use has been forced upon an unwilling profession. The question, however, of architectural style depends so much upon the means of spanning openings and covering buildings, that iron, as a material, will sink before the much more important question it opens, and, it seems to us, the future of architecture will depend largely upon the use architects make of the lintel, or the arch. When it is considered that concrete can be combined with iron in such a manner that each material may exercise its full capability of work; that beams, and floors, and roofs can be constructed so as to form homogeneous and monolithic structures, merely resting their weight upon the walls, it will at once be apprehended that these forms of construction we now regard with repugnance, because they have only been tentatively tried by the engineer in a rough-and-ready sort of way, are only awaiting the thought and refining grace of the architect to make them take their place in the evolution of architectural styles. It is even, moreover, a consideration of weight in determining the question we have put, that the revival of terra-cotta manufacture, especially in large blocks, has a tendency to lead us to the lintel rather than to the arch. The manufacture of iron beams and trussed girders, though chiefly interesting when viewed from the engineering point of view, has led to the recognition of the lintel element. It is at least clear that round and pointed arches do not lend themselves kindly to commercial or domestic buildings, except in a decorative sense, and no architect would consent to use either on a large scale, unless it were properly constructed, and provided with abutments. The smaller decorative arches are simply lintels, being cut in stone, or cast in terra-cotta. Again, the truss is really nothing more than a constructed lintel; it can be shaped by art into the form of the arch, or into any other pleasing form, while it admits of the utmost economy of material. On the contrary, a constructed arch is always a source of trouble and danger, and modern architects can, consequently, use it only as a subordinate feature in their buildings. The most beautiful arcuated and domical styles, such as those of India, are constructed, as we have seen, upon quite another principle. The dome of the Tomb at Beejapore has been instanced by Mr. Ferguson as a wonderful instance of internal equipoised construction, totally unlike the system employed by the architects of Europe. The horseshoe arches of Saracenic buildings are really self-balanced arches. Such thoughts as these lead us to the conclusion that the construction of the future will depend more upon the solution of the question we have been discussing than upon the employment of a new material only. It will be a matter of the combinative value of iron, for instance, and the settlement in our own minds of the problem we have hinted that will lead the way to the evolution of a national style, if ever one is possible.

BUILDING IN PICCADILLY AND BOND-STREET.

IF we may judge from the old prints and descriptions of these thoroughfares, given by Mr. Peter Cunningham and Pennant, so late as 1790, Piccadilly has made rapid advances during the last century. We read of the time during that period when New Bond-street was an open field, and when many of the neighbouring streets were mere roads, badly made, and full of ruts and receptacles for refuse. Many of the old mansions have disappeared, and have been remodelled. In an old print dated about 1700, Old Burlington House is shown surrounded on all sides by gardens and open fields, and at this time it formed the western end of Piccadilly. Few people remember the old front of that mansion of brick and stone, a plain façade; or the celebrated colonnade erected by Lord Burlington, the site of which is now occupied by the quadrangle and façade of the Royal Academy, and fewer still can recall the magnificent entrance and interior of the old mansion, which was at one time the resort of poets and wits. The scene has been completely changed by the Italian buildings and wings, notwithstanding the old mansion was incorporated, and forms the inner side of the quadrangle. Further westward, on the site of Bond-street, stood old Clarendon House, a symmetrical structure, with projecting wings, high roofs, and pedimented centre, in a Classic style, recalling the French taste of the 17th century, while Berkeley and Devonshire houses were other stately mansions that have given place to new streets within the period we have mentioned.

Signs of architectural progress are still being made. On the east side of the Museum of Practical Geology, a block of houses has recently been pulled down, and in its place has arisen a stone-fronted building intended to be let as shops and residential chambers. The style chosen is Italian without any very marked features, if we except the way in which the shop-fronts are managed. A series of openings have been left for the glass fronts, and these openings have flat rusticated arches with radiating joints to the voussoirs and skewbacks, instead of the usual divisional cornice separating the ground-story from the stories above. Above, the first floor is arranged with windows in pairs, square-headed, varied with circular heads to some of them. Above the window heads is a frieze relieved by medallions, and between the windows are rusticated piers. The building has already reached three stories in height above the ground-floor of shops, it will form a conspicuous front towards Piccadilly, and adjoins the stately though somewhat rigid-looking façade of Mr. Pennethorne's, the Museum of Practical Geology. We find no attempt made at present to adopt any version of "Queen Anne" in this once fashionable thoroughfare, and with the exception of the Venetian Gothic front of St. James's Hall, there is not much that is representative of the fashionable crazes in architectural style. On the west side of Burlington arcade is a new red-brick building called the "Queen's Head," but there is nothing in it to denote a following of any particular style. We might call it "nondescript," and the only feature of remark about the front is the upper gabled story, with an awkward square window in the centre, and a corner chimney-stack partly corbelled out from below, giving a particularly ungainly look to the front. The gable is enriched by cut-brick pateræ, set at intervals in herring-bone work, and the whole of the gable is cut off from the lower stories by a brick cornice of elaborate design, below which the front is as commonplace as it can well be. It is to be regretted something more sightly than a bare blank wall cannot be devised when a lofty building adjoins a low one. The insignificant entrance of Burlington Arcade suffers by its lofty neighbour, and we might even suggest the advisability of carrying up a screen wall of some kind to break the disagreeably sudden hiatus between. At the corner of Old Bond-street,

a large building is in course of erection, for business premises and offices, in a style which instantly reminds us of Mr. Waterhouse's work. It is of a dark toned red brick, largely relieved by terra-cotta in the windows and dressings, and is being carried out in a truly modern spirit. The windows are square-headed, of Late Gothic character with mullions, and the angle is pronounced by a square bay of slight projection, set diagonally to the sides, entirely executed in terra-cotta. The jambs and mullions throughout are moulded, and the square window-heads are constructed of voussoir-shaped blocks of terra-cotta, joggled at the joints in a similar manner to the arches at the offices in Holborn by the same architect. At the sides of the corner bay-window an attempt at ornamentation is made by a diaper of flat stamped patterns, these being impressed upon the terra-cotta facing-bricks. We are afraid the effect will be spotty. The design for these premises may now be seen at the Royal Academy Exhibition. As a study of colour it is pleasing; the dark maroon brick combines well with the warm terra-cotta, though the effect on the actual building is at present marred by the efflorescence that has appeared in the brickwork. In Bond-street, a few disciples of the fashionable school have already made a mark, for here and there, among the ordinary and commonplace fronts, are seen a few in red brick in Queen Anne, or a style that looks very much like it. A few of these we have illustrated. Just now the most remarkable structure is the new arcade being formed between Bond-street and Albemarle-street, which is nearly completed, and the shops let. Messrs. Archer and Green, the architects, have certainly made the most of the contracted space at their disposal. The "arcade" or passage is 15ft. wide, and on each side is a range of seven small shops, about 13ft. by 12ft. each, with a plate-glass front. The front is made with rounded ends, so that every available inch of space is utilised. Each shop has an angle fireplace, and a circular stairs at the inner corner facing the door. The first floor has a wide opening, the entire width of the frontage divided into three lights by mullions, and also filled with plate-glass. From its position, and the demand for small shops, we should think the speculation would be a good one, and the arcade will have another use in uniting the two streets in a pleasing manner. We understand the shops let at £250 each. The interior effect of the arcade, from one end, is light, and sufficiently pleasing to disarm minute criticism of detail, however much we are inclined to think a little less carving outside, or a little less display of figure-sculpture in relief, would have been judicious. The roof of the "arcade" is of glass, fixed in straight rafters, and supported at intervals by a series of cross-arches, which span the passage, which are carried on shafts which project from, and divide, the shops. The arches are finished level at the top, with triangular open spaces above, these being filled up beneath the roof with open circles. A more solid effect is obtained in this way, than if principals of iron or wood had been employed. The shafts and their capitals look a trifle weak in design, and a series of pilasters would have given a rather more solid look than the iron work. Decoration has been attempted, but in a style rather showy than satisfactory. The arches and shop-fronts are coloured of a light salmon tint, relieved by white in the ornament of keystones and spandrels; the latter are filled with folial ornament in high relief. The passage-way is asphalted, and there are vaults below, lighted by prismatic gratings. At each ends, the shops are finished with wide splayed ends, by which arrangement an additional width of entrance is obtained, forming a vestibule. On the first-floor level also, the shops are continued over the centre entrances, and have large windows, the outer ones facing the streets, and the inner overlooking the length of the arcade. These more eligible positions are, we understand, to be let as galleries for pictures, or photographic studios. The exterior entrances of the arcade are built of stone in the Italian style, and make striking features from the streets. The centre is carried up, and has a large circular window, with a flat pediment, supported at the ends by Atlantes. To be critical, we might object to the proportions of the pilasters which divide the centre from the side entrances, the centre pillar, the detail of the lintels, and the exuberance of carved work in the pediment and tympanum over the entrances. The composition of the figure subjects in the friezes above the side-entrances does not certainly add to the architecture; the figures, in bas-relief, of reclining females are ill-drawn and stiff, the swags of fruit, &c., in the tympanum, are heavy, and the leaf ornament below the frieze panels looks poor and feeble. In the Albemarle front, the details of blue granite lintels and the red granite shafts, may be taken exception to, and a more massive treatment would probably have harmonised better with the upper part of the composition. Mr. Bywater is the builder, and the work appears to have been executed in a substantial manner. Nearly opposite Union-street, is a house conceived in the Queen Anne style, of red brick; it is plain in the lower stories, but the upper story is crowned by a double gable, with side ramps, the effect of which has somewhat destroyed the unity of the design, as a whole. We notice that the device of carrying brick pilasters upon the keystones of the lower arches has been resorted to here, and this "piling up of agonies" seems to crush the lower stories, both in a physical and æsthetic sense. Panels of terra-cotta are introduced in friezes, above the second-floor windows—a feature deserving of praise, if it is not carried to an excess. Altogether, New Bond-street presents a curious mixture of Italian Renaissance, Jacobean, and Gothic features. In the last-mentioned style, we may call attention to the remarkable Tudor Gothic front of Messrs. Chappell and Co., the music-publishers, where an arcade of flat-pointed arches, relieved by vigorous carving of foliage in the arches and labels, is to be seen. We look in vain, however, for any new building of quiet dignity or merit. Those recently built suggest the idea of cramming into mere strips of frontages all the detail that can be forced into them, and we cannot avoid the reflection that, in another age, many of them will be viewed in the light of burlesques.

THE MANUFACTURE OF PORTLAND CEMENT.

No. 2.—BURNING THE SLURRY OR COMBINED RAW MATERIALS.

(*Continued from p. 593.*)

THE capacities of the kilns vary so much that it is impossible almost to reach any settled size from existing examples. The original kilns were of about thirty tons capacity, and generally speaking, that is the most favourite size now in use. Thirty tons of burnt clinker of good quality, when drawn from the kiln, will represent less than one half of the bulk and weight of the raw materials and coke with which the kiln was loaded. Much larger kilns are used, and a seventy ton kiln is about the most profitable if the raw materials are made into brick form. When in such condition not only is the loading of the kiln more accurately performed, but the speed of burning is much increased. The usual time occupied in burning of a thirty-ton kiln is a week. That is to say, the whole time occupied in loading, burning, and drawing takes seven days, but if imperfectly loaded and the materials too damp, or should eccentric action of the fire take place, that time would be much increased. As a rule, those kilns which are burnt quickest produce the best clinker, showing that sluggish draught, from whatever cause, has a prejudicial influence on the products.

There are very few of our largest cement manufacturers that possess any regular system of kiln arrangement, owing to the gradual expansion of the works preventing any departure from the lines originally laid down in their infancy. Increase of working capacity has usually arisen from increasing trade, and in the midst of a prosperous demand for cement, little heed, we fear, has been given to improvements, either in one direction or the other. Some excuse may be found for the old-established works for any shortcomings in this direction; but we sometimes feel great surprise to see new works being erected on an almost slavish adherence to plans which should long since have been regarded as obsolete. Competition will, no doubt, in the long run, rectify this supineness or indifference, and compel the old-fashioned makers, however reluctant they may be, to take advantage of these improvements calculated to better their position by reducing the cost of their manufactures. Of course in these remarks we make an exception as regards those makers who have adopted the semi-wet process, and the improved kilns which may be said to be the unavoidable sequence of the use of the drier materials.

The first cost of constructing kilns is, in itself, a somewhat expensive operation, but the continuous reparation which the trying work which they perform involves, forms a considerable item of outlay in the manufactory. For many years it was the practice to bond or tie in the fire-brick lining of the kiln with the other work of more substantial construction; but it was found that the unavoidable contraction of the refractory lining shrunk, and in its contraction pulled down with it the work with which it was bonded. The fire-brick lining is now, in all well and judiciously-constructed kilns, allowed to shrink by itself, and is not, therefore, attached to the main wall further than by the slurry, or fire-clay grouting, which is generally put in as the work of laying the fire-bricks proceeds. By this arrangement the lining, after contraction from the action of the heat, settles down without endangering the general fabric of the kiln. Owing to the peculiar section of the ordinary dome-kilns, much wear and tear of the lining is occasioned by the vitrified or clinkered cement adhering to the sides, and if the temperature has been carried to an excessive extent, it becomes attached to the lining bricks, and thus pulls them out in its descent to the drawing holes. It is, therefore, advisable to maintain the internal surface of the kiln as clean and even as possible; and a very good means of insuring this is to thoroughly remove any pieces of clinker which have become attached and afterwards wash the entire lining with a thick coating of liquid slurry. The importance of preventing the slurry from coming into contact with the lining of the kiln is in many places ignored, and in such cases the expenses of kiln reparation forms a heavy item in the cost of cement production. It is the necessity of cooling the kiln before the withdrawal of its contents that leads to this expense, from the bricks when red-hot expanding, and on cooling shrinking, having become, after a few charges, permanently contracted. If the kiln was a continuous, or running one, such as the iron furnace, much less cost in this direction would be incurred, for although the temperature of the contents of the latter are

much higher than the cement kiln, it is maintained at a manageable uniformity.

The fuel required for burning the slurry is not possible of accurate adjustment, owing to the uncertainty of the mixture. Slurry having an excess of carbonate of lime requires more fuel than that wherein clay predominates, and the most accurately-blended proportions require the least amount of fuel. If the cement-maker would carefully study the several branches of the burning department of his business, it would result in a much less fuel-cost than that which now generally prevails. The drying of the bricks, or rough lumps of slurry, should be accomplished before the kiln action begins, and as we have in our reference from the work on "Portland Cement" shown that it is essential, before any beneficial influence can be imparted, the materials must be *dry*. At present the process of drying and burning are considered, in too many cases, as inseparable, and the prevalence of such a mistake is too apparent, when we examine the progress of kilns which for many hours after being started discharge steam only from their shafts or domes. Such a practice is very objectionable, and its toleration is excused, from a knowledge that during all the cement-making period it was so, and why should the system not continue? Good cement has been made by such means, and thus the practice goes on. Bad cement has always been produced, and the chances are as much in favour of the one result as the other, because no accurate means are resorted to for the purpose of securing the one quality, and rendering the production of the other impossible.

The kiln operation is frequently saddled with the burden of making good the defects of careless washing or mixing, and with such an object excessive fuel is applied to "burn out," as it is termed, the excess of chalk in an over-limed mixture. The result is sometimes apparently satisfactory, and imparts comfort to the ignorant or careless cement-maker by the semblance of a cure, inasmuch as ordinary means of testing fail, for some time at least, to detect the imperfect cement. It has been over-burnt indeed, and becomes in that condition and from such causes inert in its initial set, and also ultimately fails to reach any profitable degree of induration, and certainly incapable of legitimate or eventual crystallisation. Much fuel is, however, lost in so wasteful and undesirable a process, besides a large amount of destruction to the linings of the kiln, and a by no means insignificant waste of power and grinding-stones when such stuff comes to be ground.

A well-built and moderate-sized kiln, say of thirty tons clinker capacity, usually requires about eleven tons of gas-coke to burn it, besides the coal and brush-wood of ignition. That amount of coke, however, may be regarded as the minimum, and, we should say, is considerably under the average of what is generally used. In a carefully conducted manufactory, where proper attention is directed to the washing process, and the slurry tested and proved before passing to the kiln, the cost of fuel as above stated will be found to be pretty near the mark. The fuel required for the Hoffman or ring kiln is the smallest coal, which is applied through the openings in the top or arches of the chambers, and has to be introduced at such times as the experience of the burner determines. There is no possibility by this system of any great extent of waste, because the whole operation of burning is constantly before the burner's eyes and control. Of course, experience decides on the amount and the time when fuel should be put into the kiln, and at first, as in all kilns indeed, the quantity required is small to prepare the contents for the final or finishing heat which is to complete the operation. It is at this stage where the danger arises of disturbing by excessive or too-intense heat the carefully constructed air-passages, for if the heat is driven too hard or too far, the semi-molten bricks are unable to resist the superincumbent pressure of their fellows, and the whole mass is squeezed down, and the capacity of the chamber to draw in the required air for combustion destroyed. There may be a saving of at least twenty per cent. in the fuel required for the Hoffman kiln in some districts where cheap waste coal is commanded, but in the London district, owing to the favourable supply of gas coke at a low price, it is doubtful whether any real advantage in point of fuel is realised, although in any case much labour saving may be effected in loading and unloading the kiln itself.

There has been introduced for many years in France and Germany a tunnel or railway kiln invented by Bock, which, for brick-making and lime burning purposes has won considerable satisfaction, and is now introduced into England in a modified form, under the style and name of Foster's railway kiln. The principle of the kiln, under whatever name it may be used, is simply a tunnel-arched passage, in which is laid a train or railway capable of being traversed by trucks. The tunnel is divided horizontally into two divisions at the level of the bottom of the trucks, so as to make an air-tight "split" between the two, and as near as possible hermetically sealing the divisions. The kiln at starting has to be filled with loaded trucks of the materials or bricks which are to be burnt, and either end of the kiln or tunnel is carefully fastened and rendered air-tight by the agency of accurately-fitting iron doors. At the middle of the kiln, on either side, are built a series of furnaces, which are lighted up when the kiln is started, and fuel is applied until a central zone of heat at a high temperature is produced. This is also sometimes supplemented by holes in the top of the arch between the side flues, through which fuel is thrust, as in the case of the "Hoffman." The firing is continued until the desired temperature has been reached, and when the truck or trucks immediately in contact or opposite the firing holes are sufficiently burnt the "train" is advanced one truck by the aid of hydraulic or other power. A fresh truck is introduced after the one at the discharging end has been withdrawn, and so on until truck after truck in this endless system is operated upon and burnt. The theory of this ingenious operation is that by the aid of a high chimney a good draught is secured, and the combustion of the fuel at the firing zone maintained by drawing or sucking the waste gases and superfluous heat over and through the loaded trucks waiting their turn to advance into the fiery furnace. The draught is towards the inlet of the tunnel, and, of course, no heat should tend outwards, but a gentle current of cold air is induced to meet the finished trucks, and so prepare them by gradual cooling to enter into the air. The importance of a perfect division of the two channels (one hot with the bricks, and the other cool, containing the wheels and under carriages of the trucks) is obvious, from our description, and on its integrity the whole success of the operation depends. This kiln is highly scientific in character, and should be built and controlled by skilled workmen. The size of the tunnel, the length and breadth of the trucks, and the position of the fire-holes must be matters of accurate calculation, as well as the size and height of the shaft or chimney, and if the true scientific principles on which success so much depends are not forthcoming, disappointment and loss is unavoidable. There have been many clumsy attempts to build such kilns, and failures of some extent have occurred from an utter disregard of the science of the question. Big tunnels, low and imperfect shafts, carelessly-constructed flues, and other blunders, have conjoined to cast doubt on what may be considered a good principle for burning lime and bricks. The intense heat required for cement purposes would require a carefully-constructed building and appurtenances, and nothing would have to be left to chance. The kiln is indeed continuous in principle, and would involve a new system of management or control for every department of the cement-making industry, and provision at least made for the continuous and uninterrupted action of the kiln during every day of the week. These kilns which have been built in this country have been too short, and in consequence a good deal of dissatisfaction has been occasioned by their not fulfilling the promise of their constructors. The failure is not due, however, to any fault of the system, but rather to an overweening confidence of the builders in their own intelligence, which they regard as superior to the controlling influences of scientific rules and guidance.

Whatever system of burning may be adopted, it is essential for the cement-maker to remember that the rules of thumb, which have doubtless carried some makers through a career of prosperity, will no longer prevail, for the consumer of cement has indeed awakened to a sense of his responsibility, and cannot longer repose implicit confidence in the producer of a material of such constructive importance as Portland cement. They require an article capable of immediate use if need be, and the day is gone by when an engineer or architect would specify "hot from the kiln," or "to be kept three months before being used." Neither should the cement-makers measure the intelligence of the general consumer by the standard, or rather series of standards, of the amateur paper writers, who here and there and everywhere oracularly proclaim aloud, in halls and corridors, that such and such is the law, and, we might almost say, Prophets. It is hard for cement-makers to follow the call of such teachers, who themselves have not been taught; but much of the difficulty is of their own seeking, for they have supinely luxuriated in their gilded chambers, and allowed the impulse of improvement to proceed from without, when, for their own sakes, it should have taken its rise and impetus of progress from within.

THE SOUTH KENSINGTON MUSEUM.*

WE have received the first three parts of a monthly publication under the above title, issued with the sanction of the Science and Art Department of the Council on Education. The object of the publication from the preface, is to "render the art treasures of South Kensington available for the instruction of all classes," and from the eight pages of illustrations and descriptive notes furnished in each part, the work promises to be a success, and a very useful addition to the art literature of the day. The illustrations are chiefly transferred by a lithographic process from etched plates in the possession of the Science and Art Department, the work of students or art teachers in the etching class at the South Kensington Schools, under the successive direction of the late Richard J. Lane, A.R.A., T. O. Barlow. A.R.A., and A. Legros, thus insuring accuracy. Not the least feature of value in the series will be the representations of decorative art of all ages and countries, including works in sculpture executed in marble, stone, and terra-cotta, bronzes, painting, furniture and carved woodwork, ivory work, ecclesiastical metal-work, gold and silver jewellery and bijouterie, enamels, pottery, glass, bookbinding, textile fabrics, cutlery, &c. Architectural subjects are not unre-

* The South Kensington Museum: Examples of the Works of Art in the Museum and of the Decorations of the Building, with Descriptions. London: Sampson Low, Marston, Searle, and Rivington, Fleet-street.

presented, the first etching is a view of the west staircase leading to the Ceramic gallery at the museum; the terra-cotta decorations of which were designed by Mr. W. F. Moody, and executed by Minton and Co. The detail is fairly drawn, and the shading of the vaulted ceiling artistically represented. A very fine crystal and silver cruet, said to be of French workmanship of the fifteenth-century, forms another plate, the most interesting part of which is the silver-gilt neck of mount. There is a six-lobed foot, chased with cuspings, a wide neck, with spout and handle. The carved oak sideboard, of Flemish design, is a nice example of carved work of the fifteenth-century, and was formerly in the Saulage's collection; the sides are splayed, and have panels with figures in relief, and a few piquant carvings of grotesque design appear. A more remarkable than beautiful porcelain jug, of Elizabethan date, is given in another plate, the mounts of which are the best part. An ivory mirror-case, of fourteenth-century work, is interesting as a piece of carving, representing the popular romance of the "Siege of the Castle of Love." We have also a design for a niche, ascribed to Pierino del Vaga, a work of the sixteenth-century Renaissance; and a copy from Mr. Poynter's cartoon of Apelles, executed in glass-mosaic, both of which are feelingly etched. The second part is of less interest, from an architectural point of view, but the subjects are all valuable as representing some of the best periods of art. We have a walnut-wood mirror-frame of Italian design, chaste in its proportion and detail; an effective-wrought cup in silver of German workmanship, showing some well-designed leaf-work; a bronze knocker (Italian); an ivory-carved crosier-head and pastoral staff of remarkable design in the figure-work; an exceedingly nice etching of the figure of Cimabue in ceramic mosaic, from the original cartoon by Sir Frederick Leighton, now to be seen in one of the series of panels in the arcade of the central court; and etchings of bas-reliefs to a beautiful Italian sarcophagus of marble, found at Padua, in which the artist has cleverly and tenderly rendered the bold relief of the female saint, sculptured by Donatello. Part III. opens with a plate of the central recess or arcade in the main quadrangle, through which light is obtained for the Ceramic gallery at South Kensington Museum. The design is by the late Captain Fowke, R.E., the terra-cotta columns having been designed by Godfrey Sykes. The etching shows careful drawing in the detail, and is well-shaded. A pleasing example of a diptych in gilt bronze and silver, with figures, is given; also a leaf of an ivory diptych of Roman design, of early date, and of considerable interest from the beauty of its style. The horn or oliphant, in carved ivory, of Byzantine character, is well drawn and engraved, and is extremely interesting as a work of art; and we must also mention a spirited engraving of an oak casket, covered with geometric tracery, and of late 14th century design. It is said to be of French workmanship. Engravings are also given of a chrismatory in silver, a brass plaque in repoussé work, and a design for a salt-cellar, ascribed to Giulio Romano. The descriptions, though brief, are full, and give many useful particulars; and the plates and type are printed on good paper. Messrs. Sampson Low, Marston, Searle, and Co. have produced a cheap work on art, which deserves the encouragement it will doubtless obtain from a large class of artists. As contemplated, the work will become an epitome of the South Kensington Museum, the treasures of which are at present out of the reach of many.

The district of Sheepshed is being sewered for the rural sanitary authority of Loughborough. Messrs. Fotherby and Sons are the contractors.

"THE DRAUGHTSMAN."*

WE have received a copy of a book of texts and ornaments for the use of draughtsmen, compiled and designed by Mr. William Thornes, surveyor, Dewsbury, containing a variety of ornaments for the corners, borders, north-points, titles, &c., of maps and estate-plans, some of them of unnecessary, not to say complicated, intricacy. Draughtsmen engaged in the preparation of large maps and plans of townships and estates, will find abundant variety in Mr. Thornes' work; but we think they will thank him more for the specimens of tree-drawing, as on plates 5, 52, and for the method of filling in wooded and rocky localities, and for the characteristic sheets of printing for the 1in. map of England, the manner of drawing boundaries and factories, and the methods in use on the Ordnance Survey plans. These are useful details for the draughtsman of maps and engineering plans. As a general rule, very elaborate corners and borders detract from the drawing, and draughtsmen are inclined to adopt those kinds of embellishments which can be readily described by the use of T and set-squares, and the bow-pen. Mr. Thornes' book contains a selection of all these methods; but we are afraid much of his labour is thrown away.

PAINTING AND SCULPTURE IN THEIR RELATION TO ARCHITECTURE.†

By C. E. NORTON.

(*Concluded from p.* 410.)

THE work which Giotto did as a painter at Padua, at Pisa, at Rome, at Naples, as well as in Assisi and Florence, was mainly accessory to architecture, and though seldom, if ever, on buildings designed by himself, yet so complete was the mutual relation of the arts, that the joint product of painter and architect seems often but the creation of one spirit. Even in his time, however, and still in greater degree as time went on, painting became a more important element in the building than the architectural structure itself. The causes of this change were numerous; they lay deep in the moral and social conditions of the age, as well as in the natural evolution of the arts. The change was essentially of equal injury to both the arts, though the evil results were most conspicuous in architecture, and the single example of the Sistine chapel is sufficient to illustrate how both arts suffered from loss of sympathy in conjoint production.

But with this decline we will not occupy ourselves, but rather attempt to determine some of the principles which guided architect and painter in their common work in the better days of the 13th and 14th centuries. In the very inception of his design the architect took account of painting as the chief assistant in producing the effect which he sought in his building. By its means, he was to secure the colour required, not merely to give the needed general tone and hue to his walls, but to reinforce the value and define the function of the separate elements of his building, to give vivacity and interest to spaces otherwise lifeless, to mark with distinctness the leading lines of his edifice, and to make the beauty of its proportions more obvious and impressive. To accomplish these ends, the painter recognised to be the object of his work. His art was primarily decorative; that is, it was to be in the first place appropriately beautiful in its colour and in its relations, whatever else it might be. The double nature of his art occasioned him no perplexity. Within the scheme of colour decoration he felt that there was abundant freedom of opportunity for the expression of emotion or sentiment,—for the representation of character or incident. He had, indeed, a story to tell, and the conditions upon which he was to tell it were not so much restraints as supports to his vivid imagination.

But though the first and fundamental object of the painter was to make his work decorative, and to enhance by it the character and beauty of the architectural spaces and forms upon or in relation with which it was to be displayed, his second and not inferior object was to make it interesting—to awaken by its means the associations appropriate to the building which it adorned, and to quicken the emotions or stimulate the thoughts connected with the objects to which the building itself was dedicated. This task during the great centuries of Italian art was comparatively easy, for what may be called the public interests of men were concentrated to a much greater degree than in subsequent times upon two main topics: religion—the relation of this world to another, the eternal destiny of man; and politics—the true order and government of the State, or of the community of which each individual formed a part. Both of these great topics, and especially religion in all its aspects, presented themselves to the imagination in concrete and material forms, which rendered them natural subjects of pictorial representation. The faith of the multitude was ardent, and it was based upon simple, and for the most part material conceptions. The political ideas of the time were also simple, and held with a degree of passion, the effect of which is difficult to realise in days of more complex and developed social theories and relations. The artist was himself wholly under the sway of the sentiment and faith of his people.

Moreover, the 13th century, and the earlier part of the 14th, in Italy, was an age in which the poetic imagination was stimulated beyond the usual measure. The inspiration of the poetic spirit was in the air that all men breathe. The shepherd boy on the mountain-side was filled with it, the artisan in the narrow street of the city did his work in unconscious obedience to the dictates of the imagination. It was the very atmosphere of art, and the artist, sensitive to all the influences of his time, and following closely, to use Dante's phrase, behind the dictator, gave the consummate expression to the faith and feeling of the community. It mattered not whether he was called to adorn church or cloister or public hall. The subject he was to treat would, in any case, be familiar. His part was to give to it the most impressive and direct treatment. His own soul was full of it. It had a real and vital interest to him, and to every man who should see his work. The same subject was frequently repeated, but each artist had his own way of presenting it, and it was to his advantage that the scene and its associations should require no explanation in words, but should appeal directly through the eye to the heart and the intelligence of the spectator. It is this absence of research, of remoteness, of novelty, which gave to the works great part of their power, and elevated their purely artistic character. They were not the expressions of merely individual fancies, of wilfulness or caprice of genius, dependent for effect upon special personal qualities or gifts, and requiring specially trained sympathies for their appreciation, or special learning for their comprehension; but they had universal and immediate significance.

It is true that the taste of the age led often to symbolic and allegoric representations. But even these for the most part readily intelligible and familiar types, and, however cold abstractions they may now seem to us, with our altered modes of conception, they were full of warmth and significance in a time when religion and poetry alike found in symbolism the favourite mode of expression of the simplest and most affecting truths. The Divine Comedy is proof of the permanent power of symbolic art, provided only that the artist be possessed of imagination of sufficient force to give real form and life to the abstractions of the understanding.

Thus it is that the works of the painters of those days are the most important records of the times,—records, not indeed of historic incidents, but of the spirit, passions, and convictions of living men. They interpret character and history.

It would be not without interest to illustrate the close relation of art with life by the study in detail of some of the series of paintings with which the walls of the churches and palaces of these centuries are adorned; to read the application and interpretation of the Bible story, and

* The Draughtsman: for the use of Engineers, Surveyors, Architects, &c.; containing every variety of Ornament, &c., required for the Embellishment of a highly-finished Plan. By W. THORNES, Surveyor, Dewsbury.

† As illustrated by the practice of the Italian artists of the 13th and 14th centuries.

of the fortunes and destiny of man, as they are depicted on the doubly-sacred walls of the Pisan Campo Santo, or the representation of the life of St. Francis in the Bardi chapel in Santa Croce, or of the labours and triumph of St. Dominic and his order in the Spanish chapel; or some other of the multitude of similar works. But such a study might seem too remote from a practical application to the mood, the faith, and the demands of our own time. Instead of dwelling upon these, we turn to the paintings with which in the fourteenth century the Sienese adorned the walls of one of the halls of their public palace, the Palace of the Republic, the City Hall of the ardent, vigorous, beautiful little commonwealth.

It was in 1337 that Ambrogio Lorenzetti, one of the masters of the Sienese school, whose modern fame does not equal his deserts, was employed in decorating the Sala dei Nove, or Hall of the Nine, the chief magistracy of the republic, in which they were accustomed to hold their meetings. His work shows him to have been a poet, deeply imbued with the doctrine of his time, and especially with its taste for symbolism, and readily intelligible allegory. His scheme of decoration included the whole surface of the walls, but his chief work consisted of three vast compositions, in the first of which he displayed, in a full pictorial allegory, the principles of good government with direct application to the Commune of Siena; the second fresco represents with fresh and varied illustrations the works and fruit of peace under a good government, while the third depicts the consequences of tyranny. It was no idle task that the painter undertook. Siena required the lessons which he proposed to set before the eyes of the citizens. He recognised the gravity of his commission. His imagination was quickened by the opportunity to give expression to truths that needed to be pressed home upon the hearts of the people. His conceptions were not the product of cool reflection, but of ardent sentiment and permanent conviction. His allegory should be easily read by all men. The beauty of its form should be but the transparent garb of its significance, and, while attracting the attention of the most careless observer, should fix it upon the meaning that lay beneath the surface. Siena had suffered deeply from the discord of her people, from the misgovernment of her rulers. There were few communities in Italy more turbulent, more distracted by faction. In spite of disorder, she yet had known prosperity. It was the part of the artist to hold up to her gaze the mirror of her own conditions and her own needs. In the whole field of painting I know of no more weighty piece of doctrine than these great works. I will refer only to some of the striking features of the first of the series.

On the left of the spectator hovers a crowned figure of Sapientia; from her right hand depends the handle of a balance, whose beam touches the head of a beautiful, serene, seated figure of Justice, who looks up to the Wisdom above. On either side of the head of Justice are the words which Dante in Paradise beheld the spirits of the Just form in their singing flight—*Diligite justitiam qui judicatis terram.* With her right hand she holds even the scale of distributive justice, leaning out from which a winged figure with a sword in one hand strikes off the head of a criminal, while the other hand places a diadem upon the head of a virtuous ruler. With her left hand Justice holds even the scale of commutation, from which another winged figure is giving their allotted gifts to two kneeling personages. Beneath the feet of Justice is seated Concord, holding in her left hand two cords of white and red which hang from the waists of the winged figures in the scales above. From her the united cords are received by a man in honourable garb, and carried by a procession of twenty-four persons, who advance two by two, and represent from the life the administrators of the government of the commonwealth, to the foot of a throne whereon sits a mighty and stately figure, crowned, holding in his right hand a sceptre to which the red and white cord is attached, and in his left a shield. On either side of his head are the letters C. S. C. V., *Commune Senarum Civitas Virginis.* Faith, Charity, and Hope float in the air above the image of the city. At his right sit figures of beautiful queenly women, representing Peace, and Fortitude, and Prudence; at his left, Magnanimity, Temperance, and Justice. At his feet, opposite the procession of the magistrates, is a group of subjects offering tribute, and of bound captives and malefactors guarded by soldiers on foot and on horseback.

Such is the main distribution of the principal figures of this speaking picture. Except for the difference in size of the figures according to their relative dignities,—a common piece of symbolism in the pictorial or sculptured representations of the Middle Ages,—there is little in this work that betrays immaturity of art, or that has not permanent as well as immediate significance. The allegory may appear to us, with our wider political experience, and our general literary education, to have almost a childish simplicity. In order to appreciate it truly, we should transfer ourselves in imagination to an age without printed books, of little acquaintance with history, and in which political reflection was with most men in its earliest stages. In all periods, even in our own, it is the simplest truths, the axioms of morality, and of political philosophy, that chiefly need inforcing upon the mass of men. Even-handed justice, concord in spite of diversity of interest, integrity in public service, prudence in public counsel, temperance in political debate, are not yet so firmly established as rules of conduct, that the artist who should so illustrate them by poetic and imaginative treatment as to impress their worth more deeply upon the hearts of his contemporaries need doubt that he had rendered a great public service.

So beautiful was the figure of Peace in this picture of Lorenzetti's, so did she affect those who beheld her, that from the time she was painted the hall has borne her name, and been known as the Sala della Pace.

It is this want of recognition of the public ends of art, the lack of conviction of the function of the arts as the means by which the deepest sentiments and the highest ideals of the community are to be, not only expressed, but confirmed, that make our arts for the most part to-day so uninteresting, so unmeaning. It is of comparatively little use for painter or sculptor to offer the aid of his art to adorn the works of the architect, unless he have something to express in painting or in sculpture that shall add to the building more than a mere play of beautiful colour, or of intricate forms of light and shade. He must have first something to say that shall be worth saying—something by which the heart of the beholder shall be touched or his intelligence aroused. No matter how familiar his teaching may be, provided only that his own imagination find in it a strong motive, and that it be of concern, not to himself alone, but to the mass of men. In our times the artist will do well to avoid allegory; it is ill adapted to our prevailing temper and to modern modes of thought. It is not the form in which the poetic sentiment in these days inclines to embody itself. Modern allegories leave the reader or the beholder unmoved, and the public service of art may well be called in question if the artist chooses a mode of expression remote from the common understanding, and incapable of touching the emotions with direct and forcible appeal.

Suppose the artist inspired with the true spirit of the teachings of Christ, will he not find in the Gospel stories incidents of inexpressible and permanent interest to be interpreted afresh by his imagination? And would not the walls of our churches once more become beautiful, and be invested with sacred interest, could he, with his heart filled with the significance of the story depict upon them, with the vivid realism of poetic conception, the scenes from the life of the most beneficent of human teachers, in such wise as to give to the worshippers a fresh sense of the message of love, of brotherhood, of self-sacrifice, of purity, of which the world stands in need to-day as much as in any past time? Or if he be called upon to paint the walls of some legislative hall, is there nothing in the legend or history of his own land from which to draw eternal and universal lessons, conveyed by the representation of familiar incidents of heroic self-devotion, of pride in duty, of fortitude, of magnanimity, of honour?

Architecture demands such assistance from the other arts, and it is for the architects of public buildings in our country to build them with such design that the painters and sculptors shall feel that their own best work belongs to them, takes great part of its life from them, and that they shall thus be brought to seek such culture as is required for the production of works rich in interior content, as well as beautiful in colour and in form. It was this union of significance of contents with beauty of representation that made the decorative works of the early Italian painters the models for all future art. As the ardour of imagination and of faith with which they were filled grew cold, and as the fancy sprang up that artistic treatment was alone sufficient, and the nature of the subject treated was matter of little concern, there crept on a general decline even in the purely decorative effects, and the crude extravagances of Giulio Romano and the absurdities of Bernini take the place of the grandeurs of Michael Angelo and the sweet, gay decorations of Benozzo Gozzoli or Luca della Robbia. The roses of Botticelli are beautiful in their decorative character; but his roses grew in a garden in which he had walked in company with the goddesses of ancient days, or with the Virgin and the saints of Christian mythology.

We cannot but believe that the time shall come again when the three arts shall recognise their mutual dependence, and when painting and sculpture shall once more give architecture its noblest decoration. But it will come only when the architects themselves feel more deeply than at present the importance of their art in its moral and intellectual relations, as embodying in its monumental structures the expression of the character and the civilisation of a race, as influencing the course of its spiritual development, as quickening its historic sense of obligation to the past and responsibility to the future. A great work of architecture, decorated with painting and with sculpture, is not a lifeless monument of the past, but a perpetual, living incentive to great achievements and high aims

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

An ordinary general meeting of the Institute was held on Monday evening, the President, Mr. John Whichcord, in the chair.

ARCHITECTURAL COMPETITIONS.

Mr. Thomas Porter announced that the committee of nine appointed by the general meeting on March 8th to take into consideration the question of architectural competitions, had invited several other architects to join them, and they now came to the members for approval of the largely-extended list of nominations, and to seek further power to add to their number. The list submitted was as follows:—Mr. Chas. Barry (chairman), Professor Kerr (vice-chairman), and Messrs. Thomas Blashill, T. E. Collcutt, R. H. Carpenter, H. Dawson, C. F. Hayward, H. Jarvis, jun., S. Knight, J. Douglass Mathews, E. J. Payne, R. E. Pownall, E. R. Robson, H. M. Sheffield, W. M. Teulon, T. Porter (hon. sec.), Cole A. Adams, S. F. Clarkson, Bowes A. Paice, R. C. Page, E. W. Farebrother, and H. Saxon Snell.

Mr. G. E. Street, R.A., said he had supposed the committee was appointed for the transaction of business, and for that purpose the smaller the number the better. He had at present heard no reason why it should be increased from nine members to 22.

After some conversation as to the advisability of giving the committee "power to add to their number," the list was approved, and this authority granted *nem. con.*

The President announced that he had received from the hands of Mr. G. E. Street, a memorial of the most interesting character. It consisted of two large bound volumes containing the signatures of 1,274 architects, to a memorial referring to the burning subject of architectural competitions. The memorial would be considered by the council simultaneously with the report of the committee now discussing the question, and which report they hoped to receive before the close of the session. In reply to a question, the President said, as the memorial was addressed to the council, it could not be shown to members, but they might inspect the volumes of signatures in the library during the evening. The subject was one of extreme importance.

Mr. G. E. Street explained that the memorial dealt only with a limited phase of the competition question, and hence it had met with a very large amount of support. He should himself be the last man to oppose competitions altogether, for to do so would be a great mistake, in the interests of the

younger men in the profession, and he did not wish it to be understood that competition was, in his opinion, an undesirable thing. The memorial, he might state, simply pressed for one alteration in the Institute rules as to competitions, and that was that there ought to be, in the opinion of the memorialists, a professional referee or adjudicator appointed in every competition in which members of the Institute took part. For himself, he believed that if this course were adopted most of the evils attending competitions would disappear. The mode of action taken by the memorialists, of confining attention to one alteration in competitions, might be usefully taken as a hint by the committee, for if they made a huge number of recommendations, they would arouse the sort of criticism with which Sir Edmund Beckett lately favoured them, and the probability was that members would not generally concur in them, and no good whatever would be effected.

Mr. JOSEPH CLARKE mentioned that the only reason why he and some others did not sign the memorial, in the prayer of which they heartily agreed, was that they were members of the council to whom it was addressed.

IRON AND MILD STEEL AS BUILDING MATERIALS.

Mr. WILLIAM WHITE, F.S.A., opened the discussion on the papers read on the 19th ult., "Iron as a Material for Building Construction," by Mr. J. Allanson Picton, F.S.A., of Liverpool, and "Mild Steel and its Applications to Building Purposes," by Professor Kennedy, the substance of which has appeared in our columns. The paper by Professor Kennedy was, he said, of great value and interest, as showing the immense bound which the use of mild steel had made since the discovery of the Bessemer process, and the rapid rate at which its application was increasing. As to the use of steel and iron in wheels, he might mention in passing that he had long held the theory that railway wheels would last longer if the number of spokes were uneven instead of regular. The succession of blows occasioned by the impact of the wheel were in the former case received by the space between two radii, and the result would be greater ease and safety. It was remarkable that originally railway-carriage wheels were made with seven radii, but now six were used. The introduction of mild steel, with its increased lightness and greater strength as compared with iron, its wonderful fineness and tenacity and ductibility under the hammer, had led to its increased use, and had suggested its applicability for building purposes, and the progress of manufacture seemed to point to the greater influence which iron would have on architecture, both in construction and design. He could not agree, however, with the anticipations set forth by Mr. Picton in his paper. Iron architecture could not be considered by architects as a legitimate use of material and its ornamentation. Indeed, to speak of "iron architecture" must be a solecism; "ferrotecture," it might be, requiring, as it would, new modes of treatment, as well as new rules of design; but "architecture" it could never be. Ironwork must always be rigid, cramped, and attenuated in its proportions, and, from its nature as a metal, was unfit for domestic uses. A great deal more was required than could be expected from iron, however improved, before it could establish its claims to be considered the most perfect material for constructional use by, and to meet the wants of, a highly-civilised people; and he could not agree with Mr. Picton in his advice to architects to study the development of iron in architecture. Steel was a material displaying immense strength under both compression and tension: in the latter condition it had far greater strength than any other material, but the massiveness, the bulk, the play of light and shadow, the superposition, which were essential features of architecture, could only be given to iron construction by destroying its leading characteristics. Indeed, were iron generally used for building, architecture would be extinguished. When they considered form, they equally found a discrepancy between works in iron and those in wood or stone. Iron admitted of elegant fashioning, very great variety, and for roofs, perhaps, it might be allowed to supersede all other materials. But this employment of iron would always be in subjection to utilitarianism. For all purposes of a monumental character, for all buildings intended to appeal to future generations of highly-civilised, well-cultured people, they must look elsewhere than to iron for a material in which to work. He was aware that some architects—some who were present—would scout the suggestion of an association between poetry and architecture, but he believed there was such a connection. In its decay steel could give rise to no poetic feeling; he could not imagine the poets of future ages admiring the ruins of a railway shed. While the great staple of work would, undoubtedly, in the future, be carried out by machinery, this would not supersede the use of handicraft, as in hammered iron for æsthetic purposes, and he hoped that mild steel would prove to be amenable for the uses of the metallurgists, and that some means would be devised for protecting it from the weather. It was a curious fact that modern ironwork had suffered more from the weather during the past 30 years than mediæval ironwork had done in 300 years. This might be due to the use of charcoal in the melting of iron or of some rust-prevention process by the Gothic artificers, or that hammering rendered the material more compact and less liable to injury. Full and suggestive as was Mr. Picton's paper, he felt compelled to differ from his conclusions as to the future of iron, and especially from his assumption that if the architects of the Parthenon, or of the nave of Amiens, or of the choir of Le Mans, had known the capabilities of iron, they would have been equally successful in devising a metallic structure.

Mr. E. MATTHESON thought there was something to be said on the other side in favour of iron, which might even be made a thing of beauty in some future age. Steel, as Dr. Siemens had told them, was a material now in a transition state, and there were no formulæ by which architects and engineers could determine its proper use. At present the steel joists to which that speaker had alluded were only made by one or two manufacturers, and certain difficulties presented themselves which shut the joists out from ordinary makers. One thing was likely to limit the use of steel, namely, the absence of some common hall-mark or brand, by which could be ascertained what was real and good steel, and what was not. At present no one, on looking at a given material, could tell whether it was steel or iron. Many of the joists, &c., were very bad, and the engineer and architect had to assume a very low strength, because they could not be certain what strain it would bear. Cast iron had special characteristics not fulfilled by any other building material, and rolled steel could not compete with it for certain qualities. As to the use of iron in fireproof buildings, there was no difficulty in making a building "fireproof" in the ordinary sense of the term, provided the contents were not combustible; but if it was to be stored with highly inflammable substances it was obvious that no construction would be "fireproof" except that of a furnace. The great drawback to the use of both iron and steel was, as the last speaker observed, their liability to corrosion, and care should be taken that every part could be easily painted. Box-girders and rolled joists were continually being put up where they must rust without being seen to, and he feared the next generation would have a great work to do in making good the structures being erected every week. He could quite confirm what was said as to the corrosion of modern ironwork. The work at the India and Foreign Offices was already rusting away, and would not last so long as the clumsier, but more appropriately-designed, gates at the Royal Exchange.

Mr. E. A. COWPER, president of the Institution of Mechanical Engineers, criticised the accuracy of some of the historical information afforded in Mr. Picton's paper, and added that the most interesting portions of that paper were the anticipations of the future use of iron. This material would, he believed, in the future be treated as a thing of beauty as well as of utility. One way to secure this would be to provide every architectural student with a book of examples and tables, and to instruct him in some of the practical difficulties that have to be surmounted in the foundry. For instance, the designer ought to know that cast-iron columns could never be cast so thin as ¼in. and that only extremely large ones need be more than 2in. in section; that he should not order columns to be cast with both ends closed, or with only a small hole at the end, because of the impossibility or difficulty of extracting the core; that a column should gradually thicken up to the flange, which should be made large; and that caps and base-moulds should be attached to, and not specified to be cast with, the column. When architects were as familiar with the conditions of iron and steel manufacture as they were with those of wood, brick, and stone, the material would be of greater and more customary use in public buildings. Having referred to diagrams in support of these points, the speaker turned from columns to girders, and said, a very frequent source of weakness in the latter was, that they were not sufficiently tied together at the ends. Before sitting down he referred to a use he had made of the tensile strength of steel and iron in bridges, in which he had designed his framework to stand the strains of an ordinary bridge, and then reversed the structure, forming a suspension-bridge with the usual arch outlines.

Mr. J. BERNAYS, President of the Society of Engineers, thought it was a matter for inquiry whether there was any reason why iron should be more used by the engineer than by the architect. It was, perhaps, to be explained by the difference in the mode of working of the two men. All materials, the engineer held, should be used in their natural state, and should be seen as they were. The architect in perfect architecture, gave us a finished picture; in a large building he did not display the smaller features of construction, all his bolts, joists, and ties were kept out of sight. The engineer, on the other hand, held it as a first rule that he must be able to see, touch, and get at every part of the structure. The work, when finished, might, as a consequence, have an appearance of unrest, but that give the engineer no disquietude or annoyance. He thought the line to be drawn between the two professions was this—that where the character of the work necessitated a number of small details being employed, if they need not be shown, it could be designed by an architect; if they must appear, then the work would fall into the province of the engineer. An instance in point was St. Pancras railway station, where the street front and hotel were designed by Sir Gilbert Scott and the roof of the station was the work of Mr. Barlow. If the latter had been the work of an architect, the cross-bars, ribs, and trellises, which, to an engineer, were interesting features, because they showed how the roof was put together, would have been covered over, and a simple arch from crown to ground would have been visible.

Mr. E. NASH had long held that iron and steel were the most evanescent of building materials, and asked whether some of the learned in the construction of iron could inform him if wrought iron, when subject to concussion and vibration, became ultimately so affected as to lose its fibrous nature, and revert to a crystalline state. If this was so, were not all structures subject to running and moving loads diminishing in strength and safety daily?

Mr. MATHESON replied that the subject of vibration had been thoroughly investigated, and that it had been demonstrated that a moving load of less than one-fifth of breaking-strain were repeated, it would require unknown millions of blows or strains to affect the structure, but that if the load were increased beyond a certain limit, probably about half the breaking strain, the material would soon deteriorate in strength.

Mr. G. E. STREET, R.A., said the subject of iron architecture was not a very attractive one to him, and confessed to a feeling of some concern as he looked upon some of the designs hung in the room. The only basis of design in the school to which he belonged was to display that construction which, it had been assumed by one speaker, architects wished to cover up. What he wanted to impress on the engineers was that if architects had a column in iron which was stronger with a plain base than with one moulded after the manner of a column in stone, they would give up the mouldings, and not apply them to the casting. The greatest sinners and the most dangerous in iron construction were the concealed girders in the middle of walls, and he had been delighted to hear that they were rotting rapidly away. In any solid construction the mode of building ought to be evident throughout. In our streets we were continually offended by houses apparently upheld by sheets of plate-glass, and which could not stand unless they were supported by these girders, which they had been told were possibly

decaying. The opportunities which ironwork afforded for superposing solids over voids were causing the architecture of the present day to lose much of its charm. He had, perhaps, availed himself less of the aid of girders than anybody else in the room. Indeed, whenever he had introduced them he felt conscious of having done something which he ought not to have done. The members owed thanks to Mr. White for having so clearly disposed of the question whether iron could ever become part of our architecture; he had done that admirably, and had also exposed the false position taken by Mr. Picton in assuming that if the great architects of Classic and Mediæval times had known the capabilities of iron, they would have used it in place of other materials. He could not believe that the architect of the Parthenon would have employed iron. His own candid opinion as to engineering, notwithstanding what had been said that evening by members of the profession, was that in proportion as the art had been more scientific it had become less beautiful. In old ironwork might be found much beauty of moulding and hammering, and much careful use of handwork, which they looked for in vain in modern work. He entirely dissented from the counsel given by Mr. Cowper, to provide architectural students with models and books of examples when designing ironwork, believing that they would do better without such aid. Some of the best specimens of modern ironwork were the public conveniencies in the City, designed, he believed, by the late Sir Digby Wyatt (Several members: By the late Mr. Bunting); they indicated that the true mode of constructing an iron house would be to form a framework in iron, and fill it in with moulded plates in some such way as that. On the walls he saw hung some photographs of what were described as iron-fronted houses in New York. These wretched examples showed that iron was not the most convenient and economical material for use, for directly the builder got round the corner it was apparent that he used brick, and the sole reason for introducing metal was, that he could provide, in that way, sham mouldings and sham decoration at a cheap rate. He had never yet understood how the interior of an iron-fronted house was made fit to live in; it could not be habitable unless a second house were built within it. It would, he thought, take a great deal more than Mr. Picton's paper to induce architects to devote their attention to iron construction; at least, until engineers had proved it to be possible to make iron buildings pleasing for their own sake. Was he to be told, in building a church, that he ought to desert the materials which God had given him—brick, stone, and wood—and use iron, just because it was the fashion to build in that material? The advantage of iron seemed to be that you could build something that would have to be pulled down and rebuilt within fifty years. As to iron structures, the more simple and the less ornamented they were, the less offensive would they be. The roof of St. Pancras had been eulogised by several speakers, but he never went under it without feeling offended with the pointed arch, which seemed to be a mere concession to the architect of the adjacent building. Contrary to what had been said, the great principle of the school to which he had the honour to belong was not to conceal any essential portion of the structure; hence all hidden work was hateful to its members. By Mr. Picton's dream of an imaginary future, they were being led away on a wild-goose chase to depart from the study of the work of their fathers.

Mr. J. N. SHOOLBRED held that to insure the introduction of steel into construction two things were necessary—a considerable improvement in the process of manufacture, so as to guarantee uniformity, and a relaxation of building regulations, so as to enable architects to avail themselves of the full strength of the material. Eight tons per square inch was not an excessive load for steel, but the Board of Trade prescribed a much lower limit. The reason iron was not displayed was that the thin proportions and hard, straight lines were felt to be unpleasing to the eye; but there were a few examples, as the Church of St. Augustine, at Paris, in which the iron construction was boldly shown, and that without real detriment. For certain works, the aid of iron was indispensable, as, for instance, at the great public library at Liverpool, where it was required to construct the chief reading-room (named, by the way, in honour of the reader of one of the papers they were discussing, in recognition of thirty years' labours for the advancement of art, science, and literature, in the advocacy of free public libraries, and in other ways), with 100ft. span, over a basement without a central support, and, of course, the roof could not be maintained on columns. This, as might be seen by drawings on the walls, had been attained with complete success.

Professor KENNEDY then replied upon the discussion. He showed upon the table specimens of parts of an iron joist and of a steel joist of like dimensions, which he had cut up and tested since the last meeting. The highest breaking load of the iron was 19·6 tons per square inch, with ·05 inches extension in a three-inch section, and a largely crystalline fracture. The steel joist, on the other, broke at a load of from 46·9 to 48·13 tons per square inch, with a minimum of ·43in. extension in the 3in. section, and a granular and partly silky fracture. These samples, he thought, emphasised the fact that architects specifying a large use of ironwork should have specimens of the material tested to breaking to ascertain what it really was, which was not shown by the ordinary tests. He had been a little surprised at some of the remarks made by earlier speakers. He thought architects were not in the habit of using box-girders, nor of shutting them up in walls to rust, nor of adding the abominable mouldings figured by one speaker to columns. He did not think the architectural profession was, as a whole, guilty of a desire to make their ironwork appear like stone, nor to hide the constructional features. As iron railway-roofs had been discussed, he might mention that a wonderful improvement was made to their internal appearance with no loss of strength, by making the purlins upright instead of following the slope of the roof. He had great hopes that the improvements in making a very pure iron now in progress would evolve a material that would be useful for ornamental hammered work, and more tractable under treatment than mild steel, and this, if successful, would place at the architect's disposal a material equally as good as the hammered ironwork of mediæval days.

Mr. PICTON thought that in self-defence there were one or two observations he ought to make in reply to the discussion. He had been rather misunderstood by one or two speakers. It seemed to be thought that he advocated that iron should supersede other materials now in use, and especially that he wished it to take the place of stone, brick, and timber. He had no such idea as this. Personally, he would rather go on the old lines; but architects could not shut their eyes to the progress that iron and steel manufactures were making. The increased and increasing use of iron was a fact that could not be overlooked, and there were many cases in which this use was indispensable if the problems of strength and space were to be solved. What could have been done in the case of the reading-room at Liverpool without iron girders, or how could the St. Pancras station have been roofed-in at one span in timber? In iron they had combined a lightness, strength under tension, and he might say beauty, not attainable in any other material. He asked architects: were they disposed to shirk the responsibility of working out the capabilities of the material, or to shunt it on to the engineers, or would they endeavour to so deal with it as to utilise its commodity and beauty? Besides true architecture depended upon the proper use of the material at hand; any deviation from this was but false taste. In Sweden and in Norway at the present day they had timber; in Belgium, brick; in Italy, marble; and in our own land, freestone and brick; in Cornwall and Brittany, granite, as a common material for houses and churches, and each material had its proper and appropriate mode of design. He saw before him a number of frightful examples of what Americans could do in iron (the President explained that he had had these photographs hung up), and he had seen a few instances of iron construction in driving through London, which were also very unsightly. The reason for these æsthetic failures, probably, was that iron was forcing itself into use before architects had applied themselves to its consideration, and, what he had tried to show, was the desirability of endeavouring to solve the problem as to how this material, which was increasing in use, should be dealt with. In Manchester and Liverpool there were to be seen one or two successful attempts to adopt iron to constructive uses, so as to secure lightness, combined with strength and plasticity. They all knew what architecture fell into thirty or forty years ago, when compo was generally used. Let architects learn from this to allow the structural features to be honestly displayed, and, in that way, they would follow the lines of their great predecessors, and show the greatest amount of beauty of which the material was capable.

ROYAL ARCHITECTURAL MUSEUM LECTURES.

GEMS OF MEDIÆVAL ART.

THE above series of monthly lectures, by Mr. J. P. Seddon, was brought to a close on Tuesday night, by a discourse on "Mediæval Gems." The lecture was illustrated by some blackboard sketches, and also by about sixty photographic illustrations of English and foreign examples of Gothic architecture, shown on a screen by the limelight. Before proceeding to the subject proper, Mr. Seddon made a few preliminary remarks, by way of taking stock of the results of the enterprise. Mr. Seddon also expressed some disappointment as to the amount of support awarded to this effort on behalf of an institution which deserved, as well as needed, the encouragement of its friends. His principal aim, however, and one not wholly disappointed, had been to indicate how the contents of the Museum might be practically utilised; to point out how the precious jewels stored therein were applied in their original caskets; and to exemplify how their comparison and analysis might be facilitated, and their practical value enhanced. This Architectural Museum might fairly, he thought, be considered as a pioneer in the direction of the present movement for technical education, and it might, and should be, made its very centre. No other school could have even a hundredth part of the marvellously comprehensive collection that they had, nor within a century to come were opportunities likely to occur for the formation of another such collection. That the system of art education pursued at the museum was specially technical, its results for the last twelve months would testify; 87 students had attended the evening class that session, 37 the life-class, and 11 the ladies' class. At the last National competition one gold medal, two Queen's prizes, and the first prize offered by the Plasterers' Company had been obtained by members of this museum. Six of the students obtained third-grade prizes; three second-grade prizes, and two free studentships were also gained, and also the £50 Goldsmiths' Company's prize for the best design in model. These showed the character of the instruction given by the art-master, Mr. Brown, and some masterly specimens of modelling done under his direction were exhibited in the room, and would speak for themselves. He was also enabled to show a series of reproductions by photolithography of drawings by members of the Architectural Museum Sketching Club, which had been published in the BUILDING NEWS by the kindness of the editor, and these eminently exhibited the practical and successful nature of the work carried on, and when completed would form a very valuable series of examples. Mr. Seddon then proceeded to the topic of his lecture, showing how the Romanesque and Norman art of which he first showed examples was influenced by the exuberant early Oriental art, by that of the refined, restrained, and well-ordered Greek, and the coarser, more voluptuous art of the Romans. A large proportion of the illustrations were drawn from the western portals of the larger cathedrals, with details of their sculpture, the panelled and columnar fronts of Lucca and Pisa being compared and contrasted with Notre Dame of Paris, with Amiens, Rouen, Rheims, and Chatres, and with Rochester, Lincoln, Tintern, Peterborough, Wells, and Exeter, besides internal views from many other buildings; and the series was closed with a historical sequence of the development of capitals from the cushions of the Tower of London, the Doge's Palace, Venice, St. David's, Llandaff, Lincoln, Westminster, and Southwell, and poppy-heads from Ludlow. At the conclusion of the lecture, Mr. E. C. Robins, F.S.A., proposed a cordial vote of thanks to Mr. Seddon

for the great labour which he had bestowed on the endeavour to popularise the Museum, and to show its value to the architect, the sculptor, and the artist. The motion was seconded by Mr. J. B. Gass, an architectural student, and carried by acclamation.

MR. NEWTON ON GREEK ART.

ON Wednesday, May 19th, Mr. C. T. Newton, C.B., delivered his third lecture on Greek art in the botanical theatre of University College. Referring to his previous lecture, in which the progress of Greek sculpture had been traced up to the end of the Persian war, B.C. 478, Mr. Newton said that between that period and the age of Phidias further progress was made in art by such artists as Pythagoras of Rhegium, Onatas, and Calamis, of whom no works remained by which their several styles could be identified. It remained for their immediate successor, Phidias, to profit by their careful work and to surpass them, not only in sculpture in marble, but in toreutic work. Having attained perfect mastery over the sculptor's materials, Phidias applied this technical skill to the representation of beauty, which he sought in nature and idealised by an effort of the imagination. This search for beauty by Phidias was not a mere vague yearning, like our modern æsthetic craving for beauty; Phidias had ever before his mind a practical aim. He had to create out of his imagination adequate fitting types of gods. From the beginning of their art the Greeks represented their gods in the human form, but at first very rudely and in combination with strange adjuncts and symbols. Gradually, as art advanced, these adjuncts and symbols were discarded, and the monstrous was eliminated from the type. At the time of Phidias a great change had been wrought in the religious feelings of the Greeks by the influence of successive schools of philosophy, who taught a doctrine about the gods opposed to the popular belief. In the eyes of the followers of these new teachers the quaint old time-hallowed idols must have lost much of their sanctity. The art of Phidias, presenting the great deities under new and more impressive aspects and embodying them in types more worthy of the higher conceptions of divinity then prevailing, may be said to have contributed much to the reviving and spiritualising of the old pagan worship. Of the many works of Phidias the two most celebrated were the Zeus at Olympia and the Athené Parthenos at Athens, both of colossal size and made of ivory and gold. We could only form a faint conception of the merits of these works by comparing the testimony of ancient writers in various ages, all of whom concur in ascribing to the art of Phidias a higher ideal character than to that of any other ancient artist. We had, however, some extant remains enabling us to judge of the qualities of Phidias as a sculptor in marble. These were the sculptures of the Parthenon. The lecturer then gave a brief outline of the history of the Parthenon from the beginning of the 15th century, when it was seen by Cyriao of Ancona, to the present day. The sculptures of the Parthenon which remained consisted of remnants of the pedimental compositions, metopes, and frieze. The frieze related to the procession at the Panathenaic festival held in honour of Athené every five years, on which occasion a new veil or *peplos* was presented to the tutelary goddess on her birthday. This procession consisted of cavalry, chariots, musicians, victims, and other groups, forming in its *ensemble* a sort of image of the Athenian State, in which the colonies and dependencies were also represented. We recognised in the figures on the frieze these several features of the procession as described by ancient authors. The lecturer then explained the groups of seated figures on the eastern side of the temple, which are believed to represent the gods of Athens assembled on the occasion of the delivery of the *peplos*. Great uncertainty, he said, existed as to the names of these gods, and from 20 to 30 different theories about them had been advanced. The metopes of the Parthenon were originally 92 in number, of which only 18 survived in tolerable condition. Among the subjects of those which have perished seemed to have been scenes from a Gigantomachia, in which Athené took a part, and possibly scenes from the taking of Troy. The subjects of the 16 metopes in the British Museum were scenes from the Centauromachia, in which the Athenian hero Theseus took a prominent part. The lecturer then described the two pedimental compositions. Here, again the greatest diversity of opinion prevailed as to the interpretation of the several groups. The three female figures in the eastern pediment were originally called by Visconti the Three Fates. This conjecture had been recently confirmed by the discovery of an altar on which the Birth of Athené was sculptured in relief, and where the Three Fates were certainly represented. The lecturer concluded by a description of the chryselephantine statue of Athené Parthenos, which stood in the Parthenon, and on which Phidias had bestowed his utmost art as a toreutic sculptor, and on the adornment of which the Athenian people had bestowed an amount of gold equal in value to at least £115,000. This magnificent statue was a fit symbol of the greatness of the Athenian Empire in the time of Pericles, as well as of the surpassing genius of the great sculptor, Phidias.

The fourth lecture, delivered on May 26, treated of the sculptors contemporary with Phidias at Athens and elsewhere in Hellas. Among these where three very conspicuous names—Myron, Polycletus, and Alcamenes. These masters, as we learn from Roman critics, had severally special characteristics. Myron was distinguished by the thoroughness of his knowledge of the forms of organic life, especially in the representation of animals, and by the fertility of his invention in motion and subjects. His three most celebrated works were a Discobolus, the athlete Ladas, and a heifer. All these works were in bronze, and excited the admiration of antiquity from his own time to that of the Antonines. Though there were in his works traces of archaism, he infused into them a wonderful vitality. He is thought to have been hardly capable of expressing more than the action of the body. He was unable to express the emotions of the soul, still less did he attain to the highest ideal types. Polycletus, an Argive sculptor, worked by a formula of proportion deduced from his own study of the human body. He wrote a treatise on this subject called the Canon, and he applied his rules in the construction of a type called also by the same name. He was great in heroic or athletic types, but in the judgment of Quintilian his divinities were deficient in majesty. He made a colossal statute of the goddess Hera (Juno) in gold and ivory for his native Argos, and two celebrated figures, both probably of athletes, one called the Diadumenos, the other, the Doryphoros. He, like Myron, worked chiefly in bronze. Alcamenes, the pupil of Phidias, and after his death, the greatest Athenian sculptor, was a sculptor in marble. His Aphrodite in the Garden is much praised by Lucian for qualities which we are apt to associate with the art of Praxiteles, of whom, perhaps, he was the forerunner. The question now had to be considered, Were there any extant works which we might attribute with certainty or probability to one of these three great sculptors, Myron, Polycletus, or Alcamenes? The lecturer exhibited a drawing of a Discobolus, of which several replicas in marble are extant, and which corresponds exactly with Lucian's description of the Discobolus of Myron. It has been sought to identify a Satyr in the Lateran with another work of the same sculptor, a group of Athené and Marsyas. With regard to Polycletus there is a statue of an athlete winding a diadem round his head, formerly in the Farnese collection, and another found at Vaison, in France, both of which correspond in subject with the statue of the Diadumenos, but how far they may deviate from the original cannot be ascertained. An attempt has been made to identify his Doryphoros with certain other statues, but the proof of the identity has not been satisfactorily made out. With regard to Alcamenes, it is possible that another statue of a Discobolus in the Vatican may be a copy of his celebrated statue of a victor in the Pentathlon in bronze. Again, when the quantity of Athenian sculpture of the age of Phidias still extant is taken into account, it is more than probable that some of it may have been executed by Myron and Alcamenes. The former may have sculptured some of the metopes of the Parthenon, which present those traces of archaism said to be the characteristic of Myron, while Alcamenes may have scultured some of the figures in the pediments of the same temple, and, perhaps, the Victories in relief on the balustrade of the temple of Nike Apteros. Adverting to the recent discoveries at Olympia, the lecturer said we had an undoubted statue by an artist of the the age of Phidias, and probably of his school, the Nike, by Pæonios, dedicated by the Messenians. This was a figure which, even in its present mutilated condition, showed a daring conception and great vigour in the execution. The same artist, as we knew from Pausanias, sculptured one of the pedimental compositions of the temple of Zeus at Olympia, while, according to the same authority, the other pediment was the work of Alcamenes. These two pedimental compositions, with much originality in the general conception, showed such grievous shortcomings in the execution that the inconsistency could only be explained by supposing that they were designed by the masters to whom they are attributed, but executed by provincial workmen, not directed by intelligent supervision. They should be studied in connection with the frieze of the temple of Apollo at Phygalia. The lecturer then alluded to the metopes of the temple of Zeus at Olympia, of which eleven have been recovered in the course of the German excavations, and which are thought to be works of the Athenian school in the middle of the 5th century B.C.

In conclusion Mr. Newton exhibited a drawing of the colossal lion found on a promontory near Cnidus, which he conjectured to have originally surmounted a monument erected to commemorate the naval victory of the Athenian Conon, B.C. 394.

ST. PAUL'S ECCLESIOLOGICAL SOCIETY.

ST. ETHELDREDA'S CHAPEL.

THE members of this Society visited, on Saturday afternoon last, St. Etheldreda's Chapel, Ely-place, Holborn, and Austin Friars. At the former building they were received by Mr. John Young, jun., K.S.G., who has been the architect, in association with Mr. Whelan, concerned in its restoration. The building, he reminded the members, was formerly the private chapel attached to the palace of the Bishops of Ely, and for a century past was used as a Welsh church, when the undercroft was let out as beer-stores, and the whole place fell into dilapidation. Half a dozen years ago the building was purchased by the R.C. Fathers of Charity, and since that time it has been gradually undergoing repairs and restoration, as funds permitted. Some years ago it was contended, by the late Mr. Charles Baily and others, that this was really the hall, and not the chapel, of the Bishops' Palace; but all doubt has been set at rest by the discovery of sedilia, an aumbry, stoup, and other features of a chapel. The building itself is a beautiful specimen of the Decorated period, the cusped tracery of the windows being especially free and flowing in its lines, and the mouldings of a bold and ornate character. We may mention in passing, that detailed drawings, by Mr. C. H. Löhr, were published in the BUILDING NEWS for June 1, 1877, showing the rich window and the mouldings of the south doorway—now the only entrance to the upper building. Mr. Young gave credit, in the restoration, to Mr. Doy, the foreman of works, who was a pupil of the elder Pugin. In the upper or principal chapel, all the fittings and the plaster-roof of the Welsh Church, had been removed. The east window had been filled with stained glass, at a cost to the Duke of Norfolk, who undertook this portion of the work, of £1,500, and although at present, perhaps, a little too bright in its colours, was, in his opinion, unsurpassed in the kingdom by a modern window, for richness, delicacy, and harmony of colouring. The west window had, after some negotiations with adjacent owners, been opened up, the removal of the bricks revealing its fine proportions, and the side-lights in the five eastern bays had also been restored from those remaining most perfect, and were filled with plain glass. In order to obtain extra room for seats, and some 10s. a year more for pew-rents, the Welsh Church had cut back the deep sills of the side windows; the Fathers of Charity had willingly sacrificed this space, and at considerable expense the walls had been made good. The stone used, and in the wall repairs generally, was a ground stone from near Chippenham, more substantial than the Kentish rag filling-in,

and Caen ashlar, with which the original work was executed. The walls were 5ft. in thickness at the top and 7ft. at the ground. Every effort was made in the restoration to find the foot of the foundations without success, and he believed they were carried to the London clay. At the east end a new altar had been built in stone, after an ancient model, with an alabaster superstructure and canopy. On the south side at this end had been discovered the vacant space, now exposed to view, formerly occupied by three sedilia, and also a singular recess and breaking in the masonry, which, the purpose not being clear, he had simply uncovered and left. The seats and fittings were but temporary, and had been made by the boys in a Catholic reformatory. When the plaster-work was removed the old roof was found behind in tolerably good preservation, but pulled almost to pieces. It was entirely of oak, put together with pins of the same wood, not a scrap of metal having been used in its framing. The common belief that it had been of chestnut was completely disproved. It consisted of trussed rafters, with tie-beams, king-posts, and braces of very peculiar arrangement. Under the advice of the late Sir Gilbert Scott it was decided to replace the roof as far as possible, the very rough mouldings on the beams being left untouched, and followed in the new work. The architects for the restoration owed, said Mr. Young, a debt of gratitude to the late Sir Gilbert Scott, who kindly gave the benefit of his wide experience, and took a deep interest in the work, and he might state that all that was done had his cordial approval, no suggestion made by him being offered in vain. A series of holes were found to exist in the inner side walls at a considerable height. In some of these the fragments of sculptured corbels were found, and these had been restored throughout. At the west-end of the chapel were two blank bays, also filled with blind tracery like the others; in the last bay to the north side was a blocked-up opening, and as the adjacent property in Ely-place on this side had been acquired, this would at some future day be reopened. The beautiful entrance on the south side was till recently concealed from sight by wood panelling. Descending to the under-croft, Mr. Young graphically described the condition into which this had fallen when in the occupation of Messrs. Reid, the brewers. The beer slides had, of course, been removed and the place cleansed and repaired and rendered as light as possible, and fit for Divine service. The oaken joists supporting the upper floor had been made good and would be left exposed; the floor had been lowered some 2ft. 10in. to the original level indicated by traces of tiling, and laid with concrete, and the timber frames supporting the upper chapel had been set on stone bases. During the latter work, the most interesting discovery of the restoration was made—a mass of concrete was found to have bedded in it the ancient Early Norman or, perhaps, Saxon font or stoup. This has been cleaned, restored, fitted with a leaden bowl, and now served as a stoup outside the south door of upper chapel. The recesses beneath the windows have been fitted up as confessionals. At the east end, exactly beneath the traces of the sedilia, has been revealed a double aumbry of unusual size, formed by erecting a square shaft and hood, in line with wall-surface, before a deep recess in upper part of wall. Outside, in Ely-place, Mr. Young showed that a new porch had been added to south side, to form a separate approach by passage to the upper chapel. He directed attention to the bases of octagonal turrets, and of a central pier below the east window, which he said it was proposed to rebuild in position, and to finish the turrets with conical caps, as at west end. The next stage in the restoration would be, however, to repair the external stonework, the windows, parapets, and copings; then the western blank bays of upper chapel would be shut off by a screen, and, after that, a series of buildings might follow on the north side; the original cloister was on the south side, and could not now be restored.

After a hurried peep *en route* into the remains of a rich Transitional Priory Church at St. Bartholomew the Great, the members reassembled in the great nave of

AUSTIN FRIARS,

now fitted for use by the members of the Dutch Reformed Church. In the north aisle Mr. G. H. Birch read an archæological paper in which he touched on the contrast between this church and that at St. Etheldreda just visited, and on the appropriateness which marked both. In one case they had a small building without aisles, yet of stately proportions, suited to the wants of the private household and retinue of a prelate; and now they found themselves in the nave of a magnificent church, which, belonging as it did to a preaching order, was built to accommodate large masses of people. Lightness and grace specially distinguished this magnificent nave, which justly bore comparison with those of many of our cathedrals. The church itself, and notably its piers, belonged to the Perpendicular style, but in arrangement and general form it preserved the Decorated character of an earlier church on the same site, and the windows, it would be seen, were removed from the preceding building, and would be seen to be of a very rich, flowing Decorated type. The City of London was, indeed, fortunate in still possessing so noble a portion of a Preaching Friars' Church, preserved alike from the Great Fire of 1666, and the more destructive greed of private interest. In 1253, two years after the founding of the Augustinian order, this house was founded, in the parish of St. Peter, in Broad-street, by Humphrey de Bohun, Earl of Hereford and Essex, and another Humphrey de Bohun, his descendant, exactly a century afterwards, rebuilt the church to which these windows belonged. The first Humphrey was distinguished by the name of Good; he was godfather to Edward I., and was a great supporter of the Charter of Liberties. For several centuries this house continued to flourish; large donations of money and land were made to it; and names of those interred within its walls represented the principal families of England. The church consisted of a choir, with north and south aisles, and Chapels of St. John and St. Thomas, transepts, and the present nave, with its two aisles; its chief external glory seemed to have been the "high, spired steeple," described in eulogistic terms by Stowe. In 1539 the revenues of the church, returned at £57 per annum, were confiscated, and the deed of surrender, dated Nov. 12, 1539, gives the name of Thomas Hamond, as the Prior, and those of twelve of the Canons. A portion of the site was granted to the Wriothesleys, Pawletts, and Riches, but in 1550 Edward VI. granted to William Pawlett, Lord St. John, afterwards created first Marquis of Winchester, the choir-transepts and chapels. The transepts, he or his son, used as barns, and the choir for storing coal; and to fit these buildings for these noble uses, they sold all the monuments and brasses for £100; stripped the lead off the roofs, and converted the chapels into stabling. On the site of the buildings Winchester House was built, and gives its name to the adjacent street. The nave was granted by Edward VI. to the Dutch merchants resident in London, to serve as their church, and to be known as Jesus Temple. A great disaster occurred to the church seventeen years ago, when its roofs were totally destroyed by fire, and the walls so much injured, that it was questioned whether it would be possible to repair it; but, to the everlasting honour of its present possessors, it was decided, at a very great expenditure, and notwithstanding the commercial value of the site, and the unnecessary spaciousness of the church, to restore it. It would be seen that the arcade on either side had broad and shallow mouldings, and these were continuous as well over the voussoirs of the arcade as upon the shafts, a certain proof that they were rebuilt during the latter half of the 15th century. The tracery was of the Transition period from Decorated to Perpendicular, was of beautiful flowing character, and every light and lozenge was cusped in cinquefoils. The length of the existing church was 153ft., longer than some of our cathedral naves, the width of the central aisle was 35ft. 8in., and the north and south aisles 22ft. 3in., each making up a total width between walls of 83ft.—wider than any English cathedral except, perhaps, Chichester. It was a good type of a town church, but open to the objection that originally there were no clerestories, the only light being derived from side-aisles, which were very liable in such a site to be blocked up. Two very beautiful modern churches in London had been modelled on this type—St. George's Cathedral, Southwark, designed by Pugin, and St. Mary Magdalene, Munster-square, designed by the late Richard Carpenter. He would refer those who might wish to study the history of this church more particularly to the paper on "Austin Friars," by the late Rev. Thomas Hugo, of Hackney, published in the first Vol. of the "Transactions of the London and Middlesex Archæological Society." Mr. Birch afterwards conducted the members in a perambulation of the church, pointing out that the dormers in the present singular roof were new features, designed by the architect for the restoration, the late Mr. Lightly, and had greatly improved the usefulness and cheerfulness of the building. The previous roof was a waggon-vault with trusses, of similar date to the arcades. These features, and the walls, are now considerably out of the perpendicular, and lean outwards. The fittings are of the plainest and most substantial description, suggestive of the Calvinistic tenets of the present possessors; other indications of the ownership of the church being afforded by the few mural tablets on the bare walls, lettered in Dutch and English, to the memory of persons having uncouth names, and by the Dutch Bibles and scored psalters placed in the pews.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

NORTHERN ARCHITECTURAL ASSOCIATION.—THE ECONOMY OF HOUSEBUILDING.—On the occasion of the quarterly meeting of the Northern Architectural Association, held on the 25th inst. in the Old Castle, Newcastle, a paper on the above subject was read by Mr. Shewbrooke. Mr. Thos. Oliver, president, occupied the chair. In the course of a well written and exhaustive paper, Mr. Shewbrooke contended that an essential to success in the planning of any house was to carefully study the nature of the site selected, and to fit the house to the site. The question of subsoil was also an important consideration, the choice should be a gravelly one, and as damp sites were objectionable, no house should be built in a hollow where natural drainage is all towards it. In this climate of ours he thought it was most important that the living rooms should have good aspects, and should be so arranged that those that inhabited them should have their lives brightened and cheered by the surroundings. In town houses there was very little choice of either aspect or prospect, but the sunny side of the street was healthiest, the east being damp and gloomy, especially in winter. He considered the practice a bad one of putting the first floor of houses too near the ground, and was convinced that they were all the healthier by being approached by six steps instead of two. Mr. Shewbrooke gave a minute description of the general principle that should govern the arrangement, disposition, and relative position of houses.

PARLIAMENTARY NOTES.

PROPOSED COMMITTEE ON ANCIENT MONUMENTS.—On Tuesday, Earl Percy moved for the appointment of a select committee to inquire into the number, situation, and condition of the various ancient British, Celtic, Roman, Danish, or Saxon monuments in the United Kingdom which are of interest from a scientific or antiquarian point of view, and to report what legislative measures are necessary for their preservation. The motion was seconded by Mr. Whitwell, and both gentlemen urged that such an inquiry would facilitate the passage of a satisfactory Ancient Monuments Bill. Mr. A. Peel, on behalf of the Government, opposed the inquiry as unnecessary, pointing out that the schedules of Sir J. Lubbock's Bill, in which all the public monuments to be preserved were enumerated, had already been very carefully considered by a select committee and the Royal Society of Antiquaries. Mr. Baring also opposed the motion, and Mr. O'Morgan, on the same side, pointed out that the Bill had been 11 times before the House. Mr. C. Bentinck, Mr. Beresford-Hope, and Mr. M. Stewart spoke in favour of the motion. Lord R. Churchill moved the adjournment of the debate. This was carried, on a division, by 177 to 78.

The improvement commissioners of Ramsgate proceeded on Friday to the election of a town surveyor; 149 candidates had offered themselves, from amongst whom seven had been selected by a committee for the final vote, viz., Messrs. W. Barley, of Middleton, near Manchester; Bowen, of Stoke-on-Trent; P. Britton, of Leeds; W. Horne, of Southport; E. Winter, of Liverpool; W. G. Osborne, of Ramsgate; and A. Twyman, of Ramsgate. The first named candidate was elected.

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DESIGN FOR A HOUSE ABOUT TO BE ERECTED.—INTERIOR VIEWS OF TWO ENTRANCE HALLS.—NEW OFFICES AND WAREHOUSE, LEEDS.—DETAILS OF CEMETERY CHAPEL, TAVISTOCK.

OUR LITHOGRAPHIC ILLUSTRATIONS.

A HOUSE ABOUT TO BE BUILT.—T. E. COLLCUTT ARCHITECT.

This house is illustrated from Mr. Collcutt's large drawing now on view at the Royal Academy, and, beyond the fact that the building is about to be erected, we have received no further particulars.

NEW OFFICES AND WAREHOUSES, LEEDS.

Messrs. Wilcock and Co., the well-known manufacturers and pit-owners, of Leeds, are about to recast their town offices on the lines of the old frontages, which have to be preserved, and this, with the already-determined heights, ruled the architect in preparing his design. It was also desired that the new façade should exhibit the several terra-cotta and faïence specialities produced by Messrs. Wilcock. Thus, for instance, the parapet to the offices is formed of a series of coloured panels, of continuous ornament, in Burmantofts faïence, like the shield over the show warehouse entrance. As a rule, terra-cotta, and such-like enrichments, have been over-elaborated, and its ornament too freely spread over those buildings which have been erected with a view of showing the capacities of the material, so that, to some extent, a less favourable impression of the uses to which clay-ware ornament may be put, architecturally, has been obtained than would otherwise have been the case, had a more sparing and judicious use of a really good style of ornament been employed. This, for one thing, is a point which it has been the endeavour of the architect, in the present instance, to observe. The forecourt is used for the display of specimen-articles of Messrs. Wilcock's manufacture, and as much business is often transacted here, the benches on either side of the entrance were thought desirable. The architect is Mr. Maurice B. Adams, M.R.I.B.A., of London. The original drawing, from which our illustration is taken, is now on view at the Exhibition of the Royal Academy at Burlington House.

TWO ENTRANCE HALLS.

These interior views, herewith published, are also now being exhibited at the Royal Academy, and they illustrate two entrance-halls, designed by Mr. Maurice B. Adams, for a leading member of the firm for whom the above offices are to be built. The ornament is chiefly obtained, though by no means exclusively, in the sort of majolica-ware specially made by Messrs. Wilcock and Co., and called by them "Burmantofts" faïence, their works and pits being situate at that place, near Leeds. The clay from which the faïence is made is of a very fine and pure quality. Hitherto it has been worked only in the Leeds district, and when subjected to intense heat, the texture becomes both very hard and close, while the colour of its surface is almost entirely free from the metallic impurities often observable in fireclay. Forms both of a constructional and decorative character can easily be made, of any size up to 3 or 4ft. square, having a moulded surface, and proportionate thickness. The artistic effect produced by its mottled colourings free this faïence from the objection of hardness in appearance, often made against ordinary tile decorations, and yet its absence of unquiet effect renders its use for mantels and fire-places to be desired instead of other materials, such as stone or marble. For exterior work, the hard texture and glazed surface of the faïence give a practical guarantee that the impurity of the air in our large cities and towns can affect it only in such a way as could easily be removed by washing, the same remark applying to its use internally, for dados, or staircase mural decorations.

CEMETERY CHAPEL AND GATEHOUSE, TAVISTOCK.

The two sheets of drawings which we give today complete our illustrations of these interesting buildings. Last week the general drawings of the chapel itself were given. This building stands on the top of a hill, and is reached through an avenue of trees, at the foot of which stands the gatehouse and mortuary. All the buildings are built of granite, and the details in consequence of this fact have a particular interest. Mr. Henry Clutton, of Spring-gardens, S.W., is the architect.

FLOW OF WATER IN CHANNELS.

There have been numerous experiments made by hydraulicians of late years to discover a formula that will give the velocity of the flow of water under different circumstances. Messrs. Ganguillet and Kutter have recently claimed to have solved the difficulty by a new formula, which is said to take into account the complicated conditions of various cases. It is said to apply equally well to rough and smooth pipes, iron and cement, wood and glass, canals and rivers. We find a writer in the "Proceedings of the Engineers' Club of Philadelphia" (Mr. Thos. M. Cleemann, C.E.,) hesitating to accept it as the panacea; in fact, he attempts to disprove its claims by referring to some experiments made by Mr. Charles Darrach, of the Philadelphia Water Department, to which the formula had been applied. Without entering into the calculations here, it may be observed that the writer shows that the formula is more complicated and less accurate than that of Weisbach in its application to the experiments mentioned. He observes, "when we add the formula (Weisbach's) is also more simple, it will, no doubt, be conceded that for small velocities in pipes running full, the new formula is no addition to our previous knowledge, but is rather in a retrograde direction. Perhaps when applied to the flow of water in open channels, its results are more to be depended on, and it is believed to have been intended by its authors only to apply to those cases." From the experiments made by Mr. Darrach, a simple formula was found to apply, in which the friction head is made to vary in a simple ratio to the velocity. This equation is

$$h = \frac{4\,L\,v}{2\,g\,d}\cdot 0379985 - \cdot 5394238$$

in which h is the head due to friction or other resistance in the pipe. A table accompanies Mr. Cleemann's paper, which gives the friction heads obtained from the above equation. In another point the author examines the formula of Gunguillet and Kutter, which is said not to be applicable to water flowing in pipes under pressure. "It is said that an increase of pressure on the pipe would increase the friction in proportion, and as the pressure due to the head of the water flowing in pipes not full was always small, its effect might be neglected in such pipes, while it would produce a great effect in pipes with a great head." In one of the experiments we are referring to, the friction-head is found to vary according to a certain law, which stated in words is that the friction is proportional to the velocity, and independent of the pressure of the water in the pipe. We give the summary of Mr. Cleemann's paper in his own words, as follows:—

"The experiments show that the friction of water in pipes under pressure is independent of the static head, and directly proportional to the velocity. The law is then applicable to water flowing in pipes with very small heads, such as pipes partly full. Conversely, a formula applicable to the velocity in the latter case is applicable to the former. Ganguillet and Kutter's formula, applied to the former case, is found wanting, therefore it is also wanting in the latter case, for which it has been so strongly recommended."

Mr. Cleemann's paper, detailing the results of these experiments, is important; from the table he furnishes the proofs seem convincing, as the actual values differ materially from those given by the Kutter formula. Those interested in the subject will find the table of the values conclusive of the views expressed.

ADDENDUM TO A DIGEST OF BUILDING CASES.*

We lately noticed a useful compilation of building cases, with notes, by Mr. E. S. Roscoe, barrister-at-law, and we have now on our desk an addendum to that work, containing the judgment in the important case of Clemance *v.* Clarke. The case has not been reported in any paper; it has therefore additional value to the architect, coming in the form of a carefully-revised transcript of the shorthand writer. Our readers may remember this was an action brought by a builder in the Common Pleas Division of the High Court of Justice for a balance of money due for work done; judgment was given by Lord Coleridge for the plaintiff. A rule nisi was granted for a new trial; and when the question was argued, the Court decided in favour of Lord Coleridge's judgment. In the prefatory note upon this case Mr. Roscoe observes: "An architect may make his certificate from the measurements of a competent surveyor; but if he delegates the whole of his duty, that would amount to legal misconduct, which would avoid a certificate. When a contract states that 'a certificate of the architect showing a final balance is to be conclusive evidence of the works being finished,' it is legally conclusive, and cannot, in the absence of misconduct on the part of the architect, be set aside." The rule was granted upon two points—that the certificate was not final, and that the architect had not properly exercised the duties he was supposed to have undertaken of certifying to the work being properly done. The wording of the certificate is important, and ran—"I hereby certify that J. C. is entitled to receive the sum of £585 to balance account of works, as certified by the measuring surveyor, to be the final amount due thereon, executed by him at, &c.—C. F. H., architect." It was contended that the words "as certified by the measuring surveyor to be the final amount due thereon" showed the architect had not exercised his own judgment; but, as Mr. Justice Grove said in giving his judgment, the architect simply takes the measuring surveyor's certificate of the measurement, who, in fact, has gone over the measurement of the work for the architect, and upon that the latter has found what is the balance due. As to the arbitration clause, the judge ruled that it refers to disputes only between the architect and contractor. Mr. Roscoe's addendum forms a valuable addition to his Digest, and we cordially recommend it to the perusal of all architects and builders. A few copies of the report have been bound separately.

CHIPS.

The peal of eight bells in Debenham parish-church, Suffolk, which were cast in 1761, have just been rehung on new principles, with new stocks, wheels, brasses, and cast-iron chairs, and were reopened on Whit-Monday. Messrs. George Day and Son, of Eye, Suffolk, carried out the work.

The foundation-stone of a new Congregational church at Looe, Cornwall, was laid on Monday. The architect is Mr. Snell, of Plymouth, and the builder Mr. S. Jane, of Liskeard. The cost will be £1,200, and accommodation will be provided for 300 persons.

A new Board school in Bradford, near Manchester, is approaching completion. The building is from the designs of Mr. Lowe, architect, of Manchester, and will cost £6,000. Accommodation is provided for 750 children.

* Addendum to a Digest of Building Cases. By E. S. Roscoe, Barrister-at-law. London: Reeves and Turner, Chancery-lane and Carey-street.

GATEHOUSE AND MORTUARY TO CEMETERY AT TAVISTOCK

HENRY CLUTTON ARCHITECT

WORKING DRAWING

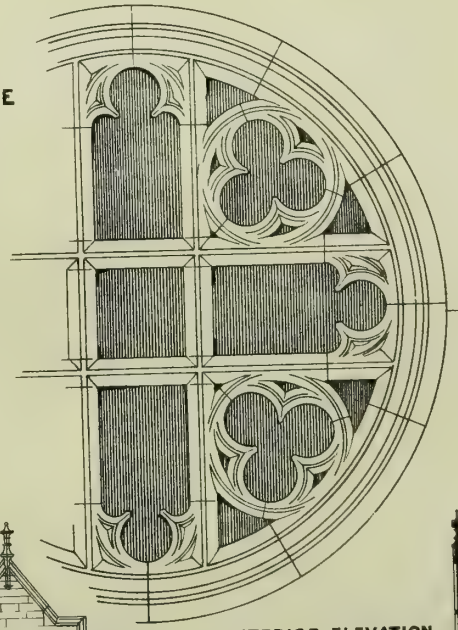


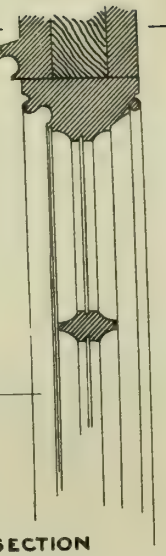
EXTERNAL ELEVATION



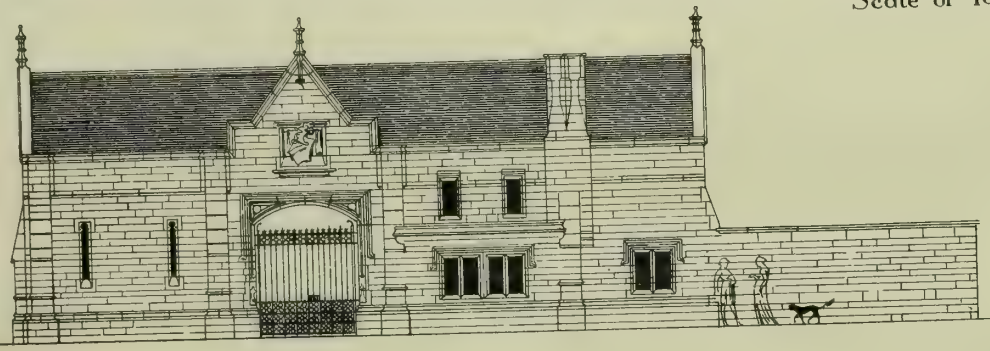
Scale of feet

DETAIL OF LARGE WINDOW IN MORTUARY

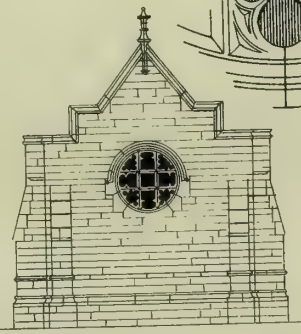




SECTION

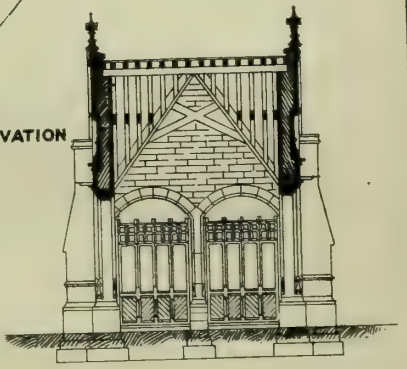


ELEVATION TOWARDS CEMETERY

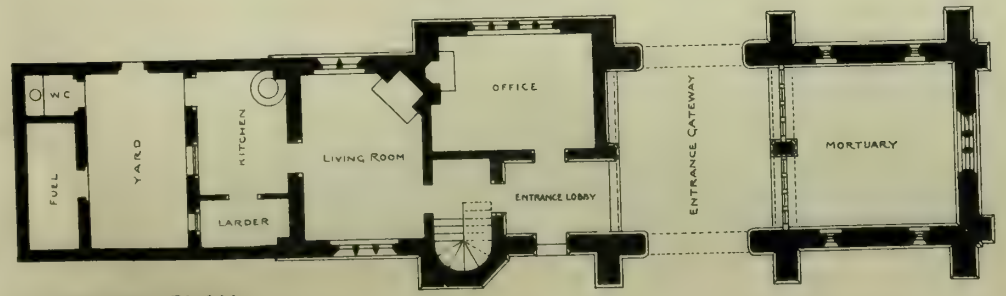


SOUTH ELEVATION

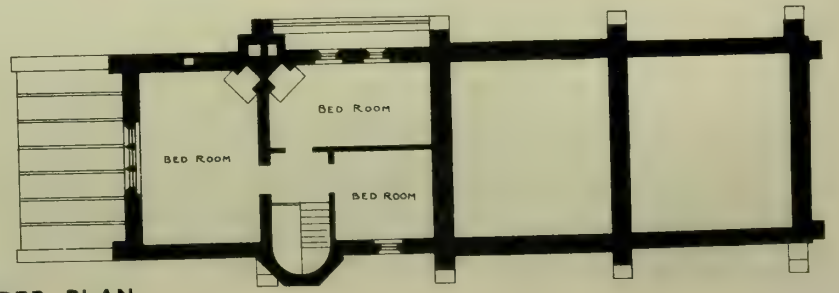
INTERIOR ELEVATION



CROSS SECTION



GROUND PLAN



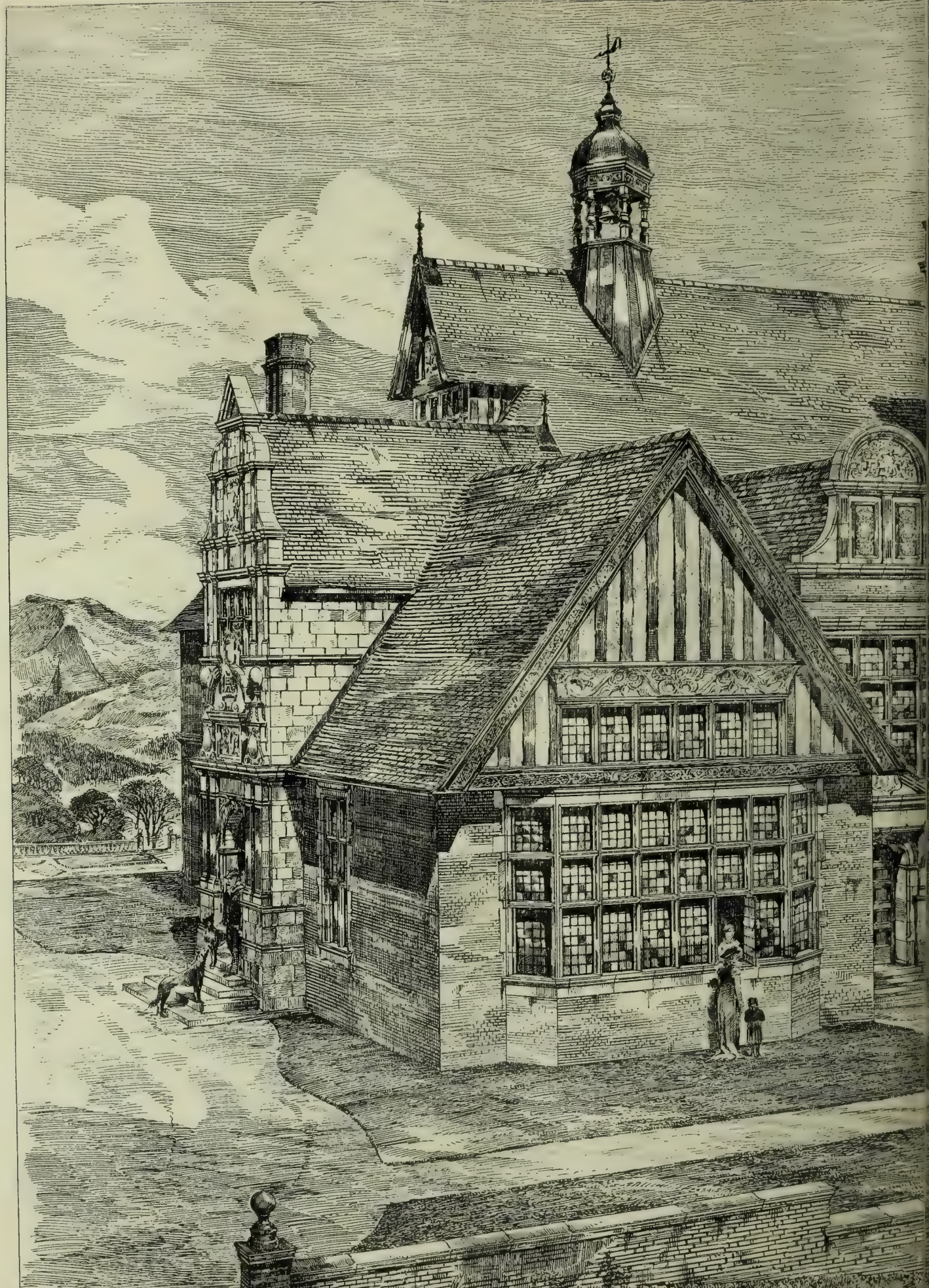
UPPER PLAN

MAURICE B ADAMS DELT

Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.



Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.



A HOUSE ABO
T.E.COL

MAY 23 1880.

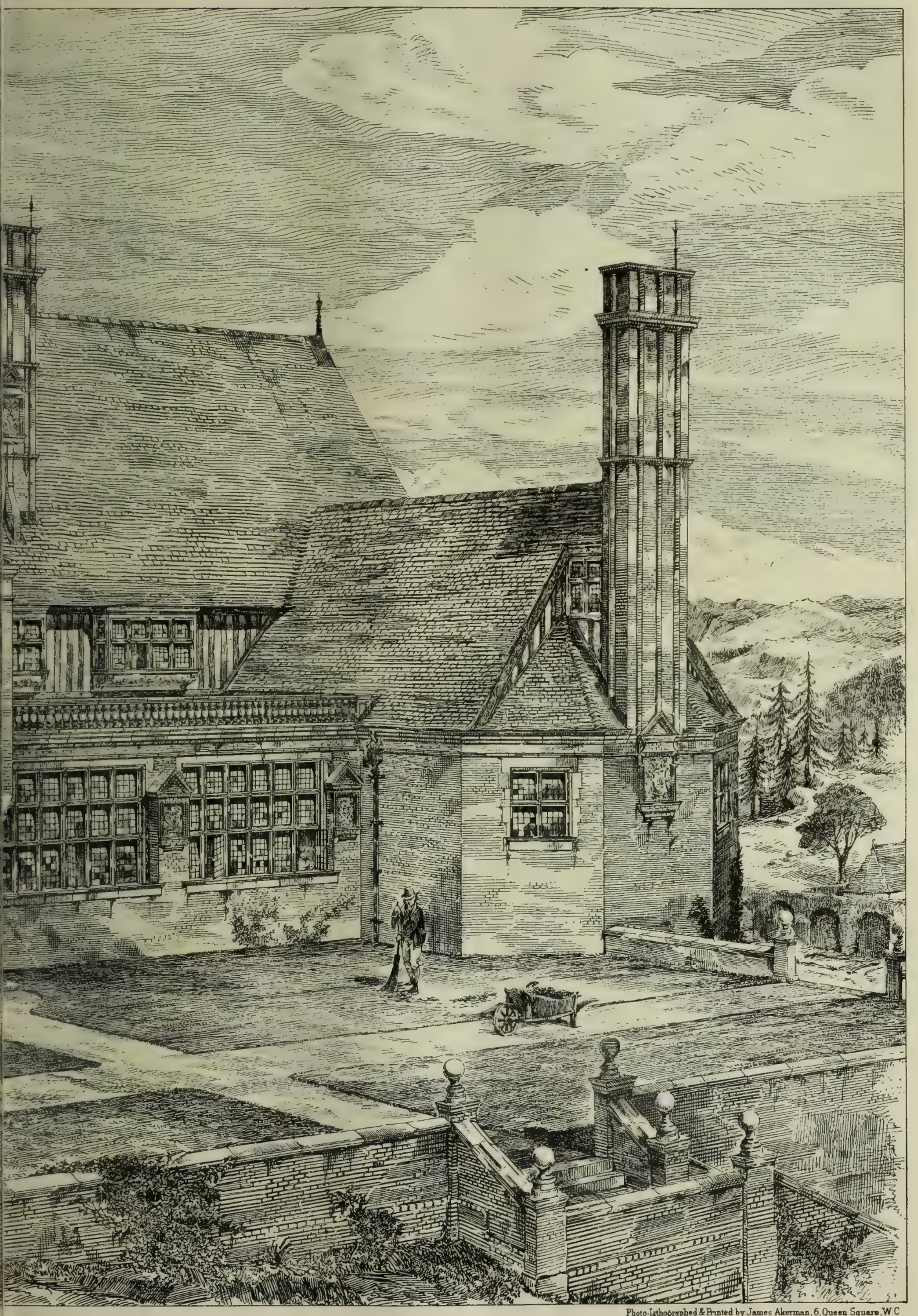


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W C

TO BE ERECTED

TT ARCHT



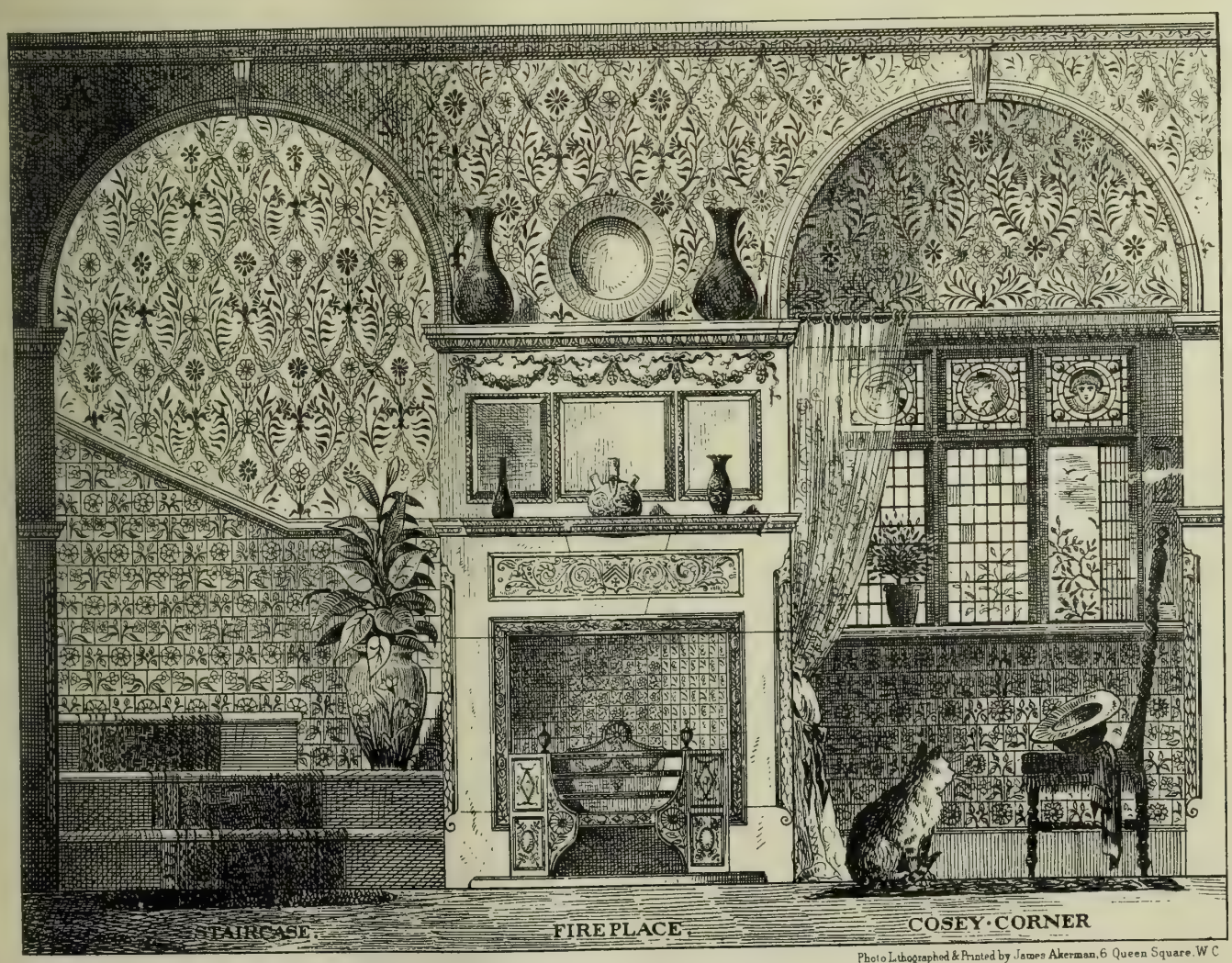


Photo Lithographed & Printed by James Akerman, 6 Queen Square, W C

TWO INTERIOR VIEWS OF TWO ENTRANCE HALLS DECORATED IN "BURMANTOFTS" FAIENCE

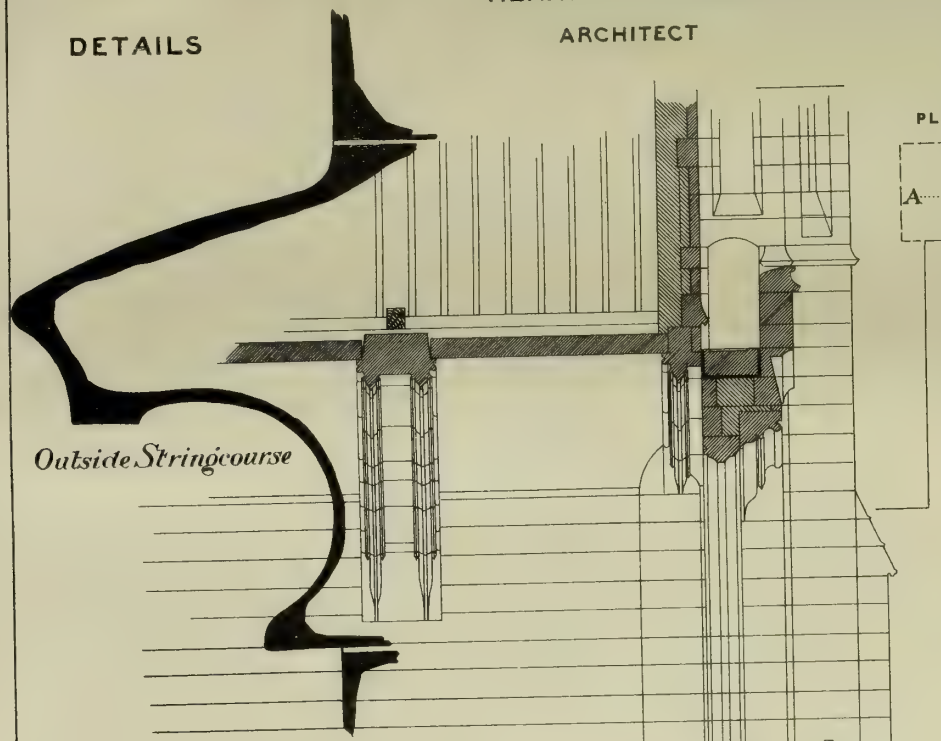
MAURICE B. ADAMS, A.R.I.B.A. ARCHT.

CEMETERY CHAPEL TAVISTOCK

HENRY CLUTTON

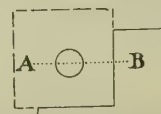
ARCHITECT

DETAILS

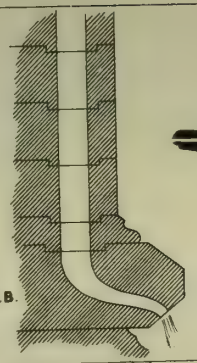


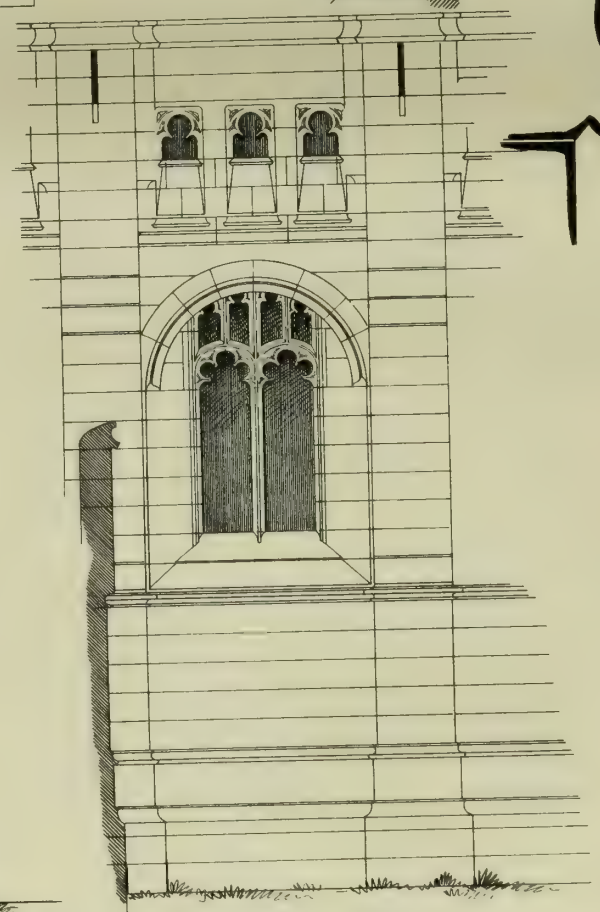
RAIN WATER OUTLETS

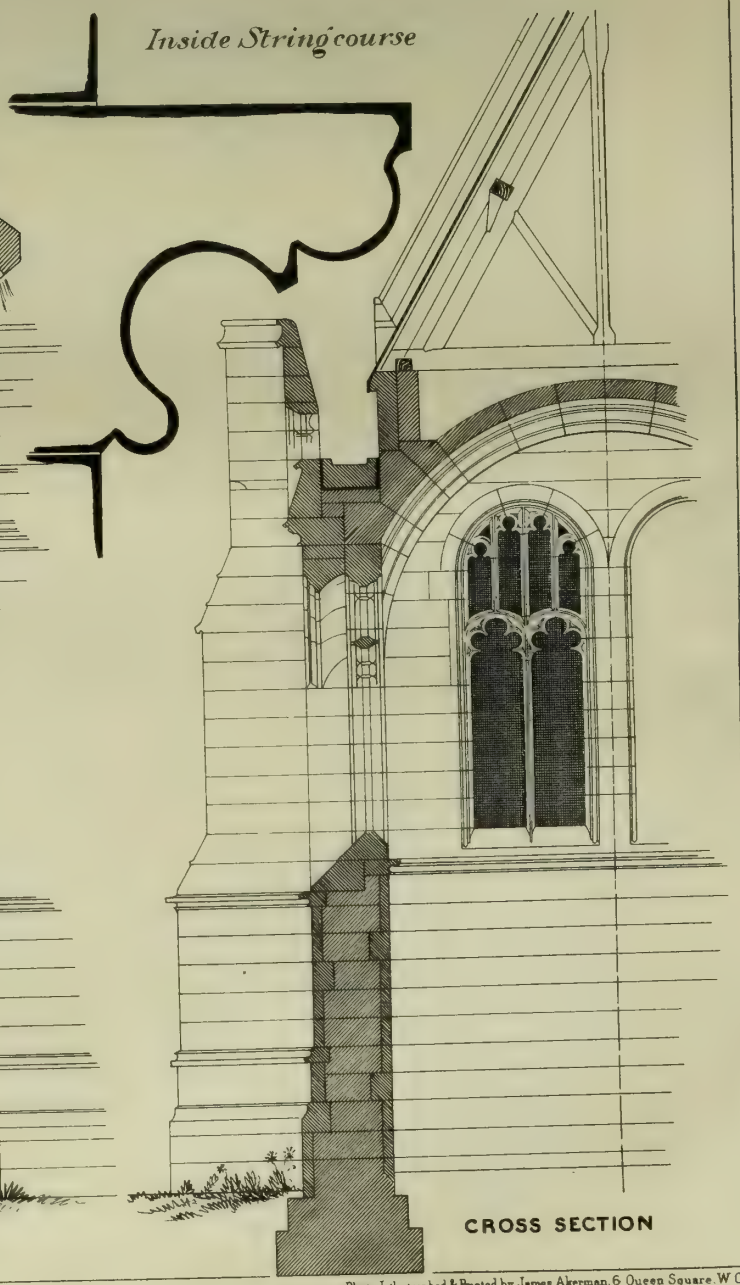
PLAN OF ANGLES



SECTION A.B.







LONCITUDINAL SECTION

Scale of feet

ELEVATION OF ONE BAY

CROSS SECTION

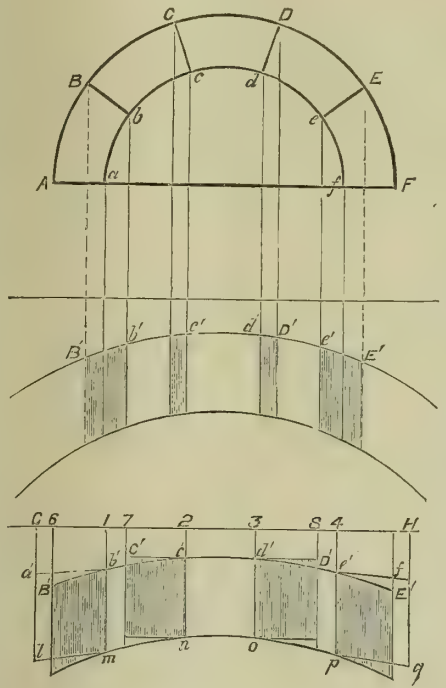
MAURICE B ADAMS DEL.

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OUR COMMONPLACE COLUMN.

MASONRY.

THE term "masonrie" was used in the reign of Elizabeth as the equivalent for "building" (Harrison in Holinshed). This term, no doubt, originated from the French *maison*, a house; thus, *maisonner* is to build houses. In the present brief notice we may confine our attention to the different sorts of masonry in use. *Rubble*, which is the commonest class of work, is of several kinds, though it may generally be considered under coursed or uncoursed. We may specify "random rubble," random rubble set with quoins, joints, and architraves, and levelled in courses; coursed rubble; "snecked rubble," generally set in courses; rubble in alternate courses with bricks or tiles; flint rubble, whole or cut; boulder rubble, both being used with brick or stone quoins and courses; herring-bone rubble. Under *squared and bedded stones* may be mentioned coursed wall-stone set in mortar, either rough or pitch-faced, scabbled, punched, skutched, and boasted—terms that describe the kind of tool-finish for the face; most of these have beds and joints more or less finished. *Block in course* describes a sort of masonry in which the stones are of large size; it represents a kind of work between coursed stone and ashlar. *Ashlar.*—In this kind of masonry the stones are gauged or set in true courses, the depth being from 12in. to any thickness, with an area on bed of from 6ft. to 18ft. The beds and joints are chisel-dressed, or drafted and boasted off. It is generally specified according of the kind of finish on the face; thus there is usually axed, tooled, and rubbed work; drafted, punched, reticulated, boasted, random tooled, or it may be, rusticated, as in quoin work. For technical information of the working of the face in these different manners, we may refer to articles in the BUILDING NEWS, Dobson's "Masonry and Stonecutting" (Lockwood's series), "Practical Masonry," edited by Robson, and to the article "Stone-Masonry," in the *Encyclopædia Britannica*. For the history of stonemasonry the reader is referred, besides the above, to Gwilt's "Encyc.," Mr. J. H. Parker's works, papers in the *Archæological Journal*, 1845, Sessional papers of "R. I. B. A." The ancients had several modes of building walls, the opus, reticulatum, incertum, isodomum, &c. The cyclopean or Pelasgic masonry was composed of large polygonal blocks carefully cut, and fitted into each other without mortar. The Etrurians were great masons also, and the reader may refer to the tombs and cities composed of blocks of great size. In Mediæval masonry the mortar was the chief constituent in the cohesion of the work, the stones being usually small and irregular in size. Mr. J. H. Parker says, fine-jointed masonry was introduced into England about 1120. The tools used were the hatchet and axe. (See Sessional Papers, 1866.) The revival of Classical architecture brought back the ancient methods of workmanship; stones became large and more accurately set, and were faced to a fine surface. Jones and Wren introduced into England a better class of masonry which flourished under Vanbrugh, Hawksmoor, and Chambers till the Adams introduced cement or stucco. It will be unnecessary here to enter into the subject of stones, which has been treated so often in these pages. But of those varieties which are generally used we may mention the arenaceous kinds such as sandstones and gritstones, of which there are several which have weathered well. The finer-grained form good building-stones, such as Bramley Fall, Craigleith, Whitby, the Mansfield, and Corsehill. Of the limestones, we may name the Chilmark, of which Salisbury Cathedral and Wilton Abbey are built, the Bolsover (magnesian), used at Southwell Minster, and Houses of Parliament, besides the Barnack, Ketton (used in the Colleges at Cambridge, &c.), and the Bath and Portland oolites. The Corsham Down is a fine quality of stone for dressings, but the Box-ground is hardest, excepting the Portland, which seems to be the only stone which withstands the acids of the London smoke. The Kentish rag is another good limestone for walling; it is hard and generally hammer dressed. The strength and stability of masonry is another important branch of the subject for the architect's consideration. We refer the reader to Rankine's "Manual of Civil Engineering," and the article in the "Encyc. Brit." The principles of masonry, as applied to ordinary construction, are given in the Mechanical section of Wightwick's "Hints" (Guillaume's edition), Lockwood and Co. The stability of masonry depends on two forces: first, its weight and mass, and second, its cohesive resistance; it is the former force or kind of stability that the architect should chiefly rely on, as the cohesive strength of stone cannot be safely calculated upon. The bonding of ashlar with the backing has been a rather disputed point among masons. Ashlar stones should not be true parallelopipedons, but they should run back irregularly to tooth with the backing, and it is also serviceable to make the upper bed narrower than the lower bed. Another and more important precaution to insure good connection is to set the backing with narrow joints and quick-setting mortar, so that it may not settle from the facing. It should, if possible, be of coursed rubble or brickwork. An architect's specification should be explicit about the mode of construction, the necessity of bond-stones every alternate course, and that they should not be in the same vertical line. *Stone-cutting* depends on various mechanical operations, as on reducing stones to shape by the axe, saw, scabbling-hammer, or in dressing it by the chisel or point. The more scientific operations of masonry require a knowledge of descriptive geometry, as in the formation of moulds and the projection of lines, planes, and curved surfaces. The student is advised to study particularly the problems relating to the sections of a cone and its development, a problem required in roofing, staircases, &c., and also the sections of the cylinder and its developments, so necessary in vaulting, &c. One of the problems in stone-cutting is to find arches splayed inside and arches in oblique walls. To find the moulds for the soffits and arch-joints of arches in circular walls is another perplexing problem that needs explanation; we may, therefore, for the benefit of our younger readers, describe the process, which is very simple. Let A F be the circular arch in the wall of a circular tower or bow, the plan of which is



L M N O P Q. Draw the arch-joints, bB, cC, &c., in the section, and at their extremities let fall on the plan the verticals b^1B^1, c^1C^1, as shown by the shaded parts in the plan. Draw any line, R S, perpendicular to the lines let fall; also draw G H in the development, and make it equal to the soffit of arch stretched out. Divide it into as many parts as arch stones, at 1, 2, 3, &c., draw the perpendiculars and set down 1, b^1, 2c^1, making these distances equal to 1 b^1, 2 c^1 on the plan. Do the same with 1 m, 2 n, 3 o, &c., then the line a^1 b^1 c^1, &c., is the front line of soffit, and l m q the inner line, and c^1 d^1 n o, b c m n will represent the soffit of each arch stone. To find the arch-joints from the lines b^1 m, c^1 n, set out the depth of arch stone equal to B b on the cross section, and on the line G H set down 6B^1, 7 C, &c., equal to the same on plan. The shaded portions will then be the moulds for the arch-joints. The method is adapted for any sort of arch or any form of wall, cylindrical or conical. The intersection of arched vaults producing groins is another important study, and is easily mastered (see Dobson's "Masonry"). Spherical vaults and domes are developed in two ways, either by horizontal sections or zones, or by the system of gores or vertically cut slices. *Induration of Stone.*—We may here give a brief *résumé* of the processes used for protecting stone. The water-glass method consisted of washing with silicate of potash, or water-glass; but was without any good results. Various oleaginous processes have been introdaced, by which the stone is saturated with oil or fatty matter. Mr. Hutchison, of Tunbridge Wells, took out a patent and applied it to a sandstone. The stones were boiled in a solution of resin, turpentine, wax, oil, &c., till they were impregnated a sufficient depth. Mr. Barrett took out another patent for a more elaborate process; the ingredients included similar substances: resins, fats and tallows, guttapercha, &c. Mr. Daines suggested a solution of sulphate of zinc, or a solution of alum, to the wall, and then a sulphur composition dissolved in oil. All these processes have failed in their object. Mr. Ransome's indurating solution consists, first, of treating the stone with a solution of silicate of potash or soda, and then with a solution of chloride of barium or of calcium; the pores of the stone are then protected by an insoluble silicate, which enters. Szerelmey's process has been used on the Houses of Parliament; with what success, any one may discover. Other recent solutions are those introduced by the Indestructible Paint Co. (Browning's patent), and various kinds of paint, which, more or less, render the stone impervious to water, or protect it as an outer covering. They have been all described in the BUILDING NEWS. For copings, cornices, and other kinds of stone-work, dowels, joggles, or dovetails of stone, slate, hard wood, or cast iron have been recommended instead of iron or copper. A stone string course well dovetailed in the bed, forms a chain and assists to tie together the brick walling. *Measurement.*—Walling is generally measured by the perch of 21ft. superficial, at a thickness of 18in., or by the cubic yard; sometimes it is cubed. In abstracting the quantities of superficial measurement it may be placed under different thicknesses. The amount of each column being multiplied by the thickness in inches, and divided by 18, gives the reduced quantity. Generally the facework is measured separately, and paid for by the foot super, as scabbled, hammer-dressed, axed, &c. Quoins or angle-piers are measured differently in different localities; though often are charged at per foot in height, except superior work. Walling of block stone is charged at per cubic foot, according to description, as ashlar prepared and set, including all beds and joints, but the face is charged extra at per foot super, as drafted and picked, tooled, rubbed, &c. Stone used in strings, blocking courses, cornices, steps, columns, &c., is measured at the cube foot for the rough stone and setting, and the work on it is taken as plain sunk, or moulded, by the foot superficial, or charged as beds and joints, sunk joints, plain face, sunk face, &c. It is usual to include the plain beds and joints in the price per foot cube, and to charge only the face work extra. (See articles by Mr. B. Fletcher on "Quantities," Dobson and Tarn's "Student's Guide," &c.) *Memoranda.*—Hurst gives the following useful data:—*Rubble masonry*, when built in courses, requires per cubic yard about 35 cubic feet of stone (including waste) and 6½ cubic feet of mortar; but in random and uncoursed rubble-work 33 cubic feet of stone and 9 cubic feet of mortar are required. *Flint-work.*—Twenty-two bushels (equal 1 ton) of rough flint, with one bushel of split flints to every yard superficial of face, and 8 cubic feet of mortar, will build 1 cubic yard of flint walling. *Ashlar* masonry requires for every cubic foot about 1 1-10th cubic foot of undressed stone, and from 1-8th to 1-12th cubic foot of mortar. Pointing ashlar masonry requires per yard run of joint from 1-20th to 1-30th of a cube foot of mortar, according to thickness.

A new town-hall has been built at Yeadon, near Leeds, from the designs of Mr. W. Hill, architect, Leeds. The building will cost about £10,000.

WORTLEY, NEAR LEEDS.

IN my rambles, after missing the train, my attention was drawn to a number of workmen coming along Old Field-lane, and on inquiry I found they were employed at a new reservoir, now drawing near to completion. As I am a little acquainted with building operations, and also wishful to add to your valuable columns, I wended my way, partly through curiosity and partly for the sake of passing time away in this remote suburban part of the busy town of Leeds, to the above. I was informed in my walks that the principal works in this neighbourhood are Messrs. Ingham and Son, Cliff and Son, and Mr. Northy, all celebrated for the manufacture of firebricks. Adjoining to Wortley is Armley, where lately has been erected a beautiful edifice, St. Bartholomew Church. I find there are extensive railway works being pushed forward for the London and North Western Railway Company from Wortley and Farnley Station to Leeds. I am also informed, on inquiry, that the reservoir to which I am wishful to draw your attention is for storage purposes for the supply of Leeds. The plans have been prepared by Mr. E. Filliter, civil engineer, and the work has been intrusted to the firm of Messrs. Cluderay and Newton, contractors, Holbeck-bridge, Leeds, which has been carried out under the management of Mr. Henry Swann, and superintended by Mr. George Barrow as clerk of works for the engineer. The reservoir has been built on the side of a hill on land purchased by the Corporation. The piece of land is inclosed with a new red brick wall one and a half brick thick, covered with a blue brick coping, half-round and bedded in cement. The coping bricks have been made at the Victoria Works, Aldridge, Staffordshire. They are 4in. thick, and of a very durable nature, and the only brick of the kind I have seen in my rambles. The red bricks have been manufactured at the works of Messrs. Massingham and Son, and Messrs. Cliff and Son, and are of excellent quality; there is an entrance-gate of pitch-pine, with two massive stone piers 2ft. square, chamfered at angles, with a double-weathered stone cap; just within the gate is a flight of stone steps with a little red brickwork at each side, coped with a sandstone coping 6in. thick. The banks are formed to the underside of the coping, and will, when complete, have a very nice appearance. The reservoir is to hold one million gallons of water, and is about 173ft. long and 83ft. wide outside, and is strongly constructed, having at the bottom 2ft. of good clay puddle on a foundation of strong shale, then a 6-inch layer of concrete; above that the bottom is divided into squares of 10ft. each, diminishing to 1ft. 7in., and about two feet high, forming an invert with 4½in. of brickwork, upon which is placed a stone 6in. thick; then a pillar built of blue brick 9ft. high, on the top of which is placed another stone 9in. thick, chamfered to a size equal to the bed of the last iron beam. All the ironwork has been supplied by Mr. Butler, of Stannaway. The side walls are diminished to one and a half brick thick on top, and the end walls are diminished to two brick on top. Inside, the reduction in the thickness of the wall is every two feet, by two courses of plinth bricks, equal to 4½in. The outside is neatly pointed and built straight; all the walls and brickwork connected with the reservoir are built with cement in proportions of two of sand (river and clean washed), and one of cement; likewise, a well 6ft. in diameter, in which are the valves for turning on and off the water, also for the outlet pipes, for the purpose of cleaning out the reservoir. This is covered with Bradford stone 4in. thick, with manhole. Outside the walls of the reservoir we find 2ft. of good clay puddle, and then well formed sloping banks. The puddle is carried 12in. above the overflow pipe, and has been laid in courses of 8in., each course having been carefully cut with a tool, and thus thoroughly united. The beams are then placed on the top of the stone on the brick piers, and on a stone built in the walls at each end, all well bolted together, forming eight spans, over which are turned arches of 4½in. brickwork, with the haunches filled with lias lime concrete to a surface 3in. above the crown of the arches, and formed hollow between each arch, with a fall from the centre to each end. Then the whole is covered with two coats of boiled tar and pitch put on hot, after which is laid a 3in. clay pipe without sockets, covered with broken stones. The whole surface is then covered with soil 9in. thick. There are light cast-iron frames in the arches, with covers neatly designed. One is placed at each corner, and iron steps walled in the wall, forming a very complete access. The other four are divided and put in the centre, principally, I imagine, for light; and when all is complete and the grass grown over, I have no hesitation in saying that a piece of good substantial work will have been completed. In conclusion, I must say that, as far as my experience allows me to judge, I think there is great credit due to all who have been connected with the work.

I intend giving you at some future time a full description of some other works there being executed, and which have been intrusted to the care of the same engineer.

A. Rambler.

COMPETITIONS.

The Rowland Hill Memorial.—At a meeting of the sub-committee appointed to take steps for the erection of a statue of Sir Rowland Hill in the City, it was decided to seek permission for its being set up beneath the portico of the old Post Office in St. Martin's-le-Grand. It was resolved that the statue should be of white marble 8ft. high, with a suitable pedestal, and that a number of sculptors not exceeding twelve should be invited to send in designs and models for it.

CHIPS.

A lively discussion occurred at the meeting of the vestry of St. George the Martyr, Southwark, on the 18th inst., relative to a proposition that the surveyor, Mr. Hiscocks, be paid £25 for extra services rendered in connection with the erection of the mortuary, the contract price for which was £60. It was contended that the work came within the duties of a surveyor, but Mr. Hiscocks, replying to questions, said he was appointed as a surveyor of roads and sewers, and not as an architect. On a division, the honorarium was ordered to be paid by 25 to 8 votes.

The tender of Messrs. Beaver and Dew has been accepted for the restoration of Burnham Westgate Church, North Norfolk.

A destructive fire occurred on Saturday on the Surrey Gardens estate. It commenced in a large building used by Messrs. Sutton and Dudley, the contractors, for the manufacture and storage of building materials, and resulted in the destruction of these premises and of the adjacent saw-mills, workshops and stores, engine-house and three unfinished houses, and great injury to adjacent property.

The memorial-stone of the new town hall for Hove, West Brighton, was laid on Saturday. The building will front Church-road, and is to be erected in brick and terra-cotta, from plans by Mr. Alfred Waterhouse, A.R.A., and the estimated cost is £31,000.

The memorial-stone of a new Baptist Chapel was laid in King's-road, Reading, on Tuesday. The building will seat 700 persons, and will cost £3,000. Mr. Ravenscroft is the architect, and Mr. Filewood the contractor.

The vestry of St. James's, Westminster, on the 20th inst., adopted the recommendation of the works committee, and resolved to dispense with contractors on all works in connection with sewers, drains, &c., the work is, during the present year, to be done by the vestry's men, under the supervision of the surveyor and a clerk of works.

The Earl of Leicester has accepted the tender of Mr. Alfred Beaver, of Burnham Market, for the restoration of Flitcham parish-church, near Lynn. The work will be under the direction and from the plans of the architect, Mr. G. T. Pedder.

The Berks Archæological Society will visit Cirencester on Thursday next, the 3rd prox., when the church, the museum, and the Roman remains discovered during the past month, at Watermoor, just outside the old Roman wall, will be examined, under the guidance of the Rev. E. A. Fuller and Mr. Christopher Bowly.

The east window of the parish-church of Tolleshunt Knights, near Maldon, Essex, has just been filled with stained glass. It is in four lights, and the subjects are, the Birth, Crucifixion, and Resurrection of Our Lord, and the Agnus Dei. They have been executed by Mr. Clutterbuck, of London.

The Bishop's Palace at St. Asaph is undergoing complete restoration at the hands of Mr. Francis Williams, a local builder.

Building Intelligence.

Bristol.—The business of the Wilts and Dorset Banking Company has been removed to the building which has just been completed at the corner of St. Stephen-street Bristol. Classic in design, the new building is carried up to a height of three stories, the materials used in the St. Stephen and Corn-street fronts being Messrs. Pictor and Son's Box Ground stone, backed by hard Cattybrook brick, while that part facing St. Leonard's-lane is carried up in brick, with Bath stone dressings. The premises were designed by Mr. Silley, architect, of 3, Craven-street, Strand, London; the builders were Messrs. Stephens and Bastow, of Cheltenham-road; and Mr. Dixon officiated as clerk of the works.

Lee.—The decorations to the sanctuary of the chancel of St. Margaret's Church, Lee, Kent, have just been completed by Messrs. Cox and Sons, of Southampton-street, Strand. The groined roof of the ceiling of the sanctuary has been gilt, and the north and south walls have been painted and decorated in diaper work, with a handsomely-painted angel in the upper panel on either side. The marble reredos has been continued on the side walls in rich inlaid mosaic marbles of different kinds, including Derbyshire spar. The other work which has been done by the same firm includes a stained-glass window, representing the baptism of Our Lord, which has been introduced over the door of the baptistry. The pipes of the organ in the chancel have also been decorated, and in the place of standards for lighting the sanctuary, two gas brackets have been placed on columns.

Soham, Cambs.—The parish-church was reopened on Tuesday week by the Bishop of Ely, after restoration under the supervision and from the plans of Mr. J. Piers St. Aubyn, of the Temple, London. The building was originally a cruciform church with central tower (now removed), built about the end of the 12th century, with Decorated and Perpendicular insertions, and with an extension westwards by one bay and a west tower in the 15th century. The alterations now completed include complete repair of all the windows, doors, and other stonework, both within and without. New roofs have been put to north and south transepts, as well as to the two chapels on north side of chancel, and a new floor to the west tower. The other works include the replastering of walls, the removal of the galleries which encumbered the church on every side, the rearrangement of seating, opening out of tower to nave, removal of font, retiling of floor, reglazing of all windows, and warming of church. Accommodation is now provided for 562 persons. Some portions of the work were carried by Mr. Tooley, of Bury St. Edmunds, and the restoration was completed by Messrs. Tebbitt, of Soham, at a total cost of about £3,000. Mr. Tebbitt, senr., died during the progress of the work, which was then taken up by his son.

Truro Cathedral.—"With princely state, with religious solemnity, with mystic ceremony, and with a pomp and glitter almost barbaric in its splendour, the first stone of the first Protestant cathedral to be erected in this country"—so the *Times* says—was laid at Truro last week by the Prince of Wales, in the presence of 8,000 spectators. In his design Mr. J. L. Pearson, A.R.A., has endeavoured to obtain the style and character of an English cathedral, and the features and details are Early English. The only portion of the church of St Mary at present occupying the site which will be retained, will be the six eastern bays of the south aisle, a rich piece of Early Perpendicular work, but the stone panelling upon it, now somewhat decayed, will not be restored, and the principal measurements of the cathedral will be: choir 115ft. long, the nave 165ft. long, 76ft. wide, and 70ft. high from floor to roof, central tower and spire 224ft. high, and two western towers, each 204ft. high. The fall of the ground to east will be utilised by the formation under the choir of a crypt, approached by steps from the choir and south chancel aisle, and to be used as bishop's, priests', and choir vestries, temporary chapter-room and singing-school. The materials will be Cornish stone for the walls, and red tiles for the roof. At the present time the choir will be built. Nearly £40,000 have been raised for the

site and building. It is not intended, at present at least, to employ a contractor. The works are to be carried out by Mr. James Bubb, the clerk of works, who has been with Mr. Pearson for more than twenty years, and has superintended the erection of some of the architect's most important works, the most recent ones whereat he has been employed being the new church at Dartington, near Totnes, and that of St. John the Evangelist, Red Lion-square, Holborn.

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CON AMORE. (In our decision we took the entrance to stable into consideration. It is certainly not good, but the leading point was the position of engine-house.)

DRAWINGS RECEIVED.—Jack, Sub Silentio, Sub Rosa, D'ewes, Ap Adam, Toledo, Torpedo, Mot, Gemshorn. Palmam qui meruit ferat, Con Amore, Our Praises are Our Wages, Mustapha, Ernest, Alfred, Edwin, Binny, W. in W., No. 90, Better Late than Never, Clansman.

W. IN W. (Your drawing for engine-house too late to hand. The offices and living-rooms are not well planned, and the passages are wasteful.)

Correspondence.

THE FURNITURE AND DECORATION OF TOWN HOUSES.—CANTOR LECTURES, 1880.

To the Editor of the BUILDING NEWS.

SIR,—Having attended all these lectures, I crave leave to offer some remarks on them; and in so doing I wish to be understood as not so much criticising them in a hostile spirit as suggesting how they might have been made more publicly useful, and, intimating how, if the lecturer have any intention (as I think he may have) of insuring a larger audience by publication of them, he may impart that knowledge and enunciate those principles which, presumably, were their object.

The name and repute of the lecturer are so well known that to agree with almost everything he said and to award the highest praise to much that he said becomes as superfluous as it is natural. His views on the æsthetic part of the subject seem to me as much marked by a good and refined taste as his views on the sanitary questions involved are marked by sound sense and practical thought. How he dilated on the abominations of the compound served out to us by our gas companies; how he denounced the cheap and tawdry metal-work known as "Brummagem"; how he instilled the advisability from an *art* point of view, as well as the necessity from a *health* point of view, of avoiding all those needless ledges, shelves, flat roofs (of bedsteads to wit), corners, angles, carpets nailed down, &c., &c., which are known to be the receptacles of dust and dirt, and are more than suspected of being also hotbeds of contagious disease; all this need not be here repeated. What I regret is that he did not, in many details, go far enough, was not sufficiently specific, was not—as he might have been, in spite of his modest disavowal—sufficiently dogmatic.

I venture to think that the lecturer failed to propose to himself beforehand the questions: "Of what class or classes of the public will my audience consist? What is the extent of their knowledge? What may I assume to be their ideas and prejudices? How can I best combat those prejudices, increase that knowledge, or at least lead them, so to *think*, on the subject that they may gradually arrive at the true principle of decoration, viz., truth, simplicity, and a perception of what is really beautiful?"

I will endeavour to make good what I here intimate as I go on. But before descending to details, I will relate an incident which happened to myself, which most aptly illustrates what I say, and indicates exactly the class of persons of whom the audience consisted, their conceited self-sufficiency, and their entire want of even so little humbleness of mind as should make them eager to hear, if not to believe, what so good an authority could teach them.

In calling on a lady, one of the great middle class, and possessed of most excellent common-sense, I happened to mention these lectures, and she at once asked me, "And what does he say?" I answered at hap-hazard, mentioning the first two or three points which I could remember. Judge of my astonishment to find that she had an answer to each point, cut and dried, and apparently quite convincing to her mind, just as if she had been deeply considering these very points for years, and had even been arguing them with the able lecturer himself and beaten him out of the field. I must confess that I was not able—even if I had been inclined—to give her the reply;—and this precisely because of the defect in the lecturer which I desire to notice, viz., the not giving in every case (I admit he did in some) a simple, sound, and to ordinary minds convincing, reason for the statements made and the arguments given. I will give instances of these defects. But I give this incident merely to indicate that which the lecturer might well have set himself to combat—to wit, the astounding idea, almost universal in the class spoken of, which may be translated into words pretty much as this, "I have taste; or, if I have not, my wife has; or, if neither, at any rate, my house is my own, and if my friends do not like my taste, they can leave it alone."

I venture to think that that the most convincing mode of argument would have been, not only to name the makers of good designs (in papers, hangings or what not), to call attention to specimens exhibited in the room—which was done at the best only cursorily—but to put the *converse argument*, to exhibit some specimens of downright bad and vulgar decoration, of tawdry and common-place papers, hangings, &c., which may be found by scores in the houses of our good streets and squares; and, above all, to give in a few straight words the reason of their badness. Smith, Brown, and Jones would have gone home and would have taken another look round their rooms; they would not have admitted conviction on the spot, but they would have thought; and thought would slowly but surely have produced the certainty that they had heard truth, and that they had everything to learn.

I have analysed the impressions I have myself derived from the lectures; and I find that the prevailing one is as follows: "If I did not believe that frequent contact with artists for very many years, discussions with them, and a pretty wide acquaintance with their houses and views on decoration, had given me some fairly correct notions, I have only one course left to me if I want to decorate my rooms, viz., to employ, professionally, some one whom I believe to be competent, and this because the lecturer has given me so few, if any, lines for my guidance; he was too general; he was not sufficiently dogmatic or specific on general points and principles, many of which cannot, I think, be disputed."

To come to details. We were nowhere told the specific effects of red and blue as a colour *en masse;* I mean, as regards making a room look larger or smaller. We were not told to regulate the scale or amount of the pattern on a paper hanging to the size of our rooms, or with due regard to the absence or presence of pictures, engravings, &c. Even the objection to papers, composed mainly of spots or lines, was but feebly insisted on, and the reason of the objection very faintly shadowed. Truth, as an element of *construction*, was, I admit, inculcated; but, as an element of artistic decoration, so far as I recollect, never touched on. May I venture to suggest that to have been told that looking-glass for doors or columns is bad in art, because it is founded on a false idea, would have set many among the audience thinking on so simple and obvious a proposition. Attention was called, but only in a cursory manner, to the papers and hangings exhibited in the room (many of which, by the bye, were of very indifferent merit). But what might not have been learnt if the lecturer had selected one or two for comment, and, exhibiting them in a strong light, explained their merits? One remembers to have passed, at odd times, the windows of certain establishments in Tottenham-court-road, or those of Messieurs Collinson and Lock, in Fleet-street, or of Messieurs Gregory and Co., in Regent-street, and to have drawn, so to speak, a deep breath of eye-delight at the brilliant effect of *colour* there produced by the skilful contrast and juxtaposition of textures or tones sober enough for a Quaker. The last-mentioned establishment especially contrives to make its window a kind of miniature room, bright, cheerful, and artistic, yet sober and restful to the eye. A hint to go and look at any of these would, I conceive, have borne good results, and by the strongest and most direct appeal to the mind, viz., by the eye.

I fear my letter—which I repeat I do not wish to be accepted as a criticism so much as a suggestion towards the greater utilisation of any scheme of publication which may exist—has already extended to nearly the length of a Seventh Cantor Lecture. My interest in the subject must be my excuse, as my desire is great for the publication of some moderately cheap and simply reasoned work on decoration, which shall be so elementary in the principles propounded, the reasons given, and the examples illustrated, as to command at once the assent of every intelligent and unprejudiced mind among those who most require it. These I, without hesitation, affirm to be our great *Middle Class*.

But I cannot leave the subject without begging Mr. Edis to discard what I believe to be one very great delusion, as it is a very common one and very mischievous in its results. He more than once, and especially in his last lecture but one, indicated his belief that "much might be left to the ladies." Now without for a moment wishing to be ungallant, I must state my total dissent from this statement. Of course, no one would deny that there exist in individuals different degrees of instinctive perception and power. This is seen in art as well as in science, one man (or woman) doing or knowing with one year's teaching, or even with no teaching at all, other than that acquired by a quick eye or ear, as much as another would gain in five years. But this holds good of man as well as of woman, and I see no reason to believe that this faculty is stronger in the latter than in the former. Once let it be granted that decoration is a science, founded on definite and immutable principles, though capable of indefinite variety in their application, and I think my proposition becomes a self-evident one. Even granting again (which

I do not grant) that women have a natural taste in dress, and that this is a long step towards taste in other things, it must be at once seen that their very love of admiration, and desire to look their best, leads them to direct their best thoughts to the subject, to think of it carefully and from every point of view, and to discuss it, to collect the opinions of others on it, and to read what they may find written thereon. This is exactly what I contend for. A person must have his thoughts directed to a subject either from an (assumed) necessity, or from natural inclination as a first step towards the acquisition of some knowledge of it, be it ever so small. The rest is a mere matter of thought, time, and study. But I ask, how many of either sex ever have their thoughts directed to this subject or take any lively interest in it? Or, when once in every few years the subject does arise in the choosing of a carpet or a paper, how many take any pains to obtain correct ideas or to gather sound hints? I say positively, none. A family jury may perhaps be convened, but eventually the head of the family—probably the mistress of the house—gives the verdict. And I say unhesitatingly that in some dozen or more cases within my own knowledge this is precisely what has happened, and with the result which might have been expected. One instance I have especially in my mind's eye, where a fine old house in Essex has been cruelly spoilt in this very fashion, the master of the house having his hands full with literary pursuits, and being every way disposed, for reasons which I know, to leave such matters to his wife. I could draw an analogy from the case of men as regards their better taste in eating and drinking, but I must spare your space.

In conclusion, let me beg Mr. Edis to give us a book, or even a pamphlet, on the subject. Let it be simple, argued on intelligible and self-evident reasons, and, above all, cheap. So may it be within the reach of those who most require it; so may some of us who have taken thought or gained by one means or other knowledge on the subject have an authority to which we may appeal when we do venture to give a hint or to express an opinion. How else should the great Middle Class, who are compelled mostly to live in the tenements put up and decorated by the speculative builder, be enabled to combat and vanquish their want of taste, and to make their own houses habitable from an art point of view. Let Mr. Edis do this, and we shall have good cause to thank him for the Cantor Lectures of 1880.—I am, &c.,

A Layman.

HAYMARKET STORES.—WALKER v. KIRK AND RANDALL.

Sir,—Mr. Walker asks you to correct an error in your otherwise accurate report of this case. I have a copy of the shorthand writers' verbatim notes before me, and I find your condensed report was perfectly accurate; therefore, there is no error to correct.

The magistrate did not ask Mr. Walker to withdraw the summons, but distinctly dismissed it, whereupon I agreed, at Mr. Newton's suggestion, that all the contract plans signed by Kirk and Randall should be shown to Mr. Walker, although he has had every opportunity of seeing them, and, indeed, has seen them repeatedly; but this is not the question at issue. It is not the general drawings Mr. Walker wanted to have produced at his office, but the drawings of the internal ironwork and concrete floors. These I have always refused to submit to him, as the Building Act gives the district surveyor no control over such work.

Mr. Walker, knowing this to be the case, endeavoured, some time since, to induce the Metropolitan Board of Works to take proceedings against the building as a dangerous structure, and tried in every way to prejudice the case before it came before the Board for consideration, even to bringing some members to see the work, and, in my presence, he explained to the Chairman of the Board that it was only by taking proceedings under the Dangerous Structure clauses of the Act that he would be able to exercise any control over the work.

When I tell you, Sir, that I had called to my assistance a well-known engineer, who has had probably more experience in work of this kind than any other, and that his design had been approved by some of the greatest authorities of the day, you may suppose I might well have treated Mr. Walker's opinion with indifference, and have awaited the issue with confidence; but as an act of deference and courtesy to the Metropolitan Board I submitted the whole of the drawings to their engineer and architect, who examined and reported upon them, the result being that nothing beyond what was originally intended was suggested as being either necessary or desirable, and the board was advised not to assist Mr. Walker.

After the collapse of these unwarrantable proceedings, the district surveyor endeavoured by a quibble to raise the question anew by taking out a summons for neglect to give notice. You will be able to form an opinion of the necessity of this when I explain that the notice of the works was written out in his office, he himself supplying the foreman with certain particulars and allowing the work to proceed until the last girder was ready for hoisting before he discovered that he had not received legal notice.

Under the magistrate's advice a supplemental notice was given, when the present proceedings were taken, with the result you know.

Mr. Walker may be very anxious to achieve a certain notoriety with regard to dangerous structures, and may even have satisfied himself that he is acting only from a sense of duty; but in either case it is doubtful whether he is justified in taking proceedings which are simply unnecessary and vexatious, as has been proved by the result in this case.—I am, &c.,

Thomas Verity.

27, Regent-street, S.W., May 26.

THE LONDON WATER-SUPPLY.—III.

Sir,—The Editor of the *Times* in a recent article on the London Water-Supply, remarked, "That the first necessity is that London should have the best supply of water that the country can afford. We have, therefore, to first determine how this necessity can best be met, and until this preliminary question is fully sifted and solved, the consideration of all others is at least premature." I quite agree in this view, and, with your permission, will sketch out how this first and important necessity can be secured; how London can easily obtain, if she will, the best and purest water-supply in the world, and at a comparatively moderate cost to the ratepayers, and with the greatest possible benefit to its four million three hundred thousand water-consumers.

It is, perhaps, as well first to determine what is a pure, wholesome, and palatable water; and what its general fitness for drinking and cooking purposes? The following may be taken as the accepted classification of waters in the order of excellence, and founded upon their respective sources:—

Wholesome	1. Spring-water, 2. Deep well-water,	Very Palatable.
Suspicious	3. Upland surface-water, 4. Stored rain-water, 5. Surface-water from land,	Moderately Palatable.
Dangerous	6. River-water, to which sewage gains access, 7. Shallow well water	Palatable.

With reference to wholesomeness, all water applied and used for domestic purposes should be absolutely free from organic matters of every kind, animal or vegetable, living or dead, and at all times of the year. In seasons of epidemics it should not be liable to convey or propagate disease; become a source of increased danger to those who partake of it, or use it to dilute milk and other beverages. It should be clear, beautifully bright when seen in bulk; refreshing and palatable, and well aërated: of uniform temperature summer and winter; contain the minimum of mineral matter in suspension, so that no deposit form in water-pipes and fur-up kitchen boilers; and lastly, it should be soft and pleasant to use with soap and for washing purposes. How these several conditions are to be secured have been very clearly pointed out by successive Royal Commissions; the last and most important was appointed in 1874 to inquire into and report upon the "Domestic Water-Supply of Great Britain." The source from whence an abundant supply of deep-well water of the best quality can be obtained is stated to be procurable within (and this is perfectly true) a moderate distance of London. "The introduction of this new water-supply," the commission reports, "of wholesome, palatable, and soft water will render necessary either the throwing open of the Metropolitan Water-Supply to the competition of new private companies, or to the transference of the control of the present supply to a responsible public body, with all necessary powers for acquiring existing works and constructing such other works as may be necessary for supplying so much spring deep-well water as may be needful to replace the river-water now delivered in London and its suburbs. Above all, it recommends "that the Thames should, as soon as possible, be abandoned as a source of water for domestic uses, and that the sanction of her Majesty's Government be, in future, withheld from all schemes involving the expenditure of more capital for the supply of Thames water to London." It is clear, then, that no select committee of the new or any future Parliament could add much to or take much from the many important recommendations of the commission of six years ago, and it is hard to conceive why they had not been acted upon by a Government that came into office proclaiming aloud its *sanitas sanitatem omnis sanitas* policy.

It will not be denied by water-engineers, and those who understand the subject, that any quantity of spring water, of the finest quality, is within reach, and that London is somewhat exceptionally situated in this respect, for whichever way we turn, north, west, and south, we find an exposed area of chalk hills, measuring in extent some 4,000 square miles. These hills vary in height from 350ft. to 900ft. above the sea-level, and the average rainfall they receive amounts to from 28in. to 30in. The chalk varies in thickness from 600ft. to 1,000ft., and is pervaded in every direction by minute pores, and will absorb four-tenths of its bulk of water, so that during a heavy rainfall as much as 2in. in depth will be absorbed into the chalk in the course of one hour. At varying depths of from 100ft. to 500ft. from the surface, the great mass of the chalk is saturated with water—that is, the lowermost strata are saturated with the water derived from rain that fell in the course of past centuries, and which have been slowly gravitating and percolating downwards. Filtration is, then, constantly going on, and perfect aëration is at the same time secured, because, beneath the surface, the pores of the chalk are partly filled with air, as well as water. When the rain falls on the surface the water displaces a certain portion of this air, forcing the water down to the next layer of chalk. This slow, but continuous purifying process by percolation, is greatly assisted by the varying pressure of the atmosphere, so that the breathing of the hills is assisted by every varying change of the barometer, and all subterranean water attains to the mean temperature of the atmosphere at its source, whilst it is effectually purified, and freed from every kind of organic contamination. It is in this way that Nature during successive ages has stored up an abundant and almost inexhaustible supply of pure spring water for the use of this and future generations, and it is impolitic not to make use of it. So far, then, it appears London is exceptionally situated with regard to obtaining a good water-supply: resting as it were in a basin, and surrounded on all sides by high ground in which the water is deposited, it is only necessary to pump it up into reservoirs constructed and placed close by, when by mere gravitation it would flow through distributing pipes to every house in the metropolis. This of itself would be productive of considerable economy, but it would secure another advantage to the drinker, and no mean one—uniformity of temperature; whereas the water now supplied from the rivers Thames and Lea varies extremely. The lowest temperature of the Thames water delivered last year was 34°, and the highest 70° Fahrenheit; that of the Lea was 36° and 68° Fahrenheit. On the other hand, the Kent Company's chalk-water preserved a nearly equable temperature of 51 or 52° throughout the year. It is almost unnecessary to attempt a contrast of Nature's process of filtration with that adopted by water companies. River water in summer-time attains, as I have said, a high temperature, and when most required for use, it is on this account the more dangerous. At a temperature of 68° and upwards it is admitted into filter-beds, compos d of layers of coarse and fine gravel, covered over by river or washed sea-sand. These several layers vary from 3ft. to 4ft. in thickness, and implicit reliance

is placed in them for the purification of water polluted by the sewage of the numerous towns situated on its banks. A layer of water some 3ft. or 4ft. in depth is constantly exposed during the process of filtration to the action of the air, and possible further pollution, since the water passes through only at the rate of 48 gallons per superficial foot in twenty-four hours, equal to four inches in depth per hour. As the water percolates, the filter arrests only the coarser particles of mineral matter, whilst the more soluble and more mischievous organic germs and animalcules in suspension and solution find their way through the open interstices between the grains of sand. A further quantity of partially-decomposed animal and vegetable matter is arrested, and in a short time becomes decomposed; and a very considerable quantity of this will certainly be gradually carried through the filter and conveyed into the house-cistern of the consumer. Once there, he has to depend upon "good luck" as the only chance of escape from the dangers of typhoid fever, cholera, and other invisible foes much too minute even for the powers of the microscope to detect.

There is no hope that the present disgusting state of the Thames and Lea can so far be remedied as to prevent the most offensive animal and vegetable matters getting into them. It is perfectly true at this moment, and, as the late Royal Commission emphatically stated, that, "notwithstanding the application of partial remedies for sewage pollution at Banbury, Eton, Windsor, and Hampton, and the greater care exercised by most of the companies in the storage and filtration of the water, the organic pollution contained in the Thames, and the water delivered in London, though subject to fluctuation from the greater or less prevalence of floods, does not diminish. In all times of flood, a very large proportion of both of the suspended and *dissolved filth* will naturally be conveyed down to the intake of the companies, and in ordinary weather a considerable proportion of the soluble organic matter of sewage discharged into the Thames and Lea, by their tributaries, will also make its way into the reservoirs of the companies, and is, therefore, still present in the water when it is distributed by them in London." It is an incontrovertible fact, which cannot be too often repeated, and which Professor Frankland and other high authorities have placed beyond a doubt, that "when sewage of towns or other polluting organic matter is discharged into a running river, the suspended matters may be partially removed by subsidence and filtration; but the foulest amongst them are in solution, and are very persistent." They oxidise very slowly, and they are removed only to a slight extent by sand filtration, for there is no river in the United Kingdom long enough to secure the oxidation and destruction of any sewage which may be discharged into it, even at its source.—I am, &c., Jabez Hogg.

1, Bedford-square, May 25th.

ANOTHER INSULT TO THE PROFESSION.

Sir,—The School Board for Tottenham have advertised for an architect and surveyor. The following are the conditions of the appointment:—

1. The gentleman appointed must act both as architect and surveyor to the Board.
2. He is to be engaged at a fixed salary of ten guineas per annum until December, 1882, subject to a three months' notice to leave by either side or party.
3. In addition to the salary of ten guineas per annum the architect and surveyor will be paid 4 per cent. on the cost of the first block of buildings, and 2 per cent. on the cost of the subsequent buildings.
4. The salary and per centage herein named shall include the cost of and charges for all necessary plans, specifications, quantities (for the use of the Board), agreements, contracts, and travelling expenses.
5. He must hold no other public appointment the duties of which will interfere with his personal attention to the work required of him by the Board.
6. He is to receive his instructions only from the Board officially.
7. He must attend when summoned any meeting of the Board, or of its Committees, and must assist them in any matters where they may deem his advice necessary.
8. Copies of testimonials only should be sent, as the Board do not undertake to return documents sent with the applications.

To my mind, this is one of the grossest insults that has ever been offered to the profession. The terms are such as no honest man can accept; but perhaps it is intended as a joke, or it may be that the Board are endeavouring to discover the black sheep who unfortunately exist in this as in all other professions, and intend to avoid employing anyone who values his reputation so little as to apply for the appointment. The Board that could seriously offer such terms would indeed be a pleasant one for a *gentleman* to attend "whenever required" for the magnificent remuneration of ten guineas per annum.—I am, &c. Hugh Roumieu Gough.

6, Queen Anne's-gate, St. James's Park, S.W.
26th May, 1880.

MEMORIAL RE ARCHITECTURAL COMPETITIONS.

Sir,—The inclosed analysis of names contained in the memorial presented to the President and Council of the Royal Institute of British Architects by Mr. George Edmund Street, R.A., on Monday last, will, I think, be of interest to a great many of your readers.

Several architects have expressed approval of the movement, but, for various reasons, wished that their names should not appear, so that the actual number of supporters must be about 1,400 and upwards.

It was intended to have printed a list of names; but, owing to the cost already incurred, the committee are unable to go to that expense; the outlay is now £25 in excess of what has been received from subscribers to the memorial, which amount the Committee are responsible for. I shall be very glad to receive any donations from a shilling and upwards towards the fund.

Thanking you for the publicity you have given to the subject, and apologising for encroaching upon your valuable space, — I am, &c, Cole A. Adams, Hon. Sec.

11, Holden-terrace, Grosvenor-gardens, S.W.
May 25, 1880.

Memorial to the President and Council of the Royal Institute of British Architects *re* Architectural Competitions, 1880.

Architects practising in London ...		360	
Architects practising in the Provinces of England, and in Scotland, Ireland, and Wales		874	
Architects giving no Address ...		40	
			1,274
,, Fellows of the R.I.B.A.		153	
,, Associates ditto		159	
			312
,, Members of the R.I.A.I. (Ireland)			24
,, Members of the Architectural Association			148
,, Members of the C.E.			41
,, F.F.S.A.			21
,, Graduates of the Universities ...			12
,, Members of other Societies connected with architecture and other sciences, &c.			140
,, Members of no societies ...			708

This analysis is taken from the papers signed by the memorialists, and from other sources, and is as accurate as circumstances would permit —I am, &c.

Cole A. Adams, Hon. Sec.

May 24, 1880.

THE OLD EAST GATE AT EXETER.

Sir,—It may be interesting to record that excavations now taking place at the eastern end of High-street, Exeter, have brought to light the base of one of the towers (the southern one) of its ancient east gate. This gate was removed in 1784. I happen to have amongst my old prints a couple of engravings representing this gate, just prior to its destruction. From the exterior, two round embattled towers projected from the direct line of the city walls about 35ft. They were 24ft. in diameter; the opening between them, covered in by a sharply-pitched Decorated arch, being 14ft. only — a somewhat narrow space for the through traffic of a fairly-sized city.

The upper parts of the gates were used as guard-rooms. Immediately over the entrance, was a niche, containing a sculptured figure of Henry VII., as well as an heraldic panel, representing the ancient arms of England, with a greyhound and dragon as supporters. The Tudor badge of the portcullis and the royal pomegranate are also introduced. When the gateway was destroyed, the stones of which it had been composed were tooled up to a regular face, and utilised by building a house close by of them. Into the façade of this erection the sculpture in question was introduced, and is to this day preserved, although, unfortunately, it has been, with such painful regularity, so bedaubed with paint, as to have become almost unrecognisable. The place where it stands is a "furnishing warehouse," and many good people firmly believe that instead of being Henry VII. the figure really represents Joseph, an error natural enough, perhaps, seeing that ever since the good cabinet-making man got hold of it, it has always worn a coat of many colours.

The base that has just been brought to view is of well-squared masonry in the red conglomerate stone from the neighbouring hill of Rougemont. The courses are regular, and the work takes the circular form the tower assumed. Although underground now, this masonry was undoubtedly exposed to view originally; the towers before remarked projected considerably beyond the wall-line and into the moat that went around. In this immediate neighbourhood are some remarkable subterranean passages, of which I may say more another time.

The excavations alluded to are being made under the direction of Mr. James Crocker, architect, of Exeter, and are the preparatory works for the erection of a new arcade and coffee tavern.—I am, &c.,
Exeter, May 22. Harry Hems.

Intercommunication.

QUESTIONS.

[6132.]—**Charlton House.**—Will any correspondent kindly inform me if this famous Kentish house has ever been illustrated by measured drawings? If so, by whom, and where?—F. E. M.

[6133.]—**Crickets.**—Will any scientific reader inform me how I can destroy crickets in a room without taking off the panelling with which it is lined? Near the fireplace is their favourite resort.—E. H. H.

[6134.]—**Lime in Clay.**—Can any practical brick maker inform me the best way to treat clay which is very full of lime, so as to make good bricks, which will not burst on exposure? What is the best book published on practical brick-making?—Brickmaker.

[6135.]—**Powers of Corporations.**—Will some brother reader kindly inform me if Corporations have power to prevent property owners from pulling down and rebuilding cottages in a crowded locality, the object of owner being to improve the property by giving more light, better ventilation, and better drainage? A few courses of the old foundations will be left in, and the new wall built thereon. There will be no encroachment on the present open space round the buildings. There are no injurious works carried on in the vicinity of the buildings. There has been no complaints made hitherto by the local authorities, and the Artisans' Dwellings Act does not exist. 2. The old property has been pulled down, and in case the Corporation refuse the sanction required, can they be held responsible for compensation?—M. C.

[6136.]—**Thorwaldsen's Statue of Byron.**—Can any of your readers inform me where Thorwaldsen's statue of Byron is now placed? It was brought to London in 1838, and a discussion took place in both Houses of Parliament relative to the conduct of the Dean and Chapter of Westminster, who refused to give it a place within the walls of the abbey, as they had already, in 1824, refused to allow of the interment of his body there. As they persisted in their refusal, it was understood that the statue would be placed over his body in Hucknall Church, Nottinghamshire, but I do not know whether this was actually done or not. The statue was subscribed for by the late Lord Broughton (formerly Sir J. C. Hobhouse) and others of the poet's friends.—Byronicus.

REPLIES.

[6131.]—**French Cistercian Abbeys.**—The "Architectural Dictionary" of M. Viollet-le-Duc is the most accessible authority upon the arrangements of Clairvaux and Citeaux, but M. Julainville, in his "Etudes sur les Abbayes Cisterciennes," gives an account of Clairvaux in the 13th century and in 1858, full of graphic details.—Mackenzie E. C. Walcott.

STATUES, MEMORIALS, &c.

The late King of Hanover.—The memorial to the late King of Hanover has now been fixed in St. George's Chapel, Windsor, in a space marked by the architectural details, between the Princess Charlotte's cenotaph and the north door. Count Gleichen prepared the designs and executed the monument. The portrait medallion of the King is surrounded by a wreath of poppies, emblematic of sleep, and it is surmounted by a group of seraphim. There is a figure of an angel on the left side, and a corresponding figure on the opposite side. The masonry is of Sicilian marble, and the marble sculpture and statuary is from Carrara.

LEGAL INTELLIGENCE.

A Case Under the Building Act.—On the 21st inst., at the Lambeth Police-court, before Mr. Ellison, Mr. Henry Jarvis, a district surveyor of Camberwell, summoned Mr. Woodhams, of Copeland-road, Peckham, builder, for neglecting to give notice of the erection of a structure on his premises. It was described as being about 24ft. square and 13ft. high with open sides, with wood-framed braces and upright posts let into the ground supporting a corrugated iron roof. The defence was that the structure was not a building within the meaning of the Act. After hearing the evidence on both sides, the magistrate took time to consider his decision, and in giving judgment said he was of opinion that the said structure was a building under the Act, and as it was not constructed in accordance with the Building Act the building must be pulled down, and he made an order accordingly.

Our Office Table.

THE South Shields guardians last week rediscussed, with some warmth, the question of the extras arising out of the contract for the new workhouse, recently completed from the designs of Mr. J. H. Morton. The contract for the building was taken by Mr. Suddards, who afterwards became bankrupt, whereupon the sureties, Mr. John Readhead, at that time mayor and a guardian for South Shields, and Mr. John Oldroyd, finished the undertaking, at a total cost to the ratepayers of about £40,000. In addition to this sum the comparatively trifling amount of £383 was claimed as extras, and £250 was voted by the board of guardians in settlement thereof. The question was now reopened, on a motion of Mr. J. B. Bushell, and the receipt of a letter from the Local Government Board, inclosing a communication from the same guardians, who inquired of the superior authority whether the guardians could vote extras, without the sanction of the Local Government Board, and whether Mr. Readhead could sit and vote as a guardian on his own bill—a vote which, with the casting-vote of the chairman, happened to decide the case. In the discussion, the insignificant amount of the extras was commented upon, and it was determined, by 9 votes to 8, not to reopen the question, and the Local Government Board were requested to give an answer to the points raised in Mr. Bushell's letter. The architect's application for payment of balance of his professional charges then came up for consideration. Mr. Morton claimed, in all, £2,224 12s., of which £2,150 had been paid on account. Several members urged that, had the appointment been thrown open to competition, the work could have been done for 3, instead of 5, per cent., and it was unanimously resolved to offer Mr. Morton £43 in discharge of his account.

THE Hudson River Tunnel is being pushed vigorously forward, under the direction of Mr. D. C. Haskin. The method presents various interesting features. A vertical shaft was first sunk to the level of the roadway of the tunnel, 60ft., at the foot of Fifteenth-street, Jersey City; but the work towards the river was started at about half the depth (as a temporary convenient device), and the bottom of the shaft is at present used as a receiving cistern for water and silt. In building the tunnel, compressed air is used to keep out the water, and partly to uphold the earth, the air-pressure being now 17lb. to 20lb. per square inch. The shell of the tunnel is an iron cylinder about 22ft. high by 20ft. broad, made of boiler iron, and worked forward in sections, a small segment being first dug out at the top, and plates placed in position, bolted, and braced, before the earth below is taken out. The work is thus advanced in sections (four to eight), the face of the ground presenting so many steps. A wall of hard-burnt brick, laid in cement, and 2ft. thick, is formed within the outer shell. The air-lock at the mouth is like an ordinary boiler. It has two doors, and a narrow car-track passes through it. The present rate of progress is 3ft. of finished tunnel per day. It is expected that the tunnel will be complete in three years. The width of the river on its line is 5,500ft., and the tunnel will follow generally the gradual drop of the bottom from the Jersey shore, and the more abrupt ascent on the New York side. It is designed to have two tunnels, side by side, under the river, these being carried into one larger tunnel at the shore ends; the second tunnel will be commenced immediately. The estimated cost of the tunnel is about 10,000,000 dols.

THE Pullman Palace-Car Company proposes, in its new manufacturing establishment near Chicago, to set an example to other proprietors of large factories. It has secured 150 acres of land, bordered on one side by the Illinois Central Railroad, and is to lay it out like a park. A drive, two miles in length, is to encircle the grounds, which are to be planted with shrubbery and grass, and the whole is to be inclosed by a wall. Between the range of shops and the railroad, is to be a garden 300ft. wide. The actual workshops will cover nearly 11 acres, and a tower, 146ft. high, will form the centre of the group. The huge flywheel of the Corlis engine is to be arranged so as to be conspicuous from the railroad. Cottages for the workmen will be scattered about the grounds.

THE Civil Service Estimates show that some of our Royal Palaces absorb a deal of money for repairs. The "ordinary" maintenance and repair of the exterior and interior of the residence of the Prince of Wales costs the nation £2,000 a year; and, in addition to this, for the present year, the larder passage is to be inclosed and the partitions in the west wing removed, at an estimated cost of £135, and the hot-water pipes and service are to be improved at a cost of £150. Buckingham Palace, which the Queen occupies for two or three days at a time about three times in the year, is also in an unsanitary condition, and "owing to the bad condition of the soil-pipes," a further sum of £1,000 is to be appropriated beyond the amount voted in 1879-80. £5,000 is required for the redecoration of the State rooms in St. James's Palace, where an occasional Royal ball or concert is given, and sometimes a *levée* or drawing-room is held. The roof of Holyrood Palace is being renewed at a cost of £4,000, and the third instalment of £1,000 falls due this year. £5,000 has to be contributed out of the public money for the restoration of St. George's Chapel, Windsor, and an instalment of £500 is furnished in 1880. The total expenditure for the year upon the Royal palaces is to be £37,771, an increase of £2,231 upon last year.

WE have received part VI of "Gloucestershire Notes and Queries," a reprint from the *Stroud Journal*, edited by the Rev. B. H. Blacker, M.A., of Stroud. Among various interesting notes we find a few remarks on Bristol Cathedral, quoted from the *Transactions* of the Bristol and Gloucestershire Archæological Society, Vol. III., p. 99, &c. The writer refers to a paper on the Cathedral by Edward Godwin, F.S.A., who says "whatever may have been the actual extent of Abbot Knowle's work, that which now remains convinces me that it is but part of one bold continuous project which, if carried out to the full length, would doubtless look full of design and originality, although, like many old and new works of the same class, by no means pleasing." The writer (the late Mr. Richard John King) scarcely understands Mr. Godwin's description. He alludes to Abbot Knowle's project as having with but slight modification been carried out to the full length, and asks "how far the cathedral in its renewed condition can be pronounced unpleasing." Of its distinguishing features he alludes to the lofty arcade without triforium or clerestory, the aisles of equal height with nave and choir, and consequently admitting of those lofty and magnificent windows which quite compensate for the absence of the usual stages above the arcade, the roofing or vaulting of the aisles, and the disposition of the sepulchral recesses. Altogether, none of these features, he adds, are found elsewhere. Notes of interest are found on Iron Acton Parish Church, with its quaint Jabobean pulpit and beautiful preaching-cross, the Restoration of Tewkesbury Abbey, Strange Epitaphs, and the indices to monumental inscriptions and extracts from parish registrars make this quarterly publication a useful handbook to the local archæologist. We may add the "Notes and Queries" appear from week to week in the *Stroud Journal*.

YESTERDAY, the Association of Municipal Engineers commenced its three days' Annual Meeting at Leeds. Mr. A. W. Morant, M.I.C.E., borough engineer of Leeds, having been elected President for the ensuing year, gave a short address, principally confining his remarks to the statistics and working of the various departments of his borough, and in this way prepared the members for the various works which they would visit during the meeting. Mr. Hewson, A.M.I.C.E., borough engineer of Rochdale, then read a paper entitled "Town Sewers." Shortly after the reading of the paper the meeting adjourned, and in the afternoon visited some engineering works. To-day, the members continue their meeting, reassembling in the Grand Jury Room of the Town. The proceedings will be commenced by Mr. R. Vauser, M.I.C.E., reading a paper on "the separate system and economical drainage of towns." Mr. Joseph Lobley, A.M.I.C.E., borough engineer, Hanley, will also read a paper on the Highway and Locomotive (Amendment) Act of 1878. In the afternoon the members are invited by Messrs. Ingham and Sons to partake of luncheon and visit their sanitary tube and fireclay works at Wortley. The programme for to-morrow includes a visit to the Leeds sewage and gas-works, and an alternative visit to the water-works in the Washbourne Valley, which will be conducted by Mr. Filliter, the engineer. We may say more about the meeting next week, or possibly reproduce one or more of the papers if space permits.

CHIPS.

New schoolrooms adjoining the Congregational Chapel at Kelvedon, Essex, were opened on Tuesday week. The building is in two stories. On the ground-floor are minister's and deacons' vestries, and class-rooms, and above is a main room, 41ft. by 17ft. Mr. C. Pertwee, of Chelmsford, was the architect, and Messrs. Siggers, Brittain, and Polley, of Kelvedon, the builders.

The Guardians of Cork Union have adopted plans prepared by Mr. M. J. Mullen, C.E., for a new kitchen, and other extensions, at the workhouse.

A vestry meeting was held at Grasmere, on Wednesday week, when alternative plans, prepared by Mr. Paley, of Lancaster, and Mr. J. G. Hall, of Canterbury, for the restoration of the church, were considered; the latter were considered to effect too great an alteration in the character of the building, and a committee was appointed to consider Mr. Paley's plan for reseating the church, and to report back, it being unanimously decided not to apply for a faculty at present.

It is often asked, What are the prospects of young men entering the engineering profession? and, few being competent to give a reply, we are glad to find that Mr. Graham Smith, C.E., of 6, Westminster-Chambers, S.W., has published a pamphlet on the subject, which, being but 7d., is well within the reach of all, and cannot fail to be of interest to those purposing to enter the profession.

Mr. Walter Horne, assistant surveyor to the corporation of Southport, has been appointed surveyor and inspector of nuisances for the district of Worthing.

Some excitement has been caused in Durham by the disappearance of Mr. J. W. Spoor, one of the surveyors and sanitary inspectors to the Durham rural sanitary authority. Mr. Spoor was absent from the meeting of the authority without leave on the 6th inst., and has not since been heard of.

Mr. Thomas Coupland, superintendent of the polishing department at the granite works at Shap, Westmoreland, met with a serious accident on Whit-Tuesday; while supervising the removal of work he was knocked down, and the engine ran down, cutting off one of his legs below the knee.

Memorial-stones were laid last week of a new Wesleyan Chapel at Harwood Dale, near Scarborough. It is Gothic in style, is built of local pitchfaced-stone, and the fittings are of red deal, stained and varnished. The dimensions are 36ft. by 24ft., the cost will be £230, and accommodation is provided for 100 persons. Mr. Wm. Watson, of Wakefield, is the architect. Mr. Hunter, of Cloughton, has taken the masonry contract.

A village-hall and coffee-room has just been opened at Fleckney, North Leicestershire. It has been erected by Mr. Haycock, of Great Glenn.

At Lostwithiel Church Whitsun Day was made the occasion of inaugurating a memorial pulpit which has been presented to the parish-church. The pulpit is of Decorated Gothic character, the drawings having been furnished by Mr. Joseph Clark, F.S.A., under whom the restoration of the church generally two years ago was carried out, and the work has been executed by Mr. Harry Hems, of Exeter.

A new Wesleyan chapel, at Chelmondiston, on the Orwell, near Ipswich, was opened on Monday week. The buildings include chapel, 40ft. by 27ft., with two class-rooms, separated from the main building by movable partition, and galleries above; and at the rear is a schoolroom, 30½ft. by 16½ft. The style is Gothic, and the material is red brick, with white brick dressings, and slated roofs. The open roof, platform, and benches are of pitch-pine. Mr. William Eade, of Ipswich, was the architect, and Mr. Wagstaff, of Preston, the contractor.

The Saint Pancras Ironwork Company have just issued a new edition of their illustrated catalogue of stable-fittings. Thirty years' experience, rewarded by the establishment of a business second to none of its kind in the kingdom, has been well turned to account by this company in a constant effort at improvement, and the standard of excellence in workmanship and material arrived at is a very high one indeed. The catalogue is thoroughly revised and enlarged, and will be found extremely handy for reference.

Messrs. Wm. Walker and Son, of 119, Bunhill-row, E.C., have obtained the highest award for furniture in the Sydney Exhibition, viz., the Gold Medal and First Special.

THE BUILDING NEWS.

LONDON, FRIDAY, JUNE 4, 1880.

DRAWING AND DETAIL.

THERE is an amount of restlessness in the designs of modern buildings which has always made the real artist feel it a pleasure to look at old work, with its masses of half obliterated details and broad shadows. It is this feeling which Mr. Ruskin, among the more sensitive of modern artists, has done so much to further in his sympathetic allusion to the value of age in the "Seven Lamps of Architecture," and which prompted him to say "the greatest glory of a building" is in its age. He speaks of the "mysterious sympathy which we feel in walls that have long been washed by the passing waves of humanity." Again, he alludes to the "golden stain of time" as that which gives light and colour to architecture, and he thinks that "a building cannot be considered in its prime until four or five centuries have passed over it." There is something more than the poetic sentiment, deep as this may be, which gives a charm to old buildings, and we find the same author hinting what this is in another part of the sentence just quoted, when he says that "the entire choice and arrangement of their details should have reference to their appearance after that period." In this remark there is an important suggestion to the modern architect, which we think he has frequently disregarded in his attempt to make his work artistic or fashionable. Nowadays a singular infatuation leads the artist to obtain picturesque character in his buildings by irregularities of outline and features, whereas the very essence of the picturesque consists in the absence of effort. Mr. Ruskin's meaning ought to be clear to those who give it the smallest attention. It is for the architect to give to his building the effect which lapse of time would have created by avoiding all unnecessary details. He notices very pointedly the characteristics of those styles of architecture which are picturesque, or those buildings whose decoration depends on shadow rather than on outline. French Gothic is particularly remarkable for this peculiarity; its interest is centred in its broad surfaces of light and shade, its carvings and points of shadow; and very little upon the purity or grace of outline of the composition. Alluding to the sculptured surface of the Ducal Palace at Venice, the same author observes that architects fancy they have obtained ornament where they have got its outline, but in sculptured decoration surface is everything, and outline follows. Such western portals, again, as those of Rheims and Troyes, and Lisieux, depend more for their beauty on their shadowed recesses and sculptured surface than upon outline; the hard lines have disappeared with age, and the eye is charmed more with the softened effect of what the artist intended—the broad masses of light and shade—than the crudeness or multiplicity of detail. Just now architects appear to delight in purposeless grouping of parts, in a want of rhythm and connection, and in showy misapplied decoration of the most fidgetty kind; even drawings of buildings, as we see them at the Royal Academy, show the same spirit of restlessness, labouring apparently under the vain notion that it constitutes picturesqueness.

One of the chief reasons why modern architecture is so essentially fidgetty is that architects and architectural artists are so fond of introducing "bits" of other men's buildings into their work, rather than being content with quietly working out their simple wants in a plain, straightforward way. Their fault resembles the fault of those who, when they write, persistently express themselves in any other but a natural manner. They think that a plentiful use of expletives, scraps, or piquancies of grouping indicate wealth and fertility of resource, heedless of the sound advice given by Pope to the over-learned of his day, and which induced him to describe the mere hunter-up of antiquated learning as

> "The bookful blockhead ignorantly read
> With loads of learned lumber in his head."

It is certainly a fact that this is an age of furbishing; cheap printing, and the facilities for multiplying copies and photographs of buildings, have, with their good and widespread influences, abundantly supplied the profession with materials, but the result has been, in many cases, detrimental to independence of thought. The buildings and art furniture all affect to admire are, on the other hand, the work of men who had little education, no books of illustrations, and had seldom travelled out of their own parishes. If we stop to inquire what it was that impressed their work with such singular beauty, we can only reply that it was individual thought and study, bestowed with ungrudging labour. The modern architect errs in using his store of materials inappropriately and unprofitably. A beautiful piece of tracery, or elaborate grouping, is sketched from a large church or chateau; it is copied and applied to a new building of a quarter the size. What looked stately and beautiful in the original work, now appears a frivolous bauble. We have quoted Ruskin once; we may well do so again. In his notes on Prout the artist, he observes:—"No architect, however accurate in his measurements—no artist, however sensitive in his admiration—ever gave the proportion and grace of Gothic spires and towers, with the loving fidelity that Prout did. . . . Everything in grace of form depends on truth of scale. You don't show how graceful a thing is till you show how large it is; for all grace means ultimately the use of strength in the right way, moral and physical against a given force." He then illustrates his meaning by reference to the wooden spire of Evreux. Very justly he argues, "a hollow tracered spire fifteen feet high would be effeminate and frivolous, for it would be stronger solid; but a hollow traceried spire five hundred feet high is beautiful, for it is safer so, and the burden of the builder's toil spared." But there was something more than scale in the beauty of Prout's drawings. He knew how to express a multiplicity of detail; he had the knack of abstracting architectural detail into a few lines. It is an unfortunate fact that few architects take the trouble to put a scale to their sketches, and fewer have the power of abstracting what they see. A large belfry, such as may be seen in Belgium, is copied with painstaking care for a small provincial town-hall; cupolas as large and pretentious as those of St. Peter's and St. Paul's are applied without the slightest consciousness of affectation to the most ignoble building, while we constantly see spires and towers virtually travesties of those of Lichfield or Salisbury attached to modest country churches. As to lesser features, such as window-tracery, mouldings, and other detail, no hesitation is shown in cramming old work covering a certain area of surface into an area of barely a quarter the size, and applying the same number of members to small mouldings which are proper only for large ones.

Fielding's remark that "the only source of the true ridiculous is affectation" is particularly applicable to those artists who attempt to give us more than is required. The redundant decoration of the present day is everywhere conspicuous, and is in no small degree due to the desire to compress as much apparent labour as possible into a small compass. Moderation is absent because our artists, as we have seen, work to no scale, and study no gradation or proportion; indeed, how can they study it, when houses are built for decoration, instead of decoration being designed for houses? The only remedy it seems to us for this state of things will be the reaction that will follow the present fashion in design. Out of the very weariness and monotony of the school we have been considering, a better phase of art will surely rise—nay, is even now in prospect, and one of the surest means of promoting it is for our students, designers, and draughtsmen to think and draw in shadow as well as in line, to learn to design under the influence of light and shade, and colour.

THE GRAND HOTEL, CHARING-CROSS.

THE completion of the Grand Hotel, Charing-cross, affords an opportunity of referring to a scheme, or, we may say, to a variety of schemes, of internal decoration, perhaps, without parallel in London. The general arrangement and architectural features of the building, from the designs of Messrs. Francis and Saunders, having been described in these pages on several occasions (we refer the reader to Vol. XXXV., p. 284, and to Vol. XXXVI., pp. 117 and 158), we can confine our remarks to the decorations of the principal apartments, and the general interior effect of the arrangements. Beginning at the grand entrance on the Northumberland-avenue side, we come to a hall and inner vestibule arranged out of the square, but with the object of preserving a rectangular disposition of the walls of the principal apartments. A light tone of decoration pervades the hall; there are white-veined marble columns of the Corinthian order, with gilded capitals, and a dark marble dado. On the right side, facing Northumberland-street, there is a general reception and reading-room, 75ft. by 20ft., in which a handsome wall lining of American walnut, divided by fluted pilasters, with panels of painted figures, forms the chief decoration. This wall-screen or lining covers the principal part of the walls, which above are painted a delicate tint. The style has been called that of the Adams, but it would be more correct to say the decorations are Italian. Above, the eye rests upon a ceiling of delicate shades of gray and buff, ornamented with a powdering of gold stars, and a cornice of elaborate design painted and gilded, and producing a rich, though harmonious effect. Leaving this apartment, we enter the *salle-à-manger* or central dining-room, an apartment 100ft. by 50ft., and estimated to accommodate 300 guests. It may be mentioned that this room occupies the area between the wings of the hotel on the ground-floor; above it the space is open for light and air, and forms a well-hole to the building. As we enter, the eye is attracted by a splendour of tint and gilding which makes this saloon the centre of attraction. The leading features are the circular ribbed roof filled with stained glass of exceedingly elaborate design, and the two rows of Corinthian columns of statuary marble (scagliola), with gilded capitals, which divide the central-arched area from the side corridors. These columns contain cast-iron stanchions which carry the back walls of the wings above. The roof is double glazed, and a system of ventilation has been adopted which is said to be perfect. The colouring in light tints produces a rich, though chastened, effect, and the whole is heightened by gilding, and the Venetian mirrors on borders of maroon satin. On the whole, we

admit the gradation of tints has been well managed; the dark pedestals and dados of columns and walls, in marble, form a good starting for the lighter shades and materials of pilasters, the veined Sicilian, the tiles and mirrors of the upper portion, and help to sustain and support the warmer tints and gilding of the apartment. It is to be illuminated by gas, lighted by electricity. Rather less elaborate in its scheme of decoration is the secondary dining-room, or luncheon-room. Here light tints of green and grey, with touches of red and gilding, are introduced in harmony and good balance. This room is intended for late arrivals. The floors of these rooms are laid with parquetry, and the glass roof is adorned by bright brass chandeliers, supplied by Messrs. Verity. We have already spoken of the hall, lined with plaques of marble; the grand staircase is lined with marble of variegated colour, disposed in panels resting upon a darker marble dado, and with the treads and risers of Sicilian marble slabs, combine to produce a rich effect. At the ends of steps are pateræ of polished onyx. The upper flights have steps of Greenmoor stone, and the whole of the soffits are panelled and richly decorated. Ascending the staircase, we come to the first floor, which is mainly divided into a series of sitting and bedrooms, with an average of 300ft. area, divided by a central corridor, lighted by stained-glass windows, with subjects taken from the history of the Dukes of Northumberland. The ladies' drawing-room is a unique apartment, furnished and decorated in the Louis-Seize style. A dark dado of black and gold surrounds the room, and above this the walls are panelled with silk in celadon, blue, and buff, with borders of embroidered satin. The furniture is in harmony, being of black walnut, ebony, and gold, inlaid; the chair-covers being of crimson silk damask, and the carpet of shades of green. The chimney-pieces are decorated with plaques, pilasters, and frieze of gold and enamel metal, by Messrs. Elkington, and support Venetian mirrors. The library and writing-room is pleasingly separated from the corridors by a screen of stained glass, with emblematic figures in the panels. Its decoration is in a more subdued key, and well-graduated; the prevailing colours are of oak and gold; there is a rich Indian carpet, with parquetry border; the ceiling has been designed with some reference to the carpet and wall-furniture. Of the private suites of apartments, we may generally say the decoration is varied, if not luxurious. The rooms are hung in rich tapestry, and the walnut furniture harmonises with the upholstery, while everything that can add to the comfort and elegance of the bedrooms is to be met with. In these rooms, the decorators have had a wide field, and almost every variety of decoration, from simple contrast to arrangements of complementary colours, may be met with.

Messrs. F. Walton and Co's "Linoleum Muralis" has been applied with a very successful result; to many of the rooms and corridors, and in the writing-room or library, the beauty of the decoration is due to its employment, where its fine carved-like relief is enhanced by colour and gold. We are certainly disposed to prefer it to the silken damask and painted tapestry of other rooms on this floor. The bedrooms are furnished with pinewood furniture.

The arrangements of the culinary department deserve attention. This department occupies the first, second, third, and fourth floors on the Northumberland-street side, the ranges for cooking being at the top, and the stores and larders on the first and second floors. The serving-room for the grand dining-room has been well arranged, and service lifts, besides a passenger lift on the "Waygood safety system," have been provided.

Electric bells have been furnished throughout the establishment, and an electric telegraph is to be provided.

In the basement there is a grill-room under the luncheon buffet, lined with glazed tiles to reflect the light, and having every convenience, while below the smoking-room is a billiard-room 41ft. by 31ft. The other portion of the basement is appropriated to the basements of the shops, lavatories, w.c., and other offices.

It would be an omission not to mention the names of those gentlemen who have been engaged in the decoration and furnishing of the hotel. The marble work and mosaic pavements have been executed by Messrs. Burke and Co., of Newman-street; Messrs. Bellman and Ivey, of Wigmore-street, were entrusted with the fine scagliola work in the columns of the hall and *salles*. The decorations on the ground floor, the hall, vestibule, and grand and second *salles* have been carried out by Messrs. Campbell and Smith, of Southampton-row, and we understand Messrs. Anstey and Co., of Regent's-park, executed the carving, panelling, and various decorations of the reception-room and other apartments. Mr. Moore, of Southampton-row, and Mr. A. Gibbs, of Bloomsbury-street, did the stained glass in the principal *salle*, apartments, and grand stair-case, while the furnishing and upholstering of the hotel and the principal apartments were undertaken by Messrs. Maple, of Tottenham-court-road. We have already mentioned the wall decorations in "Linoleum Muralis," which adds so much to the comfort and effect of many of the rooms. The gas and other fittings were supplied by Messrs. D. Hulett and Co., of High Holborn; Messrs. W. B. Simpson and Co., of St. Martin's-lane, supplied the ornamental tile-work; the ranges, cooking-stoves, and fittings of kitchens and pantries were intrusted to Messrs. Benham and Sons, of Wigmore-street; and the fire-proof flooring is the well-known system of Messrs. Dennett and Co., of Whitehall. Messrs. Merritt and Ashby were the contractors for the building, and Mr. G. H. Holloway, the clerk of works, under the architect's direction.

PORTLAND CEMENT AT THE INSTITUTION OF CIVIL ENGINEERS.

THERE can no longer be any question that a great change has been recently effected in the opinion of the principal and most competent authorities respecting the mode of testing Portland cement. The plan which has hitherto been almost universal in this country of testing the neat cement is no longer considered trustworthy, and some system of testing a mixture of cement and sand, such as has been adopted in Germany and Austria, appears to be regarded as the only method of obtaining a satisfactory proof of the quality and excellence of Portland cement. We have for years past steadily advocated some better and more uniform plan of testing Portland, and now that German cement users and cement producers have drawn up and mutually agreed upon a standard set of tests in a machine of approved construction, it is high time that some alteration should be introduced in the desultory and unscientific tests at present made use of by English engineers and architects. It is really a reproach to us who live in the country in which Portland cement was first made, and where it has attained to such a high degree of excellence, that scarcely any two specifications for cement are alike, and that we hardly ever come across two sets of experiments which are really comparative. We have half-a-dozen different forms of test briquettes, and as many different patterns of machines, while the plans employed for moulding the samples and preparing the cement for use vary upon almost every large works. In the paper read before the Institution of Civil Engineers, on Tuesday, the 11th inst., abstracts of which were given last week, General Scott and Mr. Redgrave insist strongly upon the desirability of drawing up a standard system of testing Portland cement based upon the regulations which have been adopted in Germany, while Mr. John Grant, whose careful and elaborate series of tests undertaken in connection with the supply of Portland cement for the main drainage works of London laid the foundation of our knowledge of this material and first established it in public confidence, declares that he has ceased entirely to regard the testing of the neat cement as otherwise then an expedient to gain an approximate indication of the quality of a cement in a short space of time. It is somewhat difficult to trace the causes of the very rapid conviction which appears to have sprung up in the minds of engineers of the comparative worthlessness of the test carried out with neat cement. Few who read Mr. Grant's former papers presented to the Institution of Civil Engineers upon the same subject would have expected so complete a change in his views upon the question of cement-testing as is indicated in his present paper, and the facts and experiments he now brings forward only serves to show how completely he has abandoned all belief in the expediency of testing the neat cement, though they scarcely supply us with the arguments, otherwise than by inference, which have caused him to become a warm advocate of the German system of testing.

As we have more than once described the new German regulations for testing Portland cement, we need only now remark that the great objection taken to them by our English engineers is that the period under examination is extended from eight to twenty-eight days, and, therefore, that before any consignment of cement can be made use of in the work, an interval of twenty-eight clear days must elapse, which, say they, is, under many circumstances—take, for instance, an export order—impossible. Concerning this question of time, which needs, doubtless, to be carefully considered, we can only say that, as a matter of fact, no Portland cement, however good it may be, ought to be used when less than from two to three months old, and as cement is often enough sent out from the manufactory hot from the stones, any tests which will involve a delay of a month before it goes into the work are to be welcomed. Mr. Grant, in presenting the record of numerous very careful experiments on Portland cement, mixed with sand, and while showing the obvious advantages of this plan of testing the cement, fails to call for any expression of opinion on the part of his brother-members that the system of testing a mixture of cement and sand is the right one, and one which ought to be generally adopted. General Scott and his colleague, on the other hand, boldly urge the importance of affirming that the time has now arrived when some uniform plan of testing cement may be agreed upon, and they proceed to indicate generally their idea of the nature of the tests which should be universally adopted. Their proposed regulations are three in number, viz:—

"1. The whole of the cement to be ground fine enough to pass through a sieve of 40 × 40 = 1,600 meshes to the square in. without residue.

"2. The cement to weigh not less than 85lb. per cubic foot, filled from an inclined plane at an angle of, say, 45°.

"3. The cement, tested with three parts of standard sand, must have a minimum strength of 112lb. per square inch in 28 days, during one day of which it has been in air and 27 days in water."

The first thing we have to remark is, that General Scott, although he bases his tests upon the German regulations, has deemed it advisable to depart in several instances considerably from his model. Thus, in the first clause, he wishes us to declare that through a given mesh there shall be *no residue;* whereas the German authorities name a percentage of residue which shall be allowable on a far finer mesh, viz., 10 per cent. on a mesh of 72·2 × 72·2 = 5,213 meshes per square inch, though in practice most manufacturers give a vastly finer cement than this. In theory all coarse particles only take the place of sand, and we should expect better results from a sifted cement, entirely free from coarse particles, than from an unsifted cement with a 10 per cent. residue on a 72-mesh sieve. Messrs. Scott and Redgrave tell us that manufacturers can sift all their cement, and that there is no good reason for selling "core." If this is the case, a test which will reject all unsifted cement is to be encouraged, but whether a finer mesh even than that proposed, say, one of 50 × 50 = 2,500 per square inch should not be insisted upon, is worthy of consideration.

German experimenters have condemned the weight test, and the reasons alleged for not including this favourite mode of judging of the quality of Portland among their regulations is that the weight of cement is so wholly unreliable and so misleading, the best ground cement being always the lightest, that no certain indication of quality can be derived from it. This, we may say, is in strict accordance with the observations of many of our English authorities, and Mr. Colson, in his table, proves the heaviest cements to be invariably those which were most coarsely ground. But a weight test, carefully checked by the sieve, is by no means to be despised, and General Scott has many good reasons for retaining a test which all English observers have insisted upon. Mr. Grant, who also advocates a weight test, declares in favour of the bushel as the measure of capacity, as being that most commonly employed in selling cement in England. General Scott suggests the use of the cubic foot. If any change is to be made we should be inclined, for many reasons, to adopt the *litre;* a measure universally employed by scientific men, both in this country and on the Continent, and one which can be much more implicitly relied upon in cement tests than either the bushel or the cube foot, as we have proved by numerous experiments. In any weight test, especially when the vessel to be filled is large, the use of a filling hopper or inclined plane is imperative, and 45° is advocated as the fixed angle by General Scott. The adoption of 85lb. per cubic foot as the minimum weight for a sifted cement appears fair and reasonable.

In the third of their proposed regulations, we think that General Scott and Mr. Redgrave have undervalued the average quality of English cements. The tensile strength of 112lb. per square inch of section in twenty-eight days was that originally fixed in Germany, but this figure has since been raised, as Mr. Grant points out, to 148lb., and it is very easy to produce a cement capable of testing up to 200lb. in the square inch of section in twenty-eight days. Everything depends on the degree of fineness of the cement, for while a material with 15 per cent. of "core" on a 72-mesh sieve will barely go to 120lb., one with only 5 per cent. of "core" will readily stand 200lb. per square inch after the lapse of the given time between moulding and testing. So entirely is this fact now recognised in Germany, that all the chief makers prepare a cement which leaves less than half the stipulated residue on the finest sieve, and the fineness of the grinding is continually improving.

Both Mr. Grant and General Scott appear to be in favour of the square inch, as the standard area of the test briquette instead of the 5 square centimetres (0·775 square inch) adopted in Germany or the 1½in. × 1½in. = 2·25 square inches of sectional area now commonly employed in England. The shape of the test briquette is a matter of considerable importance, and we are strongly opinion that if a uniform system of tests is to be imposed it must be employed in connection with a prescribed form of test briquette. In Germanly, not only the shape of the briquette, but even the form of testing machine, is fixed. On this point we await further information before pronouncing a definite opinion; but we believe that there are good reasons for following the German precedent in these respects. Very minute regulations are proposed by the German cement users for the preparation of the sand, the amount of water, the plan of mixing, and the filling of the moulds. On all these points General Scott is silent, though he proposes to give ample instructions in foot-notes. Surely these points are of sufficient importance to be made part of the regulations.

The preparation of the standard or normal sand, which is to be a sharp, washed sand, containing no grains which a sieve of 20 × 20 meshes = 400 meshes per square inch, will reject, or which will pass a sieve of 30 × 30 = 900 meshes per square inch, seems to present fewer difficulties than would be anticipated. Thames sand, or river sand, will furnish an excellent sample of "normal sand," and different classes of sand, after being sifted, appear to give fairly uniform results. There is a strikingly equable character in the breaking-weights of mixtures of cement and sand. Thus Mr. Grant gives a table of experiments made by three different observers (10 to each set), on similar mixtures of cement and sand, where there is an average difference of only 5 per cent. between the entire series of observations.

We have not, on the present occasion, dwelt at all on the manufacturing aspect of the question, which Messrs. Scott and Redgrave have examined at some length, nor have we considered with Mr. Bernays the employment of cement for concrete. We have, in fact, restricted our observations to the one subject, the testing of the cement and the changes therein proposed by the authors of the papers. The time seems to have now come when the testing of Portland cement might be attempted in some more uniform way throughout the country, and we shall be interested to see whether the efforts of the members of the Institution of Civil Engineers will accomplish a change which has certainly much to recommend it.

A RECENT VISIT TO RUSSIA.—VIII.

ST. ISAAC'S CATHEDRAL, ST. PETERSBURG.

WE left our readers before the great screen of the St. Isaac Cathedral at St. Petersburg, a feature we must now endeavour to describe. This is not a screen in the sense common to us in England: it is a great wall, the full height and width of the church, which screens off the sanctuary, and the side or eastern chapels, from the body of the church. This wall is divided by eight attached columns into seven compartments. The centre one is pierced by the opening or gate of the sanctuary, and those at the extreme ends by the openings into the side-chapels; the other four, that is two on either side the sanctuary gate, are unpierced, and thus form the groundwork for magnificent mosaics. The eight attached columns above alluded to are amongst the wonders of the world; but, from the darkness in which the east end of this nave is shrouded, their beauty is lost. Upon our visit, the verger or guide set out their charms with the aid of a wax taper. The lower orders of these columns, including the base, the die, and the surbase, are executed in red porphyry, the effect of which is heightened by the panels being wrought in malachite. The bases of the shafts are highly chased and gilt brasswork, their length on each face of the square being 5ft. 4in. These are in single castings, and, like the other bronze works of the building, were cast at the great local works of Mr. Baird. From these bases, to the height of about 43ft., with a diameter of about 3ft. 8in., rise the splendid shafts of highly-wrought and polished malachite. These are fluted throughout their length, and cabled in the lower part. As this beautiful stone is only found in a fragmentary form, it has been necessary, in applying it to the purpose of these columns, to shape and joint the same, and build it up as a facing, round cores of white marble, to which it is securely cemented. This lapidary-work is of the highest order, the joints, coursing in all directions over the surface, being barely perceptible to the eye. The pattern grain or figure of the stone is in all cases carefully matched, and the general effect of the work is that the shafts are entirely wrought from single blocks of this precious stone. The caps of the columns are of gilt bronze, and the entablature is of various coloured marbles, with inlays and gilt or bronze enrichments. As this is our first introduction to works wrought in this beautiful and costly stone, it may not be out of place to offer a few remarks thereon. Malachite, as we have already stated, is a product of the copper-mines of Siberia, its beautiful green colour being derived from oxides of that metal. It is a material of which the Russians are justly proud, and lapidary works, mostly subsidised by the State, have long been established for its manufacture at Perm and St. Petersburg. The palaces of the reigning family, and the residences of the nobles, are largely furnished or decorated with works in malachite, specimens of which have, from time to time, been accessible to the general public at the various European exhibitions. As far as works of importance are known, there is nothing in existence to compare with any one of these eight columns of St. Isaac's Cathedral. Malachite is generally obtained in small fragmentary pieces, and for purposes of ornamentation it is sawn or cut into thin slabs or veneers. Large blocks, ranging about the size of half a brick, are shaped and polished as models of the rock, or base of the equestrian statue of Peter the Great; and, when mounted with miniature statues, are sold by the art dealers as decorative objects for the better class of houses. The largest block, or native mass, of this stone ever discovered, is preserved in the School of Mines in St. Petersburg; its weight is given as 29cwt. Although a native material, its manufacture is not confined to Russia, as large consignments of the stone are made to France and Italy; this is owing to the fact that the standard of art is higher in these countries, and, hence, it is by no means a rarity to find work of this class recrossing the frontier of Russia. The native manner of working-up this stone for ornamental purposes is in stand or table-tops, mirror-frames, ink-stands, paper-weights, &c., added to which, is the popular form of depicting, in gilt bronze, a peasant drawing a sledge over a ground of malachite, his load being a block of rock-crystal.

Reverting to the St. Isaac screen, we will, with these remarks, leave the further picture of these costly and famous columns to the imagination of our readers, and divert our attention to the central compartment, which, as before stated, is pierced with the entrance into the sanctuary. The archway itself in its lower part is wrought in red porphyry, and the upper part in white or statuary

marble, inlaid with malachite and lapis-lazuli. The inner arch of the entablature is supported by a couple of costly columns. The highly-wrought brass bases of these columns are 2ft. 8in. on the square, and the diameter of the fluted shafts are about 2ft. 2in. These shafts, the height of which we could not obtain, but which is given by one authority as 30ft., are of white marble, entirely faced or built round with that still more costly stone lapis-lazuli, the sublime azure tint of which is lost by the darkness of their situation. These shafts, the workmanship of which in fitting, shaping, and polishing the stones is perfect, were wrought from this valuable product of the Siberian silver mines at a cost of £12,000. This stone, from being of higher value than the malachite, is rarely seen outside the royal palaces. As it is our intention to take a hasty glance at these stately residences, we will not further dwell upon this material, but will proceed to notice the famous gates of highly-wrought and gilt brasswork which fill the opening between these precious columns. These gates are 23ft. in height and 15ft. in width, and they are each formed of castings of the most massive character. The design is florid, consisting of foliage, scrolls and flowers, which in their turn are overlaid with finely-modelled cherubim. The sanctuary in their rear is not visible, as the openwork of the gate is backed with purple curtains. These gates, we were told, are thrown open during a portion of the service, and the sight revealed, amidst the blaze of lights, is dazzling in the extreme. This holy place, never defiled by the tread or presence of woman, is a circular temple, the gift of Prince Demidoff, the owner of some of the most productive mines in Siberia. The material is the produce of these mines, and in its raw state it was conveyed to Italy, where it was wrought, at a cost in all of £250,000. The steps, we learn, are of porphyry, the floor of marble mosaic, the dome of malachite, and the walls of lapis-lazuli; the pillars supporting the choir are enriched with caps and bases of gold, and the shafts, 8ft. in length, are of rock-crystal.

The wall-space in the adjoining compartments of this famous screen are above the base-line, are marble and porphyritic mosaics, the subjects being colossal representations of the leading saints of the Greek Church—viz., Christ, Mary, Isaac, Alexander, Catherine, and Nicholas. This work is credited to Russian artists, having been wrought at the manufactory close to the Academy of Arts.

The end compartments, as before stated, are pierced with archways into the side-chapels, the walls of which are of white and other marbles. The decorations of these arches are very rich; the panels, of malachite, are surrounded with white marble, enriched with a key-pattern inlay of lapis-lazuli, the whole of which are set or framed in three moulds of chased and highly-gilt brasswork. From these chapels, through brass doors, the panels of which are painted with celestial figures, the central chapel is approached: a holy place that corresponds with the Lady-chapel in our English cathedrals. The light of this chapel is obtained from a large eastern window, enriched with a representation of the Ascension; beneath this is placed the high altar, conspicuous in the neighbourhood of which stands a pair of colossal candelabra, each being fitted for sixty candles. The most conspicuous object in this chapel is a model of the cathedral wrought in gold, and preserved in a case of plate-glass. We need scarcely state that its execution is of a faultless character, for this is a remark that applies to every detail of this marvellous cathedral.

We must not, in bidding adieu to this famous building, this Aladdin's cave of gold and precious stones, bear away the impression that all the wealth of the body ecclesiastic is centred in this cathedral; but as a true work of art, and a specimen of Classic architecture in its best and purest character, we may safely assert that it has no rival in the great empire of Russia. Taking it on the ground of beauty of material, which, so far as the external or monolithic columns are concerned borders on the sublime, it has no rival in the world.

We propose to conclude our notice of the churches of St. Petersburg with a hasty visit to the

KAZAN, OR MILITARY CATHEDRAL, AND TO THE MAUSOLEUM CHURCH OF ST. PETER AND ST. PAUL.

The former is situate in the centre of the Nevski prospect. It was erected in part as a model of St. Peter's at Rome, and, from its completion being contemporary with the great victory over the French in 1812, it became famous for its association with deeds of arms. Its columns are hung with flags, and its walls with the keys of conquered cities. This cathedral is remarkable from the vaulting of the interior being carried on fifty-six Finland granite columns, each shaft, set on a bronze base and surmounted with a Corinthian cap of the same metal, being a monolith of 35ft. in height, and from the great screen, or ikonostas, and the balustrade in front of the same, being wrought in silver, which, as an inscription sets out, was the "zealous gift of the Don Cossacks" after the campaign of 1812. On the screen of this cathedral, at a convenient height for the worshippers to kiss, is fixed one of those sainted pictures which are said to work miracles for the Russian army, and which, in case of need, are carried to the battle-field. This picture of the Virgin Mary was brought from the Tartar city of Kazan, on the river Volga, in 1579, and fixed in its present position in 1821. Excepting the face and hands, the whole field of the picture is overlaid with plates of fine gold, covered with sapphires, and other precious stones, valued at £15,000. These jewelled shrines are common to nearly every church in the land; the figures, including our Saviour, are always on the flat surface, and painted in the swarthy hue peculiar to the Egyptians. In this respect they are understood to conform to the commandment—"Thou shalt not make unto thyself any graven image."

The Church of St. Peter and St. Paul is the mausoleum of the Romanoff dynasty, and the Church of the Great Fortress. It is a plain building of the old Russian type, dating from the early part of the last century, remarkable only for its western spire, and its eastern dome, or cupola, which, in the true Russian style, are overlaid with gold. The interior is divided into nave and aisles by two rows of massive columns. The royal tombs, plain to a fault, are placed in single or double lines along the walls. These tombs are of white veined marble with plain coped covers. It appears to be a law, or custom, that the pomp of state, carried to such excess during life, should in death be set aside, and that the heads of this remarkable family—these Cæsars of our time—should, in death, know of no distinction. In all, we counted twenty-eight of these tombs, thirteen of of which were clustered about the high altar. The church is open to all comers; but at the period of our visit the only inmates were a couple of soldiers, on guard, and a stoker to attend the stoves, whose duty, in severe weather, is to keep up a summer heat, a detail that is highly necessary, for the tombs are half-hid in the shade of orange, myrtle, and other half-tropical trees.

The influence of Peter the Great, the founder of Russian civilisation, is powerfully felt in this church, for here his ashes repose, away from those of his ancestors in the Cathedral of the Archangel Michael, in the Kremlin at Moscow. The example of Peter in resting here has been followed by all his successors with one exception, viz., Peter II., who is buried at Moscow. Our impression, from the fact of water standing alongside the church about 5ft. below the level of the floor, was that these tombs formed a group of sarcophagi; but we were informed that such was not the case, as the bodies are placed in vaults below the level of the floor.

(To be continued.)

PERPENDICULAR ARCHITECTURE.

MR. J. D. SEDDING gave a lecture at St. Paul's Chapter-house on Thursday week, before the St. Paul's Ecclesiological Society, on the Perpendicular Style. Mr. J. Grimshaw, who occupied the chair, remarked that, although after Mr. Carpenter's lecture, he had spoken of Decorated Gothic as the culmination and zenith of English architecture, it must be admitted that Mr. Sedding's illustrations, hung in such profusion on the walls, proved that in the succeeding style was embodied a glorious and brilliant sunset.

During the preliminary proceedings, it was announced that a visit to Westminster would take place on June 5th (to-morrow afternoon) when the members would be conducted over the building, in sections, by Messrs. G. H. Birch, J. T. Micklethwaite, and J. L. Pearson, A.R.A. On Saturday, the 19th, an excursion will take place to Greenhithe, for the churches of Stone and Swanscombe, and another on July 3rd to Canterbury.

The architects, the critics, the antiquaries, the connoisseurs, the frequenters of archæological pic-nics, and other representatives of the current taste think, said Mr. Sedding, that the art of the Perpendicular period is either intrinsically or—in regard to the earlier periods—relatively bad, and that its tendency was to go from bad to worse. Strange, divers, and even contradictory things are said of it; but the charges laid against a dog with a bad name are not strictly investigated, and hence the "bad name" which the Perpendicular has somehow obtained answers all requisite condemnatory purposes. It is too horizontal for one, too perpendicular for another, too modern for the dry-as-dusts, too secular for the sanctimonious, who seem to fancy that Gothic art was invented for the spread of Christianity, and think art becomes "profane" when it illustrates the human side of every-day life; it is too rich and lavish for the purist, too scientific and matter-of-fact for the lovers of the queer and the unexpected, too free and playful for the pedant, too refined and artful for the worshippers of the crude and the rude, and everybody of consequence except the great Pugin, Fergusson, and Freeman has had an ill-name for the Perpendicular. Now, if the thing so roundly, so all-but-universally condemned, were a mere abstract idea, out of the pale of practical life—if current taste, art, historical and other knowledge did not suffer from this wide-spread antipathy—if, too, the very existence of the relics of the discredited style were not meanwhile imperilled by it—one might look philosophically at the whole business. "They say: let them say!" Or one might reflect that in due season the wheel of fashion, if not the informed judgment, would turn this way. But there is much in the past and in the present to deplore in the attitude taken up, and speaking as a student to students, I would ask you to use your endeavours to abate the evils of these invidious distinctions. If we are to have any dealings with Gothic art, let us trust it altogether; let us have the courage of our convictions, and let our attachment to the national style be a fearless, unhesitating allegiance that accepts Gothic all in all, or not at all! Let us have done with these self-imposed bonds touching the use of the later styles, which must tend to make the Gothic revival affected and short-lived. Having quoted from Parker's "Glossary" descriptions of the Perpendicular style couched in terms of the faint praise that damns, Mr. Sedding condemned the text-book criticism which has influenced popular opinion by pitting style against style, labelling this as "pure" and that as "debased," regardless of the facts that the art-principles are identical throughout, and that there is the same chance of getting

good or bad work in every style, and that the craftsmen of all the periods alike were Englishmen working for Englishmen, expressing English enthusiasm in English ways. In church restoration, contempt for the Perpendicular has both prompted and given moral justification for the destruction and mutilation of a vast body of architecture of the period during the last 30 years. Buildings have been valued according to their chronology. We have valued age in art, rather than art for its own sake. We have been more anxious to support theories about the work of a period, than to be put into communication with the period. There has been a good deal of pickaxe and crowbar work, of raking amidst old stones, of grubbing up old foundations; a great deal of conjectural restoration where license has been given to 19th-century architect-dreamers to express their unwarrantable 13th-century dreams, and no concern whatever about the Perpendicular work destroyed in the process. A practical result of this aversion to the Perpendicular is seen in the utter inability of architects to design in the style. A full half of English architecture is—perhaps I ought now to say *was*—of this period, and yet there are not six men in the profession who are able to *think* in the Perpendicular, or to express themselves sympathetically through its forms. On the occasion of Mr. Carpenter's lecture on the "Decorated Period" your chairman—whom I am glad to see again occupying that position to-night—expressed his satisfaction at the exclusive adoption of the Early styles by church architects of the present day. I propose to-night to pass in survey the mutual relation of the Perpendicular and other periods of English Gothic, marking where they touch and illustrate each other. In the Perpendicular we have what has been called the "complete Gothic of England"; and taking 1350 as the starting-point of the style (although the Gloucester work would give us some 13 years earlier than this date), we are carried on well into the 16th century for some of its latest examples, showing how thoroughly the style was engrained in the English mind, how it fitted the desires and aims of the later generations, and how much hidden capacity there was in it. Even if we take 1350 as the beginning, and 1560 as the close of the Perpendicular, we give the style a longer space of time than the Early English and Decorated put together. The term "Complete English Gothic" is, in a mediæval sense, fairly accurate, and conveniently sets forth the continuity of the effort which here reaches fulfilment. If Perpendicular indeed be the Complete Gothic of England, then whatever is vital to Gothic in general, and to English Gothic in particular, must be here at its zenith, and brought to what Emerson would call its "grand climateric." Before proceeding to technicalities, let me say a few words as to the national character of the Perpendicular, and as to those elements of Gothic in general, and of English Gothic in particular, which we may expect to find here brought to completion. Let us try to master a few of the characteristics and motives of English art, and to learn something of those unseen forces which led the English to formulate the Perpendicular, and the French the Flamboyant. In dealing with English Gothic we are apt to make too much of the distinctions of styles, and too little of the general impression of the whole. We are apt to forget that the style is, after all, only the manner of the thing—the bit of string that ties the posy together, not the flowers themselves. We reduce art-knowledge to an "exact science," and treat styles as though each were a passing phenomenon that ran in the course of a century to some arbitrary result and then stopped, and then something else was started. On the other hand, the art of all periods of our national Gothic does not express one mind at one time, and one at another, but the English mind always. So one period but helps to fulfil the aims of its predecessor, as it more or less anticipates its successor. But in all the fount of inspiration is the same. All are equally English, equally heaven-born, whether we like to own it or not. The first thing to note is, how much more akin the arts of the Northern races are in the early formative stage than in their formed stage—in their beginnings than in their endings. The line of demarcation between the several national modes of working from the common Romanesque is, at starting, but as the separation of a narrow stream over which people can still touch hands; but as time goes on the banks widen, so that by-and-by the points of contact have entirely disappeared. This view of the origin and development of national arts has an important bearing on the rank and place of Perpendicular in English art. The next point to note is the limitation of national arts. Not even the most ardent lover of England expects to find English art perfect and evenly-balanced all round. The history of art shows us that no race, not even the Italian, which had the Benjamin's mess of art, can excel in more than one particular; but in all things human there are compensations as well as limitations. Since the law of progress and development in art is the same as the law of progress and development in nature, it follows that the full character of national art can be most accurately studied where it is most declared. In the Perpendicular, then, we have not only what is the outcome of national insularity, but that closing phase of Gothic which has most absorbed the national character, and hence the achievements of this time, down to their smallest particular, are so valuable and so full of interest. It is on this ground, too, that we may fairly test the whole art power of mediæval England by the Perpendicular. For this reason, when considering the technical side of the question, we may be prepared to find a certain noble *abandon* of power, a wealth of accumulated experience, skill, material, and art-resource in the Perpendicular, and to meet craftsmen who, nurtured on far-reaching English tradition, having learned the extended capacities of English art and the limits of English desires, can hit straight at the mark and touch our national sympathies to the quick. Let us now pass to the consideration of the characteristics and motives of English work, discernible in the early divisions of Gothic art, but more fully displayed in the later stage. From the Geometrical or Decorated period, the French pass to the Flamboyant and the English to the Perpendicular. Speaking broadly, the Decorated differs from the Early English in exhibiting a greater degree of decoration; the Perpendicular differs from the Decorated in having certain perpendicular members, which, in the earlier phase, are not perpendicular throughout. English art is everywhere distinguished, first, by love of, and carefulness of, detail; secondly, by general disregard of picturesque effects; thirdly, by reserve and sobriety of spirit; and, fourthly, by a tendency to perceptible harmony of parts. English art ever excels in detail, but it is never daring, restless and aspiring; its works have measured aims and compass. Thus we have no unfinished buildings like the French and Italians, and so it is that all our buildings are of homely compass, and their effects calm and unstrained, and harmony, and not contrast, is aimed at throughout. English work is concentrated; all-circumspect, well-considered, and without any dash of experiment. Having indicated the salient traits and specialities of English work, let us try to realise its aims by a brief examination of a few details, as bearing on what has been said, and as illustrating the development of styles. The usually-accepted theory that Gothic architecture derived its leading features from the necessities of vaulting is true as far as it goes, but it does not go very far. It so happens that except in our cathedrals, and some of our collegiate churches, and in some 16th-century aisles and chapels, vaulting was not practised in England, and that theory must therefore be abandoned for broader ground. In architecture, man's imagination employs two mediums by which to express itself. First, by the development of lines, mouldings, and masses in agreeable proportions, and secondly by sculpture. As to the science of proportional lines in elevation, Winchester Cathedral affords a well-known illustration of the process of transformation which went on as the science developed. It will be interesting and instructive to compare the aims of workmen in the early and later Middle Ages, as shown by an enlarged copy of Willis's drawings of the nave in its original and present states. The Norman compartment is divided into three parts of nearly equal height, whereas the Perpendicular is divided into two parts enclosed under one arch. The lower pier arch of the Norman work is less then one-third of the whole height, whereas the pier arch of the Perpendicular work is half the total altitude. The triforium is of equal importance to the other two parts in the Norman arcade, but in Wykeham's work it is subordinate to the general design and becomes a panelled balcony. I am aware that some people consider that the omission of the triforium is one of the many signs of debasement ascribable to the Perpendicular period, and these same people with charming inconsistency declare in the same breath that the proportions of Wykeham's nave, which they cannot but admire, are the proportions of the Norman nave. But it needs no angel from heaven to tell one that the proportions of the Norman arcade are not of the highest order. The three divisions are made of equal height, and there is nothing principal and nothing subordinate, nothing above and nothing below the rest. This, then, is not a composition, if composition mean the conscious disposal of parts. The design, further, is made bit by bit, and one part is not intimately linked to another. In every respect where similarity was possible, the Perpendicular is designed in entire disregard of the earlier fabric, and as independently as though the whole had been rebuilt from the ground. The nave of Canterbury is like it, and that was thus rebuilt and begun in 1380, before Wykeham's nave. Again, the designs of other cathedrals of intermediate dates exhibit a tendency towards the very treatment here brought to perfection even to the practical obliteration of the triforium as in the choir of St. Alban's and the nave of Exeter Cathedral, clearly proving that the Perpendicular nave of Winchester is a spontaneous expression of the principles and laws of design as then understood. In regard to composition, that of Salisbury is higher than that of the Norman nave of Winchester, just as the Perpendicular of Winchester is higher than the Early English at Salisbury, and Exeter lies between these two in ability of design and the clearer association of part with part. But neither Salisbury nor St. Alban's carries out Gothic principles to perfection. At St. Alban's, as Mr. Freeman has pointed out, the three continuous horizontal ranges have no more vertical divisions into bays than a primitive basilica. And though vertical lines are more enforced at Exeter, so as to mark the bays more definitely, yet they are only used for a moiety of the whole height, whereas at Perpendicular Winchester there is a continuous line from ground to vault. The evolution of the inherent principles of Gothic design is also illustrated in another particular. Exeter nave dates from 1331—Winchester nave from 1394. At Exeter a large traceried window almost swallows up the whole space above the pier arch, but the triforium forms no part of a scheme in the general design. There is nothing to carry the eye from pier arch to triforium arcade, nor from panelling to window, and the design is checked. But at Winchester the vertical principle is strongly felt and asserted, and the law of association has intimately linked part with part. The old division was but threefold, this is multifold. The window here only forms part of a composition of wall panelling, which has a deeply-moulded arch divided at mid-height by a transom. The window is not a feature by itself so much as a glazed space in tracery which would take its present shape whether glazed or not. Even the upright bars separating the sides from the centre compartment are carried through the spandrel of the pier-arch, and the cusping is repeated. So strongly is the artist dominated by the sense of harmony, so exalted is his perception of the beauty of order, that the whole structure becomes one piece of harmonious toil. Each part has its multifold division in principal and subordinate members, and the whole structure is one system of energetic copious life; the vertical moulding of the wall-pier rises like a tree from the ground, to burst into branch and flower in the lierne vaults overhead. On every possible count, then, the Perpendicular nave of Winchester differs from the Norman, and hence the significance of the example. In proof that the principles involved in these instances are capable of illustration in every kind of Gothic detail, take the subject of screens. Compare the early screens with their single uniform series of openings, and the later east and west-country screens with their tiers of varied divisions, the mystery of their intricate tracery, the complex harmony of their associated line. Take a larger subject still—roofs. There is not a high-pitched wooden roof of ornamental character in any Early Gothic church, and they are all *common* rafter roofs. Given one rafter, and you have the whole. Turn to the Late roof, and you come to quite another phase of things. Even in Devon and Cornwall, where the waggon roofs are continuously used, even here, where the rafters have

uniformly arched collars, every fourth or fifth rafter is carved or moulded, and connected with purlins similarly treated. More than this, the wood principals are drawn into the main thought of the structure by being led down the wall into the piers of an arcade, as at Bruton, Bury St. Edmunds, and Rougham. Another treatment is at Thirsk, where below the principals there are large painted figures. Or take a nave exterior like St. Alban's, of Early-English work of two dates. What can be more monotonous than its long range of uniform lancets? Can you wonder at the fifteenth-century architects craving for a change, and with that magnificent west window (which I fear is doomed) can you regret the change? But compare this nave with Malvern, which has a Norman substructure, a monotonous range of windows in clerestory and aisle, and a flat roof like St. Alban's, of therefore the same necessities of construction, and which is what it is by Perpendicular conversion. You cannot analyse the charming result any more than you can analyse a poem or a piece of music. You see that, starting with the old cross plan, the architect has obtained much effect by keeping his transepts lower than the other arms of the cross, and he has further subordinated the transepts by running his tower windows down into the roof without a horizontal sill, letting the three ranges of coupled buttresses grow out of the roof to rise like lean tree-stems unobstructed to the parapet. He makes his aisle-parapet half the height of the transept and a fourth of the tower, and by heightening the masonry of the walls, and by the artifice of strongly enforced vertical lines of window-tracery and pinnacled buttresses, the main fabric is so magnified as to seem to start out of the background like a vast church out of a church. But as to this point of the use of monotony as an ingredient of design at St. Alban's, and at Malvern, the architect at Malvern uses monotony in his two ranges of similarly-treated windows, as a composer does in a concerted piece, or a poet in a drama — as a pause to stimulate expectation and not to satisfy. The repeated lancets at St. Alban's imply no future movement, and all participation in the scheme of the building begins and ends with themselves; but at Malvern, every line of the repeated windows contains dormant harmony, every fragment is instinct with changes of measure. The three lights are subdivided into the six heads in the tracery, having three and five foliated cusps in the heads, and the clerestory windows are in two tiers. More than this, almost every known application of curvature is introduced in the arches. From the windows, the eye is led on by ranged buttresses to the next phase of the movement, where the light glances through rich open tracery, and the pinnacled buttresses, with their strongly-asserted vertical lines, contend with and overmaster the ridge of the roof. And the exterior of this building is but a faint echo of the harmony within. Cut through the choir pier, and you have in its lines the whole fabric in a compressed form, for the mouldings throughout the fabric spring from this section. Those towards the aisles are less rich than those towards the choir, but arch, wall tracery, window, roof, aisle, aisle window, aisle panelling, screens, chapels, stained glass, tiles, and every fitting only prolong or change the measure of the theme stated in the pier. This marvellous power of associated line, demonstrated in every structure and fitting of the Perpendicular period, demands a few words as to the development of mouldings. Simple as it was, the invention of the chamfer by 13th-century architects marked an epoch in architecture. For next to the removal of the edge of the stone, came the hollowed chamfer struck with a compass; then a plain roll occurs in the hollow chamfer, then an elaborated roll struck out from two centres, called keel-shaped, and terminating in a point; or the roll is enriched with one or more fillets. The hollows are becoming more and more emphasised, and more and more skilfully planned as the science is better understood. These hollows are also struck from centres, and in the enriched mouldings are only separated from each other by a narrow neck of stone, the roll having grown from half to three-quarters of a circle to get richer effects. Two observations are important for the due understanding of the art of the Perpendicular. First, one step at a time seems to have always been the English mode of progress. The later Norman was essentially a decorative age, when surface-carving was practised, when form was not invented or modified to take sculpture, but the plain unmoulded faces of a wall were enriched by bas-reliefs. The Early English is not a carving, but a moulding period, when the first lines were struck of all future developments in the imaginative use of mouldings. The Decorated combines tracery with mouldings and carvings, and the Perpendicular takes up all that was incomplete in former phases, adding thereto the abler disposition of lines and masses, and a higher range of carving and colour decoration. The second point relates to the indebtedness of the designers of the Early periods to the bow compass, and this, both in design and execution. The bow compass is the bridge which carries the designer from the rudimentary Norman and Early English to the Perpendicular, when mouldings and tracery are almost entirely struck by hand. The compass produces the Early English mouldings, the lancet, and the plate-tracery; it defines the precise and formal tracery of the Early Decorated. But both executive power and perceptions of grace grew and disclosed themselves until at length the compass was abandoned, just as a crutch is cast aside by the cripple, when he can do better without it. "Grace, 'tis a charming sound"; but there is grace and grace. There was grace in the long lancet and the ranged cylinders of the Early English period, but I do not refer to passive, but to active grace—the easy elegance of lines that have a will of their own to bend into subjection, and are what they are by the perfect law of liberty. This natural grace is exemplified in the excentric ogee curvature of the Perpendicular period. The principle of the ogee curve was as slowly and painfully evolved as any other piece of Gothic development. When first used it was a leap in the dark, as you can see if you look at the window over the north chancel door at Kettering Church, in Billing's book. And in spite of the fact that God's finger has taught the petal of the lily and the leaf of Solomon's seal to produce the daintiest ogee curves, one might, if our designers had done nothing better in this line than Kettering chancel-window, have thought that the enemies of Perpendicular were right after all, and that Beelzebub *did* invent the ogee for the frustration of all pure art. It must not be supposed that the vertical tendency ousted the ogee curvature, for the perpendicular lines in tracery are introduced only for a set purpose, and the ogee is of the essence of the style. Vertical lines are used in windows for the sake of the tiers of stained-glass figures, in structural fittings to give scale or to contain figures arranged in tiers; or, again, the sense of the interpenetrative use of lines dictated the adoption of the vertical lines. In the chantries of this period you have the vertical principal used for the sake of scale. Gloucester Cathedral is one of the finest illustrations of the capacities of the Perpendicular, and of the alliance of the ogee curvature and strongly-asserted vertical lines; but the ogee is ever the constraining factor, the vertical lines being introduced as subordinate elements of the structure, and as mere containing-lines for certain decorative effects. It is well to note how extremely free the tracery of this period is, when not conditioned by the necessities of structural ornamentation, and that wherever curvature is introduced it is drawn by hand. Of the numerous examples of Somersetshire seat-ends illustrating this point which I show, those from Weston Zoyland are the most remarkable, for here we see 27 patterns all different, and the imaginative use of proportional lines is carried to a very high point of excellence, the secret of the beauty of the work being that it is all hand-drawn. You will see that, whereas the Early English plinths are all mechanical, the latest examples represent a continuous flow of hand-drawn line, and the same rules of progress can be followed out in the weatherings of the buttresses. So, too, in door and window moulds. The 12th and 13th century examples have a series of columns in square recesses, with the angles taken off. There is not much scope for the higher elements of design in cylinders set in square recesses with the angles taken off, and the whole has an arbitrary air. The repeated shafts in the jambs are accompanied mostly by a repetition of the same mouldings in the orders of the arch. Hence the only gradation of line and shadow comes from the retiring members of the arch—a matter over which the artist had no control. After the substitution of engaged for detached shafts there is a steady march of improvement, until we get the grand channelled mouldings of the Perpendicular period. The mouldings of columns and arcades are intimately connected with those of doors and windows. Starting with the plain circle in the 13th century, from thence we come to the chamfered octagon, and then to the quatrefoil, and in large churches to a central circle with smaller shafts grouped round it. But in pier and arch moulds the compass is largely used, frequently with fine results. But all that was done in earlier times had a disciplinary effect on the minds of the workers. In Late work none of these old forms were forgotten, but they are handled differently; new combinations are made; there is a more artful disposition of lines; certain wavy freehand strokes appear, the ranks of members are more graduated and more accentuated. I have spoken much hitherto about the disposition of lines, mouldings, and masses in architecture; now let us turn to ornamentation. Mr. Ruskin admits that it requires genius and special gifts to produce agreeable proportions, but invention and genius being granted, how unprofitable is the building without sculpture. What good, he asks, did architectural proportions ever do any one? The gist of his teaching, as to architecture, in the "Two Paths," is that architects should be more than proportionalists; more than mere numerators and denominators; that they should be carvers or painters who watch the external forms of nature, who can tell facts about nature, bring out sympathy, foster the power of sharing in the feelings of all living creatures, tell tales to amuse men and to raise the human spirit's aspiration. Let us test the ornamentation of the Perpendicular by Mr. Ruskin's definition of the nobler side of architecture. Ornamentation is of two kinds, sculptural and coloured, and the former has also a twofold subdivision into foliage and figures, the second being the higher of the two. The Later Norman was a decorative period, but the Early English, being a moulding period, sculpture was, for a while, comparatively neglected, and the Decorated was a tracery period in which the art of sculpture was reviving. The Perpendicular period, however, combines the power of sculpture, both figure and floral, of mouldings, and of tracery.

At St. Alban's, we may see what there was in the sculpture of the Perpendicular period. This should prove a damaging example, for Mr. Neale, in his first-rate book on this Abbey, sums up the matter thus:—"In the Perpendicular carving at St. Alban's there is no want of skill; always skill enough to perform what the artist aimed at; but the rich luxuriant freedom of the Earlier work is not to be found in the best work of the Perpendicular period." Let us apply Mr. Ruskin's canon of criticism to some of this work, in which "there is no want of skill." First, there is the watch-loft (date 1420-30), a wooden erection, with a chamber raised about 9ft. above the floor, and it is to the carvings on the cornice of this cove that I direct attention. They may be "rude"; the Mediæval world was full of rude people and things. There are 25 subjects on the north side and 21 on the south, some being angels playing on musical instruments, and others scenes illustrating the avocations and pleasures of life. They include a man gathering mulberries and a basket of fruit at the bottom of the tree, a woman picking flowers, a mower of barley with a scythe, the martyrdom of St. Alban, two figures reaping wheat with sickles, a man with two dogs, a tradesman and his wife setting on a settle in their shop, their wares at their feet, a huntsman sounding "Tally ho"! and two hounds, scenes from the life of St. Alban, &c. Now, these images are not such as our carver of to-day, who only carves for the "genteels," would care to pourtray, and yet Milton, writing his "l'Allegro" two centuries after the loft was erected, travelled over much the same ground. Another phase of Perpendicular carving is in Duke Humphrey's tomb, where the main conception, especially the upper part, is charming. The figures of kings on the south side, 17 in number, are about 2ft. high, and are severe-looking. There is much variety in their face, figure, and drapery. They have large heads, and are such as we find in stained-glass of this period. The subject of Perpendicular reredoses is one which needs a special lecture. There is a glorious series at

Gloucester. At St. Alban's, Winchester, Christchurch, Hants, All Soul's, Oxford, and St. Mary Overie, they are high screens, the two first being similar in general design. The carving at St. Alban's is superior to that at Winchester, but the traceried canopies in the latter far surpass those of the former. There is more imaginative power in the central canopy at Winchester than is to be found in a score of modern churches. Very small carving was frequently found in Late Perpendicular chantries. Judged of in the abstract, infinitesimal carving is unpardonable. Yet we have seen that the Later Perpendicular is anything but a day of small things—the largest mouldings, projections, channelings, windows, and carvings in all English work are to be found in this period. Why, then, was the carvings in such fittings as chantries so minute? It was done to gain scale, to magnify the proportions of the buildings in which such structures were placed, and also to gain height for the fittings. The trained eye and sense of the artist taught him to minimise the masses of subordinate fittings, and to magnify their heights for the sake both of structure and fitting. Have you ever realised how much Salisbury Cathedral suffers from the loss of its 15th-century chantries, dotted above the nave, which the correct Wyatt so ruthlessly destroyed? This view of what closely-set vertical lines can do for a structure is intimately connected with the office of the multitude of lines in Perpendicular windows. A general review of English and foreign Gothic shows that, whereas our early Mediæval builders only built long, low structures, the later men felt the deficiency of height, and set to work to give altitude by artificial means, by strongly-enforced vertical lines; hence the crowning phase, the Perpendicular. While the Continental architects reared lofty piles, and then threw their ornamentation broadcast over them, in wide belts of carving, or in the diffused floriations of the Flamboyant. English ornamentation, whether of sculpture or stained glass, has ever known but one method of application, that of long tiers of figures, rising one above the other. Ours has been an art for creating single figures. But French and German art has ever been more of a narrative art, for dramatic purposes, expressed by horizontal bands. As a rule, in ordinary English churches, the east window will be one of narrative, the side windows will have single figures. It is hard for us to realise the great importance given to decoration in the middle ages, when stained glass, or painting, or sculpture, was considered the crown and glory of a building, and an indispensable item. The Perpendicular window was made for the glass, and to suit the tiers of figures, but there are cases where the tracery takes strange forms to suit the glass. In summing up this matter of decoration, I would have you observe that the later the date of the work the fuller is it of ornamentation and of the higher class of sculpture, that of figure-work. I have not attempted to group the various works chronologically, because I do not believe the period capable of such classification, nor do I see the value of such an arrangement. To a true lover of art, the mere date is nothing. In Gothic, it is all a matter of relative development. I know nothing of "pure" art, nor of "debased." It is everything to me that the art is fine of its phase, that the man who gave it birth was a great man. I have tried to give you the motives and characteristics discernible in the earlier phases, and more clearly declared in the full-grown "Complete Gothic" of the Perpendicular. My object has been to show how all the past had worked for this complete phase; how the Perpendicular is the outcome of our national insularity; how it is English of the English; how, if we would know the whole art-power of mediæval England, in proportional lines, decoration, stone-groining, wooden roofs, stalls, reredoses, screens, glass, and sculpture of all kinds, we must turn to the Perpendicular period. In brief, the Perpendicular period is the crown and culmination of a long series of effort; it is the harvest-time of all our Mediæval endeavour. For in English Gothic, as in Nature, there are three phases of development—first the blade, then the ear, then the full corn in the ear.

A new chancel, chancel-aisles, chapels, and sacristies, which have just been added to the Roman Catholic Church of SS. Mary and John, at Wolverhampton, were dedicated by Cardinal Newman on Tuesday.

THE RESTORATION OF ST. MARK'S, VENICE.

A CONFERENCE was arranged by the Society for the Protection of Antient Buildings, to be held at the Society of Arts' room, on Monday afternoon, to discuss the restoration now in progress at St. Mark's, Venice. The attendance was very thin, not thirty persons being present throughout the afternoon, and the proceedings were delayed for more than half an hour, awaiting the arrival of Mr. G. E. Street, R.A., who had promised to attend. The Hon. Percy Wyndham, M.P., occupied the chair.

MR. J. J. STEVENSON stated that he recently visited St. Mark's, and had reported on the retoration to the Society for the Protection of Ancient Buildings. He arrived at the conclusion that the walls were perfectly stable and in sound condition, but that the marble plaques with which the brickwork was encased had in one or two places become displaced. What was being done was that the work was being gradually rebuilt in perfectly straight lines, and faced with large slabs with the streaks all set vertically, as though it had been washed with dirty water, whereas the old work was irregular, had the charming tone of age, and was composed of small pieces of marble, the veins being matched in patterns. In the old work no attention was paid to straight lines,—even the arches were not accurately centred, colour and beauty of effect being the first considerations. In the modern work precisely opposite guiding principles were adopted. They knew the irritability of the Italians as to foreign interference, and it seemed the true course was to point out that St. Mark's was an historical document which ought not to be altered; and, taking that ground, it was unnecessary to prove to the Italians that the new work was less beautiful than the old. He could not altogether agree with Mr. Street, and certainly thought for several reasons that the floor was not purposely laid wavy; but in most of his statements he fully concurred. He would move: "That in view of the arrangements that are now reported to be made for carrying on the restoration of St. Mark's at Venice, it is desirable to obtain for the information, and to gather the opinion of artists and archæologists, and generally cultivated people throughout Europe and America."

This was seconded by Mr. EWAN CHRISTIAN, who dilated upon the irregular sizes of pillars, caps, windows, and arcades of the old work, and upon the cold, rigid, miserable appearance of the accurately set-out new work.

Mr. STREET said, although the work of refacing had been stopped since last autumn by the Government, it had been left in such a state that it was evident it would be continued. By means of some sketches on the blackboard, he showed that both the north and south flanks have been recased, and that returns have been made on the great west façade. The old work, he had proved by careful measurement, although for the matter of that any architect could see it, was curiously and charmingly irregular at every point; the new work on the flanks was engineer's work, scrupulously accurate in every line and angle, and from the engineer's point of view, was very well done. That was irreparably gone; he yet wanted to save the west façade. After reading Signor Meduna's letter, he made a special visit to Venice, but found it impossible to withdraw a single word of what he had said. During that visit he discovered that the west front was set out on a delicate curve, receding in the centre, and that minute corrections were made in every part, just as Mr. Penrose had shown the world existed at the Parthenon and the best works of Greek architecture, and just as we might see in the entasis of Mediæval church spires. But the Italian architect and builder at St. Mark's seemed ignorant of, or to have overlooked, this point of refinement, and, consequently, the new work did not range with the old at any part in the plinth, the orders, or the cornice, and would, as the work advanced towards the centre, become increasingly divergent from the former lines. Hence, he had stated that nothing less than the rebuilding of the front was contemplated or would be sufficient. The plea could not be advanced that the old pile foundation was defective, for the new work was set out on the old piles, and even Signor Meduna admitted that the foundations were good, and had not attempted to strengthen them. As to the mosaics, many were in fragments, but since the Oxford meeting it had been impossible to see them. He had pointed out to the manager of the Venice and Murano Glass Company (whose contract for restoring was about to expire) the differences between the cement of the old and new work, and the essentially different mode of formation, when the manager replied that they were going to re-cement all the joints alike—a process which would utterly destroy any archæological value the mosaics might have. It was a delicate question, seeing the objections of the Italians to foreign interference, to say how the work of destruction could be stayed. Perhaps the consideration of the enormous cost that would be incurred by any further steps—an outlay which might be well saved—would deter the Government from going further.

The motion having been adopted, a second resolution was moved by Mr. WILLIAM MORRIS, "That a committee be formed, and that the following gentlemen be invited to act thereon:—Earl Wharncliffe, Hon. P. S. Wyndham, Messrs. G. E. Street, R. A. Ewan Christian, J. J. Stevenson, William D. Rossetti, — Wallis and William Morris, and Professors Richmond and Sidney Colvin." The resolution was carried unanimously, and it was also decided to invite Count Zorski, M. Charles Yriarte, and the President of a French society having similar aims to that for the Protection of Antient Buildings (but the name of which did not transpire), to act on the committee. Mr. Rosetti suggested that our new Government should be asked to take action; but Messrs. Balfour and Street pointed out that this would arouse the national feeling of Italians, and would render the movement quite hopeless. The Hon. R. C. Grosvenor suggested that a deputation should visit Venice and Rome, and represent the matter to the authorities, but no resolution was arrived at on the point; and a vote of thanks to the chairman, proposed by Prof. Richmond and Mr. Rossetti, closed the proceedings.

CHIPS.

The spire of the parish-church of Friern Barnet is being rebuilt and reshingled in oak. The contractor is Mr. Woodhall, of Whetstone.

We see a company is being formed at Uttoxeter for working the Hollington stone, to which we called attention on page 447 in our notice of the exhibits at the recent Building Exhibition at Islington. The quarries have been worked with success for many years, the stone is evidently a valuable one for architectural purposes, and a very moderate output should return a good profit to the company.

On Tuesday the coroner for the Sittingbourne district of Kent held an inquest at Northfleet touching the death of Aubrey Percival Gard, aged five years, son of Mr. Arthur Gard, a draper, killed by a water-tank falling upon him. The jury returned a verdict of Accidental Death, but recorded their opinion that the unfortunate occurrence arose through the negligent manner in which the tank was constructed by Henry John Stedman, the builder.

Plans have been prepared by Mr. Scoones, C.E., of Bristol, for the town commissioners of Weston-super-Mare, showing proposed improvements of the sea front and the taking-in of 20 acres of land between Regent-street and the Sanatorium. The estimated cost is £22,000; but the question of acquirement of manorial rights, for which £100 per annum is asked, blocks the way.

The chancel of the ancient church of Chastleton, near Moreton-in-Marsh, was reopened for Divine Service after restoration on Sunday, the 16th ult. Mr. C. E. Powell, of Rolls-chambers, Chancery-lane, London, was the architect, and Mr. Alfred Groves, of Milton, Oxon., the contractor.

Although the sum required by the Act of Parliament (£10,000) has not been all subscribed for the restoration of St. Giles's Cathedral, Edinburgh, the liberal offer of Mr. Chambers has been accepted, under the guarantee of private parties, who have confidence in the completion of the sum. The session of West St. Giles's have received notice to this effect, and, therefore, there is now the near prospect of this unique specimen of church architecture being thoroughly restored. The congregation are to be congratulated on leaving one of the darkest and most disagreeable churches in the city.

Lieut.-General Sir J. M. Adye, K.C.B., has been gazetted to the appointment of surveyor-general of the Ordnance Survey.

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ILLUSTRATIONS.

"ARTISTS' HOMES"—NO. 3: OAK-TREE HOUSE, HAMPSTEAD. —DESIGNS FOR BUFFET.—DESIGN PLACED THIRD FOR CARDIFF FREE LIBRARY AND SCHOOL OF ART.

OUR LITHOGRAPHIC ILLUSTRATIONS.

ARTISTS' HOMES.—NO. III.: MR. HENRY HOLIDAY'S HOUSE AT HAMPSTEAD.

OAK-TREE HOUSE is situated in one of the most charming parts of Hampstead. The geometrical illustrations give, of course, the structure line for line; but mere elevations and plans hardly do the building justice, so we add a general view taken from a sketch made on the spot by Mr. Holiday. The house has been built about seven years, and Mr. Basil Champneys was the architect, the style being Queen Anne. At the time of its erection it was spoken of with interest by those who were then turning their attention to the square window and red brick class of building which has since become fashionable. The house stands on the steep slope of a hill, and is approached from the east side almost on a level with the first floor or rather studio rooms. This latter expression correctly describes the studio, which forms of course the feature of the planning, as it is substantially divided by running doors from massive girders as shown by the section and the plan into three compartments. The length of the studio, when all three divisions are thrown into one apartment, is about 50ft. The north end of the studio is really used as the everyday workshop of the painter, where drawings in progress and sculptured figures, with casts from the antique, robed in wet fabrics, for the study of folds and drapery keep an ordinary lay-figure company, and form the chief furniture of the compartment, which is chiefly lit by a top skylight. The middle bay or lofty nave-like centre, with its gallery on one side, is where Mr. Holiday paints large decorative subjects which require height and an effect of light such as that in which works of this kind are generally intended to be seen, and so a useful purpose was in view when such church-like proportions were given to the main compartment of this studio. The roof and joiners' work is painted a very pale green, doubtless with a view of not having too marked a tone of colouring in the room, but from an architectural point of view, the effect in consequence is comparatively poor and commonplace, a result which white of a creamy shade would have avoided. It may be noted that the present lighting is not sufficient, and two more long dormer lights like those existing are to be added. For the purpose of removing the large subjects from the studio, a long thin opening, hung with a door, is provided on the south front, as will be seen on the first-floor plan, through which the paintings can be lowered into the garden, and so taken away. The small screened-off part, shown at the south end of the studio, does not now really exist, and this, the third division, is mostly occupied by Mrs. Holiday as a music-room, the studio for sound being remarkably perfect. The landing is spacious, and the same may be said of the staircase and hall, the cream-white painting to the woodwork and walls being admirably finished and clean-looking. The solid square newels strike one as being suggestive of firmness and strength—an effect often wanting in staircases of houses of this class. The drawing room, with the boudoir beyond, is unquestionably the most pleasing room in the house. There is something so thoroughly simple and home-like about it, a common stone-colour being used for the woodwork, and pale greens, of the quietest tones possible, for the walls. The cosy effect of the bay-window, and its Morris drapery covered settees, with their cushions of refined and charmingly-designed needlework, the productions of Mrs. Holiday, alone can apologise for the adjectives which they at once, with reason, suggest, as a view is taken through the balustraded and arched opening which divides the boudoir from the drawing-room. The dining room is decorated in dark blue, and, like the other rooms in the house, contains some good examples of Chippendale and Adam's furniture. In the recess, a cabinet, of bookcase proportions, stands, and arrests attention as being rather unusual in the treatment of the lower part, having disengaged shafts with Corinthian-like caps to the large arched opening. The fireplace is a fine reproduction from an old high hob basket-like grate, such as are often seen in old seventeenth-century houses, but these high hob stoves are not the most practical things in the world, and those who occupy rooms where they are used often find them of very little service. This is the determination arrived at with regard to the one now described, and its room will be made good by one of the low-placed slow-combustion grates now more generally used, and, like those already employed in the hall and other rooms of Oak-tree House. The principal entrance is rather singular, and is reached by a long passage or covered way, which is convenient, but odd. No doubt it was, to a large extent, the outcome of the peculiarity of the site, but it fails in prepossessing the visitor in favour of the house, as all entrance-ways should do as much as possible. The bare brick walls and continuous steps suggest an ascetic feeling, and in no way assimilate or bespeak the homely and social character of everything beyond the final entrance-door. The kitchen and offices are arranged below the studio, and have a well-screened kitchen yard, and easily-approached tradesman's entrance. Externally, the high, double stack of chimneys is a leading feature, with the arched connection, which forms an opening for the dinner-bell. The projecting ironwork may not at first be understood; it really is the monogram of the owner, H. H. The walls are of red brick, and the roofs are of tiles; the deep cove is of creamy white, as it should be, and the windows are divided by good thick window-bars, of solid and satisfactory proportions. The dormers are covered with lead, and their cheeks are richly elaborated with ornament in the same material. The conservatory has yet to be built, but, in other respects, our drawings correctly show the house as it has been erected. The sheet of details will be found interesting, and show how thoroughly the spirit and character of the style chosen has been worked out. Messrs. Bedford Lemere have taken two very good photographs of this house, one from either side.

DESIGN FOR A BUFFET, CHAIR, ETC.

THIS was a study sent up for the National Competition of last year. It was originally intended by the author to have shown the complete decorative treatment of the whole of one side of a room in the same taste, showing fireplace, window, &c., but an accident to this latter portion of the drawing necessitated its being cut off; as it is, the study is incomplete. The buffet is intended to be constructed of American pine, stained light yellow, and left unvarnished, with inlaid brass on the uprights and under the shelf. The lower cupboard's panels are intended to have a groundwork in small lines of blue on a paler blue, with the flowers, ornaments, &c., painted on in subdued tones. The curtains for middle recess are to be olive-green Indian silk. American pine is also suggested for the chair, bracket, and wainscoting, the mouldings of the latter to be picked out with gold. The covering for the walls would be imitation stamped leather, similar to those manufactured by Jeffery and Co. The design is by Mr. Arthur Marshall, of the Nottingham School of Art, under the headmastership of Mr. J. S. Rawle, F.S.A.

DINING-ROOM BUFFET.

THE design, by Mr. John A. Stamp, is proposed to be executed entirely in brown oak, without stain or polish; the furniture hinges, handles, lock-plates, &c., are of polished brass, pierced, and chased. Silvered-glass panels would be inserted behind the circular shelves, at the angles, for bric-à-brac. The drawing, along with other works in the same stage of study, received a third-grade prize, and was exhibited at South Kensington last year, and was noticed in our review of the National Competition drawings last August.

CARDIFF FREE LIBRARY COMPETITION.

THE design we illustrate this week, one of the three from which the committee made their final selection, was submitted under motto "A Local Effort," by Mr. Henry C. Harris, A.R.I.B.A., of 16, St. Mary-street, Cardiff. A Free Classic style, broadly and simply treated, was adopted in order to obtain large window-openings for the library and schools and a bold effect at a small cost.

BURTON-ON-TRENT CHURCH.

THIS church has been designed to take the place of the old one, which was erected some 60 years ago, and has fallen into decay. It will be erected mainly at the expense of the Allsopp family and firm, who, together, have contributed over £13,000, the total cost being estimated at about £17,000. The spire, which stands at the north-west angle of the church, will form a conspicuous feature in the town. The church will accommodate about 900 persons. It has been designed by Mr. John Oldrid Scott.

COMPETITIONS.

FEVER HOSPITAL, RYDE.—In response to an advertisement for sketch-plans for new sick-wards, 13 were sent in to the Isle of Wight Guardians, and these were referred to the works committee, who selected four marked respectively—Mr. W. T. Stratton (estimate, £5,119); Experience (£4,150); Experience No. 2 (£4,800); and Newport Arms (£5,300). On Thursday in last week a final selection was made. The first voting resulted thus: Mr. W. T. Stratton, 18; Newport Arms, 9; Experience (No. 1), 5; and Experience (No. 2), 5. The two "Experiences" were struck out, and the votes taken on the remaining two, the results being—Mr. W. T. Stratton, 21; Newport Arms, 17. The clerk was instructed to request Mr. Stratton to meet the works committee.

THE YORKSHIRE UNION OF MECHANICS' INSTITUTES.—STUDENTS' DESIGNS.—The designs for textile fabrics, decorative art, &c., sent in for competition by students at Mechanics' Institutes in connection with the Yorkshire Union are being exhibited this week in the offices of the Union, Victoria Chambers, Leeds. These designs have been adjudicated upon and the prizes awarded. The most numerous designs are in worsted trouserings and coatings. In accordance with the conditions of the competition, the designs are executed in colour and carried out in fabric, so that a pattern is submitted along with a description and plans. In the annual report of the Union, it is said of these designs that they "are much in advance of last year's, and encourage the hope that a still greater improvement will be shown in future." In addition to the designs in textile fabrics, there are on exhibition some of the results of a competition instituted by the Union with the special object of teaching the adaptation of natural form to artistic design in manufacture. These include designs for metal-work, for silver or electro-plate, for mural decoration, for a sideboard, for carved oak pulpit, for a drinking-fountain, &c. The design for a drinking-fountain which has been awarded the first prize is creditable to the author. The subject given for the design for mural decoration was the Four Seasons, and of the first-prize design the examiner writes:—"A very creditable bit of work, showing an advanced knowledge of decoration, coupled with originality of conception. The allegorical figures representing the Four Seasons are very suggestive." Of the first design for a carved oak pulpit, the examiner also writes:—"The student has not only thought out his ornamentation, but has exercised due care in the drawing."

CARDIFF FREE LIBRARY & SCHOOL OF ART

DESIGN PLACED THIRD *Henry C. Harris A.R.I.B.A.* Archt

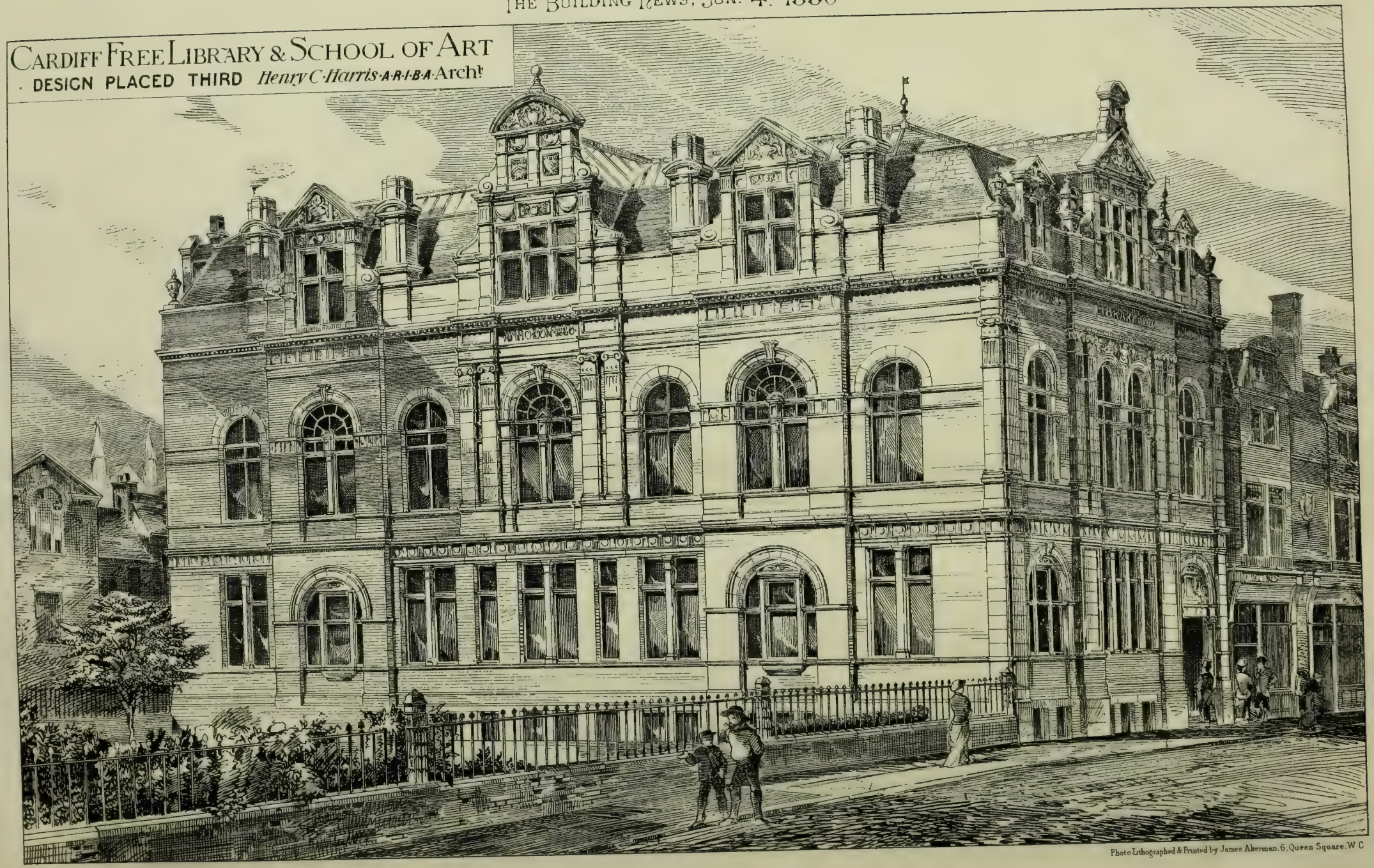
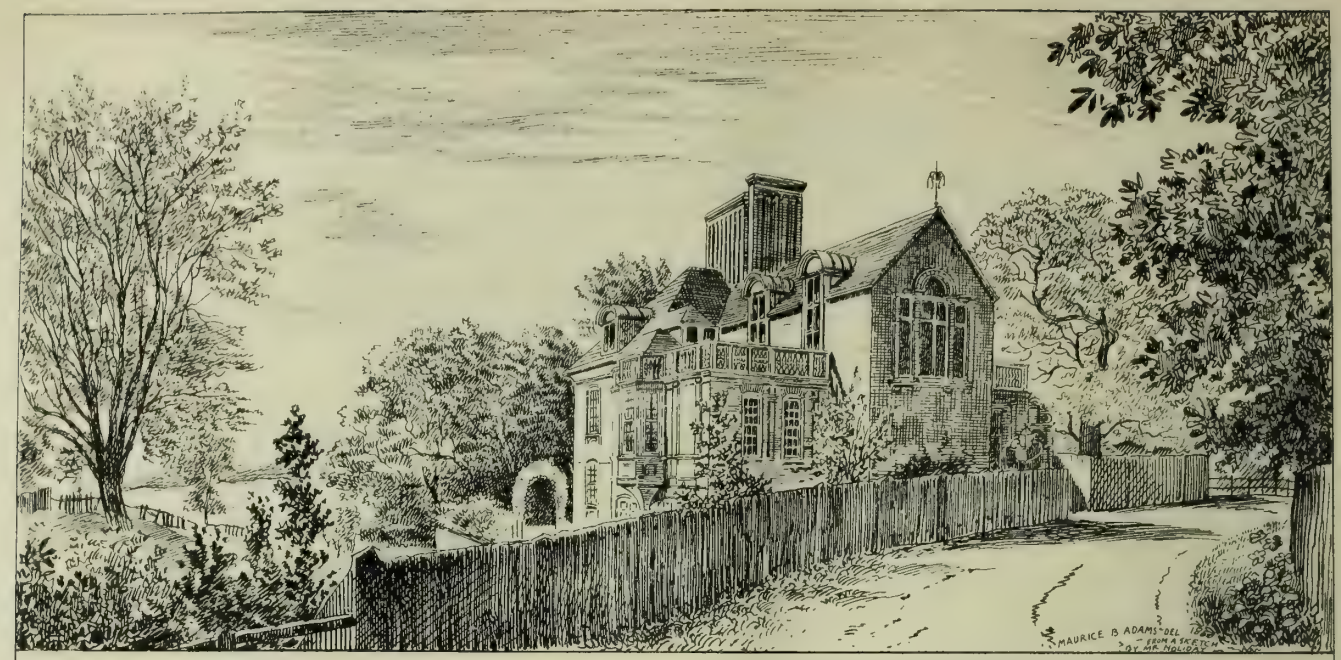


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.



"ARTISTS' HOMES" No. 3. "OAK TREE HOUSE" *HAMPSTEAD* THE RESIDENCE OF Henry Holiday esq

DETAIL DRAWINGS.

DORMERS

PLAN

SECTION

CORNICE AT A

LEAD

CAPPING AT B

CHIMNEY STACK

PLAN

SECTION AT D

SECTION AT C

HALF ELEVATION

SECTION OF BAY WINDOW

DRAWING ROOM BAY

Basil Champneys
Architect

Scale of Feet

0 5 10 15

MAURICE B. ADAMS DEL.

SECTION C

SECTION F

SECTION OF CILL

PLASTER

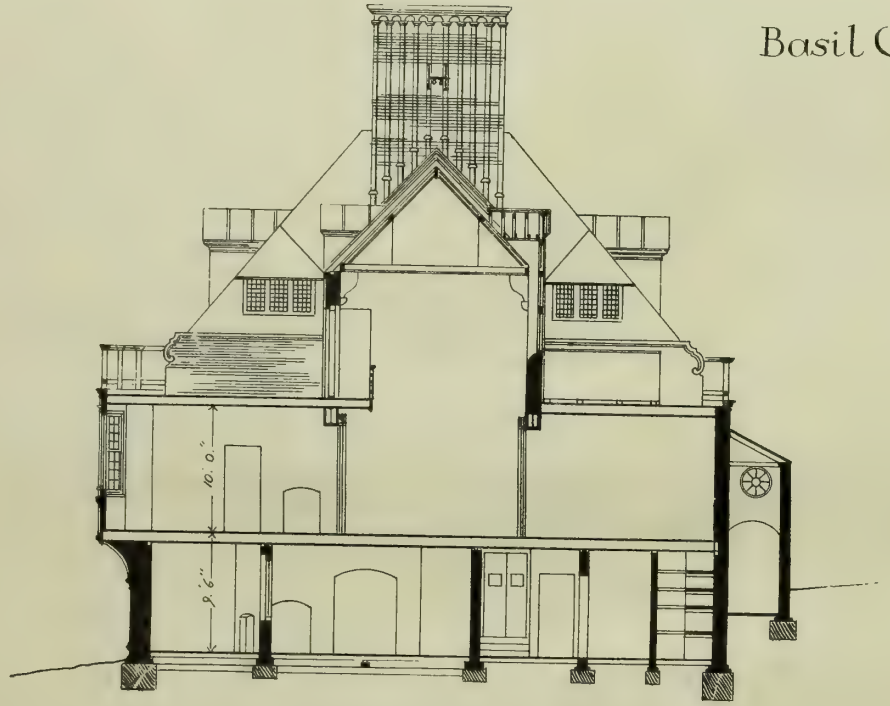
BASE E

Photo-Lithographed & Printed by James Akerman, 6, Queen Square W.C.

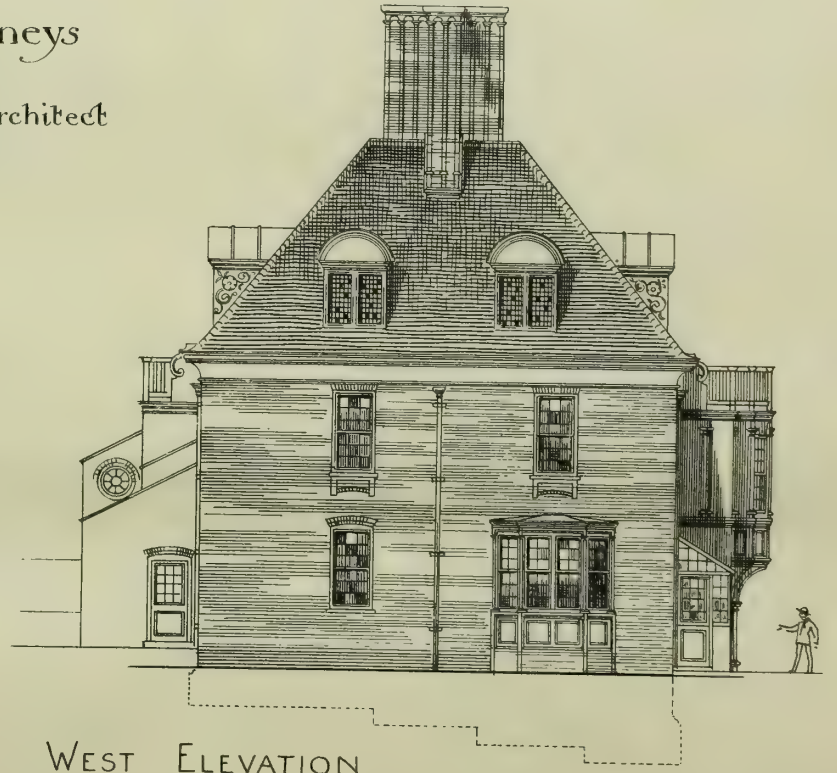
ARTISTS' HOMES · No. 3 · "OAK TREE HOUSE" HAMPSTEAD · Mr HENRY HOLIDAY'S RESIDENCE & STUDIO.

Basil Champneys

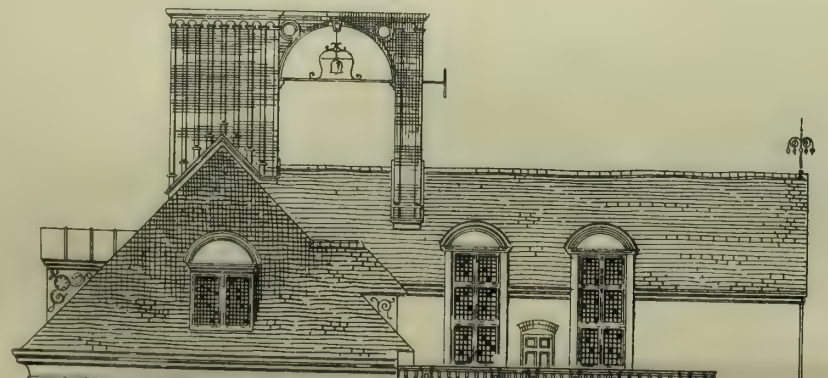
Architect

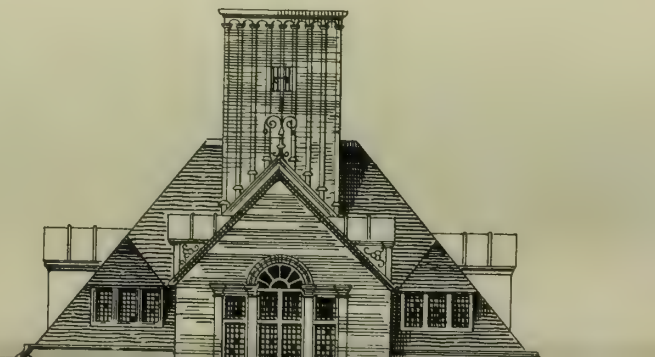


SECTION A·B·



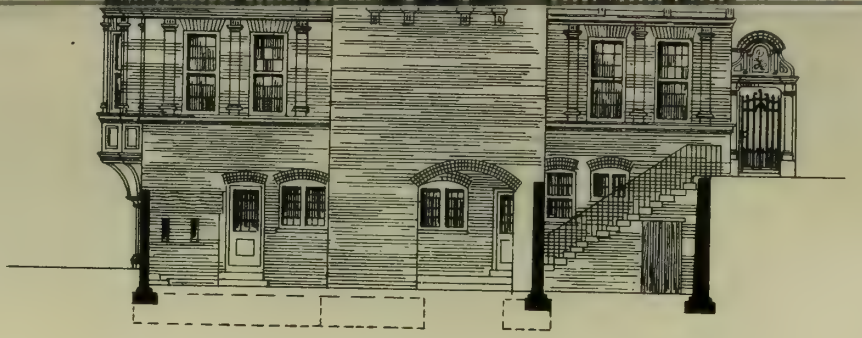
WEST ELEVATION



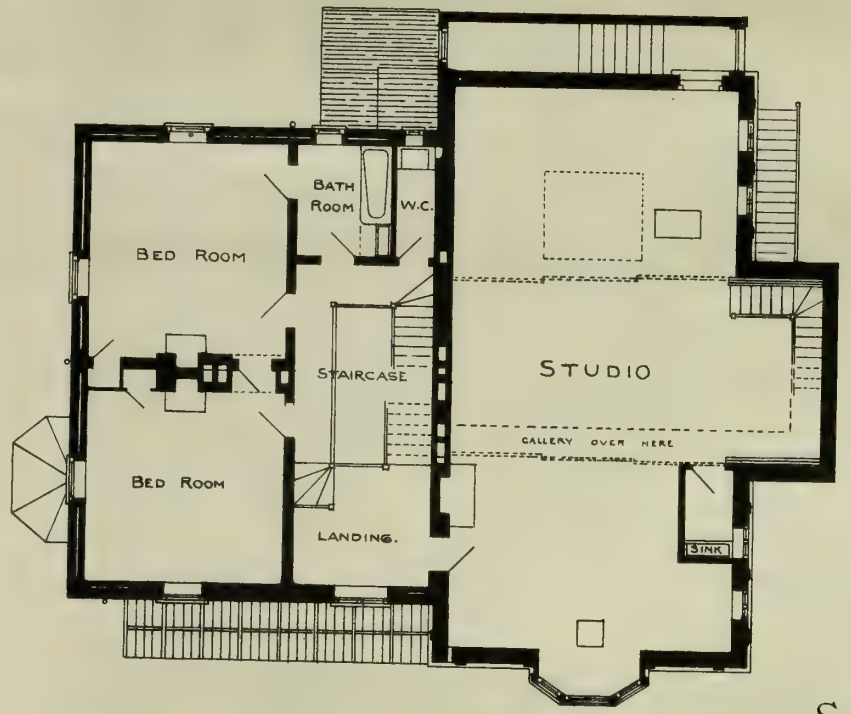




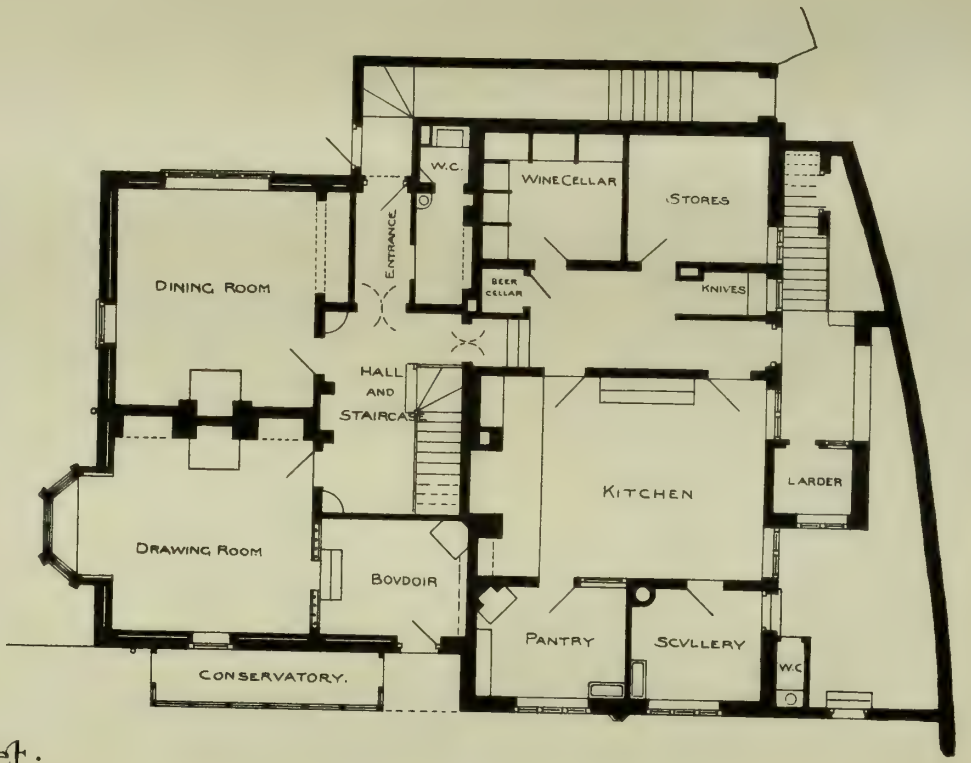
SOUTH ELEVATION



EAST ELEVATION



· FIRST · FLOOR · PLAN ·



GROUND · PLAN ·

· Scale · of · feet ·



MAURICE B. ADAMS DEL.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

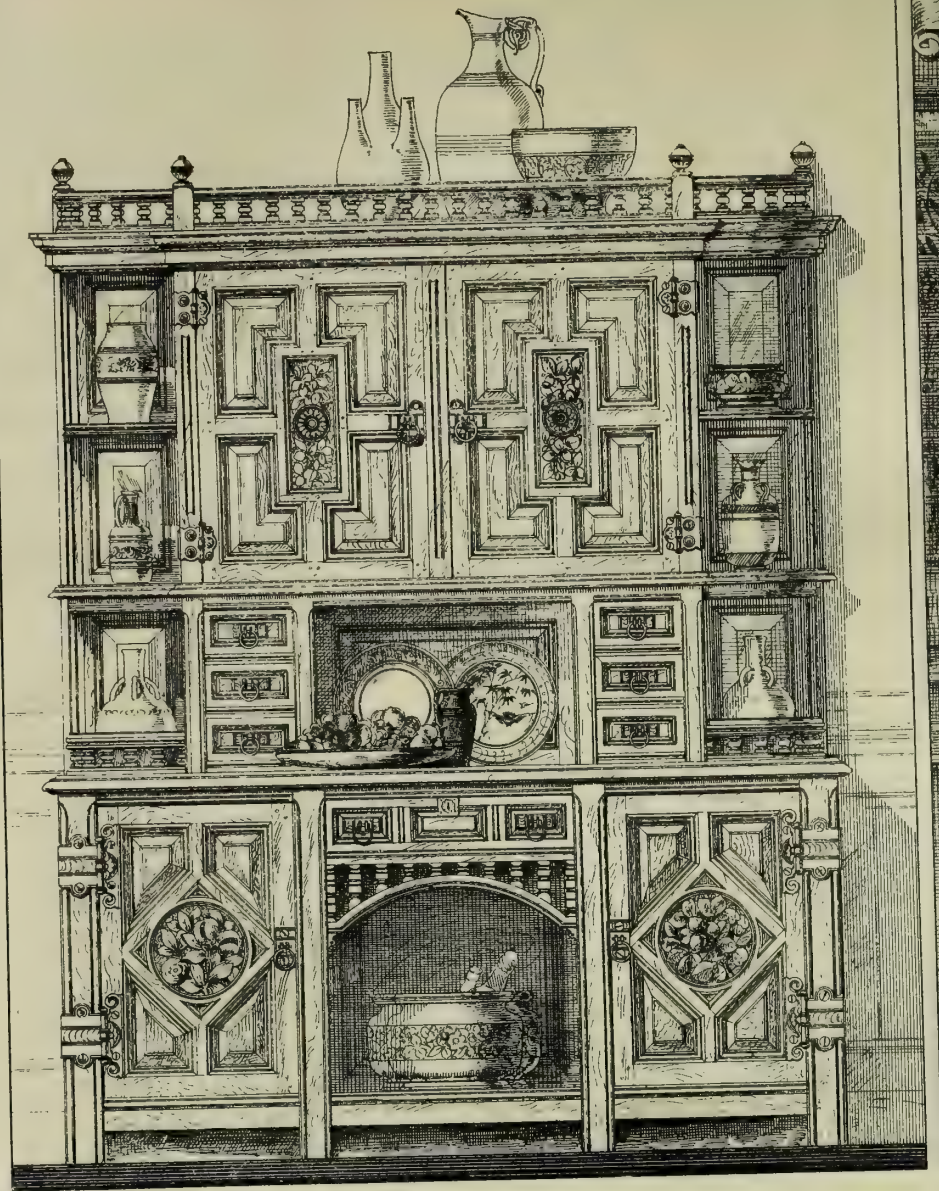


J. Akerman, Photo-lith London

New Church Burton-on-Trent · John O. Scott *Architect* ·

DINING · ROOM · BUFFET ·

by John A Stamp · *Nottingham School of Art*



A Buffet · Chair · and · Bracket ·

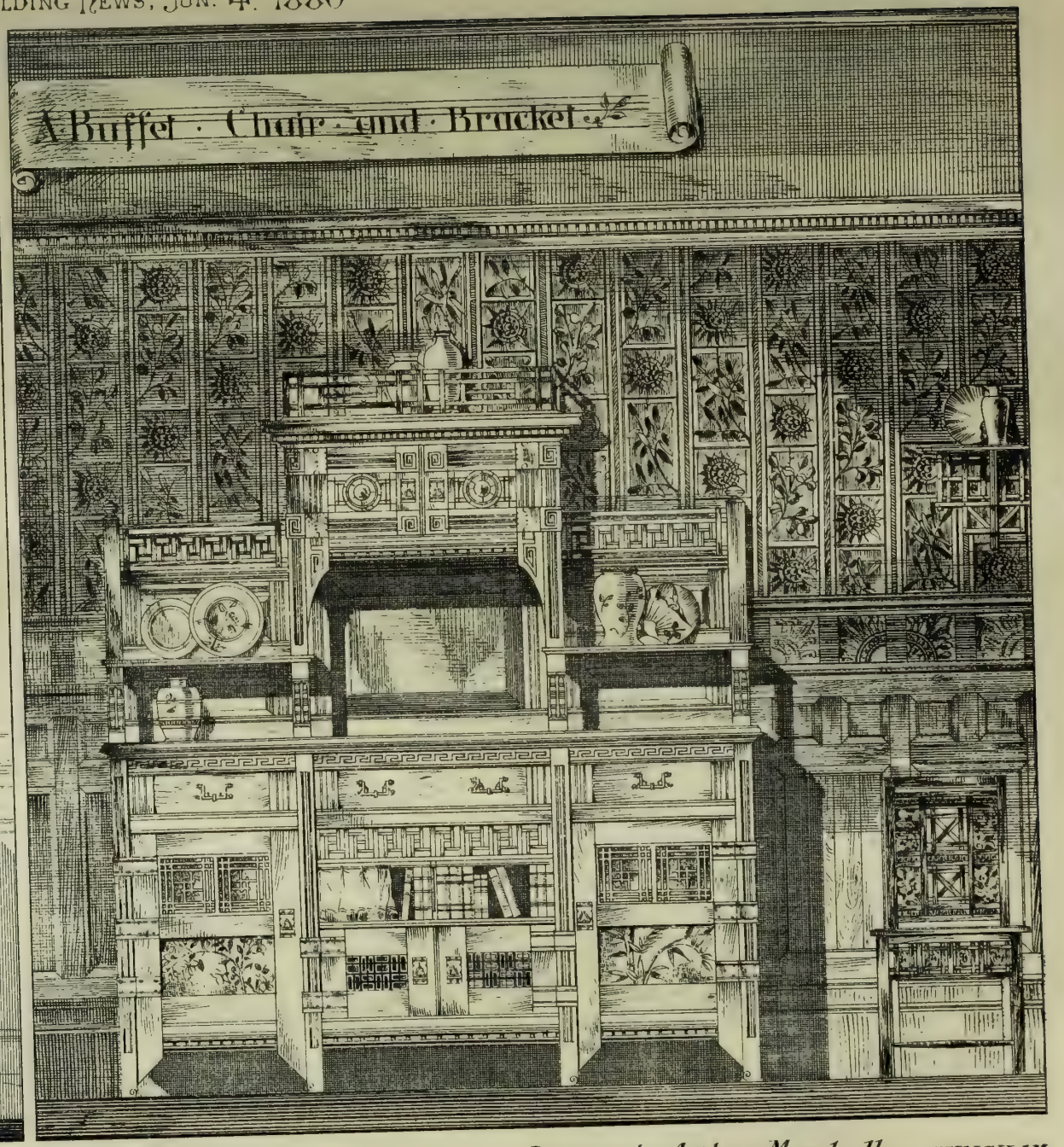
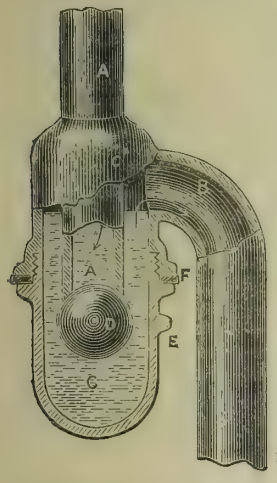


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Designed by Arthur Marshall NOTTINGHAM

SANITARY APPLIANCES.

WE have recently seen a sewer-gas trap which unites all the advantages of the siphon trap without any of its defects. In the common trap, as every practical man knows, the water-seal is a very imperfect safeguard against the passage of sewer-gas; it is liable to what is known as "siphonage" whenever the action of a closet or basin is brought into use the water in the siphon is partly or wholly emptied by the suction created in the pipes, and the gas finds an easy escape. But if even in perfect order, a "seal" of an inch or two of water is of no use to prevent the pressure of gas, or against the absorption of gas by the water; and in dry warm weather evaporation often destroys any seal that may exist. The "Bower patent gas-trap," which has been acquired by the "London Sanitary Appliances Company," 1, Queen Victoria-street, Mansion House, combines the advantages of a valve with a water seal, but it is a form of valve that cannot get out of order like the ordinary hinged metal flap. It is a ball of indiarubber, compressible, and so buoyant that it must always close the aperture at the end of inlet pipe, and with the indubitable merit of closing it with a pressure corresponding to the force of gas itself which it excludes. As we have seen the trap in action fitted to a lavatory basin, we can speak with confidence of its extreme simplicity and efficiency. There is nothing that can get out of order, the inlet or discharge pipe ends in a small cylindrical vessel attached to the outlet pipe, and resembling rather a widening out of the inlet itself; the lower half of it is a glass cup screwed on with a semi-spherical invert. Between this vessel or receptacle and the inlet pipe there is an annular space which becomes filled with water, and acts as a seal. In the glass cup is placed an indiarubber ball free to move, and which is made to fit closely to the end of the inner pipe from lavatory, which is accurately ground to the spherical shape of the ball. When any water passes it escapes; but there is always sufficient left in the receptacle to float the valve firmly back to its seat, and the slightest pressure of gas only forces the ball against it with greater firmness. Another advantage of the Bower trap is that the indiarubber ball valve perfectly excludes back water, and the greater the pressure against the ball the more secure is the inlet. The lower section of the trap or the glass cup can be unscrewed and taken off. The trap can be applied to old baths, sinks, and to the overflows of valve closets, and we lately noticed that Messrs. Warner have applied it to their special valve closet; and that in the patent "Eddystone closet" made by Messrs. Smeaton and Sons, the Bower trap has been fitted to the overflow. The invention has not only the merit of ingenuity but simplicity, and effectually shuts off the sewer-gases from the house. The action will be more readily understood from the illustration. The floating-valve D gives free passage to all entering from the house end A; but on the pressure ceasing, the valve immediately closes the inlet, while the back pressure of sewer-gas, tide-water, &c., from B forces the valve closer to its seat.



A thoroughly scientific mode of making pipe joints secure cannot fail to commend itself to the engineer and surveyor, and we may here draw attention to an invention introduced by the "Engineering Appliances Company," 1, Queen Victoria-street, E.C., called "Painter's patent Hydrostatic Pipe-joint," which has been brought under our notice. It is simply a lead ring caulked by hydrostatic pressure between the two ends of pipes. In the socket end of the pipe is a groove which encircles the inner surface, and within this is a lead ring or gasket. After the spigot end is inserted, the lead ring is squeezed upon the surface of it by the compression of a semi-fluid behind; the mode of doing this is by introducing into a screw hole cast in the upper part of socket a small screw jack, which as it is turned forces the semi-fluid upon the lead ring. As it flows round it presses equally upon every part of the ring, which forms a caulk between the pipe and socket. The labour required is exceedingly small; any labourer can apply the pressure, and a perfectly tight joint is secured. Among the advantages claimed for this manner of jointing, we may mention the important saving of excavation in the width of trenches, which may be narrower, the reduction of depth of sockets, a saving of lead and the elasticity of the joint, and the even pressure all round which is increased by the pressure within the pipes. A tapered shoulder of the socket keeps the spigot end in a concentric position as it is introduced. For gas and water mains we commend the hydrostatic pipe-joint, as an economical and thoroughly effective substitute for the usual method of jointing with its awkwardness and uncertainty of result.

ARCHITECTURAL ASSOCIATION.

THE usual fortnightly meeting of the Association was held on Friday evening, the president, Mr. S. Flint Clarkson, in the chair. The following new members were elected:—Messrs. E. J. Harrison, A. S. Henderson, G. A. Price Coxson, K. Tatsumo, F. W. Spittall, and A. E. Murray. Mr. Eales, the hon. sec., announced that the next visit would take place on Saturday, the 5th (to-morrow), and would be made to Hampton Court. Mr. Page read the list of nominations of officers, the name of the proposed president for 1880-1, Mr. Ernest C. Lee, exciting some applause. The President stated that the annual dinner of the Association would be held at the Holborn Restaurant on the 22nd June, at 7.15 p.m., and that the annual excursion would take place in August, and all particulars could be obtained of Mr. C. R. Pink, hon. excursion sec. Mr. Page read two requisitions for a special meeting of members for the purpose of considering the proposed alterations in rules, having for their object the appointment of an additional officer—an "assistant treasurer"—and the addition to the rule relating to Saturday afternoon visits to works in progress and important buildings the words "or excursions to special localities." The meeting would be convened for the 11th June, that day fortnight, at 7 p.m. It was also stated that a surveying class was being formed by Mr. H. B. Flood in connection with the Association. The president read a letter from Mr. William Scott, who was to have read a paper that evening on "Some old Italian Architects and their Works, with Thoughts on an Architect's Education," dated from Rome, in which he expressed his regret that unavoidable circumstances over which he had no control had prevented him from preparing the paper, or of being present, but he sent them another paper, written for another purpose, which he hoped would have some interest. On the walls of the room had been hung a series of drawings of Italian palaces, executed by Mr. Scott, who was the Academy travelling student, and also the Soane medallist for the present year, which would be found very interesting, and he understood that Mr. Scott was about to publish in Rome twelve etchings of that city. Mr. Hebb, who had been requested by Mr. Scott to read the paper, mentioned that the "unavoidable circumstances" were an attack of nervous exhaustion, probably induced by overwork. The title of the paper received was

THE RESTORATION OF ST. MARK'S, VENICE.

The writer of the paper, at the outset, made the works in progress on the south-west façade of St. Mark's the text for a dissertation on the general question of restoration, wherein he advocated the views and opinions rendered very familiar to our readers from their frequent exposition by the Society for the Protection of Antient Buildings. He laid stress on the charm of colour and tone added to a building by age, and on the higher interest imparted to the structure by association with some person as his production, urging the impossibility of restoring an ancient edifice without falsifying the record, and so rendering it not only worthless but misleading. He admitted that a building, however well constructed, would ultimately stand in need of repairs; but the execution of these works of reparation should be governed by the true spirit and intent of restoration—that of "bringing back" that which had been taken away, or had ceased to exist. Coming to his more immediate subject, Mr. Scott wrote: The manner in which Italians generally, and the Venetians in particular, have received and commented upon the remonstrances from England as to the proposed restoration of the façade of St. Mark's, though not always complimentary to ourselves, has been, perhaps, all that could be expected. It is natural that so sensitive a people as the Italians should be inclined to resent anything like an interference in the treatment of the building which, in the broad sense of the term, is their own. Willing reverence and admiration are lavished by foreigners upon the art treasures of Venice, foremost among which stands the Church of St. Mark, but all this and much more would be of no account, in considering the rights of the Venetians to deal as they might choose with their own, to pull down, rebuild, or blot out for ever, anything, were it not that a monument of ancient art has acquired another value, another interest over and above that usually recognised by its mere temporary possession as a piece of property, and far beyond that which would be accorded to it in the cold calculation of a formal code of law. The average lifetime during which a man can possess property and work his will upon it, is but a small part of the period during which a building should, and usually does, endure; and while every man has a perfect right to alter or destroy that which he himself has built, or which has been given him for his exclusive use and possession, yet when a building has become the property of a nation or corporation, the immediate possessors are merely trustees, whose account will be rendered to, and their stewardship judged by, those who come after them. While generation after generation passes away, leaving records to enrich the fabric it has inherited, the building is accumulating a store of interesting associations of which it would be wrong to rob posterity. And this makes England's plea for St. Mark's so strong and so justifiable, that the treasures of Venice belong not absolutely and merely to the Venetians of to-day but to the time that shall come as to the time that is past, to the nation of Italy as a part of her history, and to posterity as its rightful heritage. It ought, therefore, to be a matter for pride rather than resentment on the part of the Venetian citizens that others, as well as themselves, are anxious to see their basilica preserved. Unlike the rules of restoration in this country, in Italy such work has usually come under the cognisance of the Department of Public Works of the Government for the time being, sums of money being voted by the central authority for the work. This has been the rule with the works already done to St. Mark's, and it is being followed at the Ducal Palace, and is proposed to be followed in the western façade of the church. No doubt public works carried out in this manner are a fair and reasonable mode of giving help to certain districts in time of commercial distress, but their very merit and advantage make those who desire to benefit by them less careful than they otherwise would be as to the exact nature and results of the works proposed to be done in return for the bounty of the Government and much less severely critical of any scheme than if the cost were to be directly defrayed by themselves. In times like the present, Venice would be only too glad to have a grant of three million lire, or £120,000, the estimated cost of the proposed works, poured through the pockets of her industrious workmen; but we may ask whether the price to be paid for their benefit, viz., the total destruction, the irreparable loss of one of the fairest gems of ancient art that the world has ever seen would not far outweigh any mercenary advantage. True, some few repairs absolutely need to be done to the old façade, and it is matter for regret that these have been neglected so long, but it is equally true that they are infinitesimally small compared with the proposed works. There is no danger whatever of any kind to be apprehended at to the stability of the structure, nor is there a single indication which would justify the taking down and rebuilding of any other portion. Where the marble wall facing is loosened it could be and should be at once refixed and the places of missing portions filled with new to form a protection to the brickwork behind;

besides which, various precautions might be taken to avoid for the future some influences which have proved injurious. All that is really necessary could be done and well done for the five-hundredth part of the sum proposed to be expended, and the ingenuity of Italian engineers would be fully equal to suggesting a score of ways in which public works of enormous benefit and of great ultimate benefit could be carried out without robbing the world of one more of its treasured links with the past. Our best hope lies in the gradual acknowledgment of the true principles upon which depend the value of St. Mark and those which would guide us in its treatment, and also in the fact that among Venetians themselves there are not wanting accomplished and enthusiastic men full not only of love and admiration for the treasures of their fair city, but with an intelligent appreciation of their worth. Already their voices have been raised in protest against the wanton destruction of a monument which has long been legitimately their pride and pleasure, and they have welcomed the assistance which foreigners have wished to give them. It is to be hoped that their reasonable counsels will ultimately prevail, and that we may be spared the sorrow of having to put another item in the list of victims to the mania for restoration. For ourselves, it is to be hoped that the efforts we have been making to preserve a monument of art in Italy will result in a more appreciative and intelligent attention to those still left in our own country; and that the energy and enthusiasm recently aroused will not be allowed again to slumber till the danger of a mischievous destruction has for ever passed away from the priceless treasures of art scattered through the length and breadth of the world, and until their tender and loving preservation has become assured by the universal consent of, and intelligent respect for, the past, and an authority which unites all men of all climes in the worship of Beauty and Worth.

The PRESIDENT said the principal point in Mr. Scott's communication was the restoration of St. Mark's, and he suggested the desirability of restricting discussion to it. They had recently learned much as to what was going on there from Mr. Street's statements, and he regarded Mr. Street's reply of a week or two since to the defence of the architect in charge of the works as a model of an attack before an architectural audience, as in it the writer had clearly explained what was in progress, and had shown that he had reason to fear that the irregularities of the building would be removed. As to the general subject, he thought that had been sufficiently discussed; architects were agreed in the main as to what should be done—until they came to that particular case.

Mr. WILLIAM WHITE, F.S.A., thought but one opinion would be held and expressed by members of the Association as to the works in progress at St. Mark's. As to the general subject, it ought not to be made a question as to whether the restorer should satisfy the antiquarian, the architectural student, the painter, or the advocate of the adaption of old buildings to present uses; all must be taken into consideration, and each case must be carefully studied. It was because of these varying circumstances that the conservationists, pure and simple, had so often come to grief, and failed to obtain public support. The speaker gave two instances of church restoration from his own recent practice, in one of which he had been obliged to substitute new roofs in deal for rotting ones of oak, the funds not being forthcoming for a better material. In this case he believed the old woodwork would not have lasted many more years; but in the second case, although a local builder had condemned the roof, he had the tie-beams scarfed and made good, and was able to save the old work. As to St. Mark's, the only legitimate way of dealing with any part necessary to be rebuilt, would be to take the portion down, and replace it stone by stone, without retooling it. The loss attending the breaking up of early mosaics was to art so great that they ought not to be interfered with, unless to be bedded on face to composition, and so removed and replaced in their entirety.

Mr. STANNUS said as he differed entirely from the reader and author of the paper, it was right for him to disprove a fallacy as to St. Mark's at once. He had spent considerable time at Venice, and had conversed with the authorities and with those superintending and carrying out St. Marks, and could, therefore, understand in some measure the way in which they regarded the subject and their feeling of resentment at English interference. Mr. Street's contention was that the flanks were being rebuilt on new levels, so that it would become necessary to rebuild the whole west façade. Mr. Scott had gone further, and had implied that the work was being done to expend money for the support of the poor, and had suggested that there was plenty of other works needing to be done. The Venetians would consider this unjust. Measurements taken from time to time proved a gradual subsidence of the lagoon; the building had settled during erection, as the varying lines of the courses indicated, and this was said to be going on now. The Venetians and the Ministry of Public Works were engaged in a continuous struggle with the waters, and thought they had no alternative than to rebuild the west façade in order to preserve the building. As for this façade, the mosaics in it were not of a high order, not being ancient; one was as recent as 1836, and the oldest was an unsuccessful copy executed in 1630 of one of Titian's paintings, a subject unsuited for rendering in mosaic. The Venetians were, after all, the best judges of the necessity of the case, and they declared that if the outlay of the immense sums now laid out on dredging the lagoon were discontinued for ten years, not only St. Mark's, but all Venice, would practically be lost to us by the rise of the water. Members could imagine what Signor Meduna would say were he told that one of the gentlemen who wrote so strongly on this subject, when appealed to as to his own work at some building in this country, had said in effect, "You must know my practice by this time, and I am not going to change it for you."

Mr. PRATT visited Venice with Mr. Stannus, and then and still differed from his opinion as to what was being done at St. Mark's. The subsidence of the structure was no new thing; it existed while the walls were being carried up, and any modern amendment of the lines of building was to be regretted. As for the mosaics, whatever their value might be, they were merely thrown down in heaps, and for a "tip" to the workmen, one could purchase a pocketful.

Mr. HEBB could not agree with Mr. Stannus as to the mosaics. Whatever their artistic character, they were the works of previous generations, and, as such, ought to be preserved for their historic value. Mr. Stevenson and others had reported that there was no necessity for rebuilding the front, as it was not in danger, and that, even if the front fell, it would not involve the destruction of the building, as the main wall was recessed from, and independent of, this western atrium. Mr. Hebb then proceeded to quote portions of an article by M. Charles Yriarte, in the current issue of the *Revue des Deux Mondes* upon the restoration of St. Mark's, in which he deplored the loss of that *patina* which gave general harmony to the building, and which was the result of the action of time, the effect of a saline atmosphere, of sunshine, of hygrometric conditions, and of natural combinations acting under the climate of Venice. M. Yriarte also urged that the scheme of decoration at St. Mark's was at the same time pictorial and architectural, the general effect being given by the juxtaposition of materials of various colours, intensified by the lively tints of gilding and of compositions executed in brilliant mosaics, and that during the past nine centuries a haze had been creeping over the serpentine, the granite, the cippolino, the breccia, the Oriental alabaster, the verd antique, the African marbles, polished like gems, the gold colour and glittering enamels, and the rare gems with which it was encrusted. In Venice the most celebrated architects, Lassus, Viollet-le-Duc, Ruprich-Robert, Dubar, Doeswilwald had endeavoured in vain to anticipate this effect by imitation in the new work of their restorations. In truth, the hand of man could not throw this harmonising veil over buildings; it was the work of the hand of Time, and of the hand of Him who was before Time was.

Mr. BLASHILL mentioned that he had met Mr. Scott at Rome, and could testify that he was making good use of his time as a travelling student. While opposed to Mr. Stannus's views, he also differed from Messrs. Hebb and Scott in their monstrous fallacy,—one which had done more to bring the Society for the Protection of Antient Buildings into ridicule than anything else,—the theory that because a building was the work of a prior generation, it ought to remain as an historic record. If that were generally entertained, the lumber of the past would go on accumulating for ever, no matter how worthless. Surely the people of the present day possessed buildings that had come down to them, and had a perfect right to do as they pleased with them.

Mr. WHITE having protested against the statements of Mr. Stannus, a vote of thanks was accorded to the writer and reader of the communication.

THE ASSOCIATION OF MUNICIPAL ENGINEERS AT LEEDS.

THE annual meeting of this association was held at the Town-hall, Leeds, on Thursday, Friday, and Saturday, of last week. The President for the new year was Mr. A. W. Morant, borough surveyor of Leeds, who delivered an address descriptive of the sanitary and engineering undertakings of the corporation.

TOWN SEWERS.

Mr. Hewson, borough engineer of Rochdale, submitted a paper entitled "Town Sewers." Much disparity existed in the practice of modern engineers, owing to the differences of opinion as to time for which provision should be made. More uniformity would result if the sewers were made sufficient for the estimated population at the end of the term of years given by the Local Government Board for the repayment of the cost. Although this was not self-sacrificing, it would be just, inasmuch as they were now being compelled to make up the arrears of centuries of sanitary neglect. He would not receive the sewage of manufactories into the sewers, as the ratepayers not engaged in trades producing liquid refuse ought not to be called upon to contribute to the extra cost involved in making the sewers of sufficient size to relieve such trades from the duty of purifying their liquid refuse. He added—"My opinion is that it is neither expedient nor right to make provision in a sewerage system for carrying off water abstracted by manufacturers from natural or private streams; that arrangements should only be made with manufacturers possessed of an absolute and full right to the water used by them; and that manufacturers using water supplied to them by the local authority should have a free right to discharge the resultant liquid refuse (not being poisonous) into the sewers. What I further insist upon is that, given the term of years to be provided for, it is the duty of the engineer to calculate the population and area required, and these being ascertained, to unflinchingly make provision in the internal or street sewers for such a quantity of rainfall as would run off that area in the case of storms so extraordinary as to be 20 years apart. An intercepting sewer ought to be of sufficient capacity to carry off the greatest estimated flow of sewage at the end of the term provided for, diluted to the practical standard suggested in the report of the Royal Commissioners on the Pollution of Rivers, and of the rainfall of the holme land. The question of economy should not be limited to the intercepting sewer, or to the assumption that liquid once admitted into it must of necessity be dealt with at the purification works. There is no difficulty in fixing on the intercepting sewer. Immediately it receives the discharge of the last internal or street sewer, a mechanical arrangement of valves and levers arranged to divert the diluted sewage to the river the moment any fixed degree of dilution has been arrived at, and from this point to the purification works, an outfall sewer be laid, of no larger dimensions than would be necessary in a perfect dual system, if such a one is ever carried out."

EFFECTS OF SULPHATES ON LIME MORTAR.

Mr. Graham Smith presented a paper of much interest to engineers, builders, and all concerned in the subject of mortar, inasmuch as from the results brought forward it would appear that a lime mortar composed of one of slaked lime to four or five parts of sand can be made possessing greater strength than a mortar composed of one part of Portland cement to three parts of sand, which would cost double the price of the lime mortar. The author commenced his investigations in 1870, and has carried out some eight hundred experiments. His method of proceeding is simply to mix a small per-centage of plaster

of Paris, *i.e.*, sulphate of lime, with the slaked lime before making it into mortar, and by this simple expedient he is enabled to put double the quantity of sand with the lime, and at the same time make the mortar twice as strong as ordinary mortar. The plaster of Paris is added in small quantities because it is the most convenient and economical medium for supplying the requisite chemical constituents. It may be inferred that if plaster which has already set were reground it would answer in some processes nearly as well as plaster of Paris. By repeated experiment he had proved that while it was desirable to employ plaster of Paris in ordinary building operations, it was not advisable to add it to slaked lime mortars intended for hydraulic purposes, as the strength of mortar containing a small percentage of plaster, was, after immersion, materially reduced. The paper was accompanied by fourteen tables, giving the details of the writer's experiments, and comparing them with the experiments on Portland cement mortar and selenitic mortar carried out by other independent engineers. The conclusions arrived from his own and independent inquiries were that the ultimate strength of all lime mortars will be much increased by the addition of a small per-centage of plaster of Paris, and that when mixed in the manner described they will apparently at first possess similar properties to ordinary mortar made with the same kind of lime in the manner as at present practised.

On Friday the meetings were continued, the first paper being one on

THE SEPARATE SYSTEM OF DRAINAGE,

by Mr. R. Vawser, of Manchester. The conclusions at which the author arrived are that a perfect system of sewers ought to provide for the removal of all domestic sewage and the greatest rainfall known to have fallen in the district, and he said that whether the sewage and rain-water should be removed in separate sewers or in a common sewer capable of receiving all the liquid refuse of the town depended on estimates and local circumstances. The cost of a duplicate system of sewers in ordinary cases was about two-fifths greater than a single system; by the duplicate system rain-water from small showers would be discharged into streams without purification, notwithstanding that it had been held by the highest chemical authority that such water was as foul as any domestic sewage. On not more than 22 per cent. of the wet days did ¼in. of rain fall; there were consequently 78 per cent. of wet days at least when foul surface water would pollute the watercourses, even if all domestic refuse were diverted. Until sanitary authorities were protected by legislative enactment from the consequences of fouling a stream with surface water, no system of town sewage could be satisfactory that did not provide for purifying surface water resulting from moderate showers. Except under very abnormal circumstances, the separate system was neither economical nor desirable.

A long discussion followed, in which the author's views were generally supported. Mr. Lemon, of Southampton, remarked that there was not a town in the kingdom entirely drained on the separate system, although many were partially so drained. The majority of speakers suggested that each town must stand on its own merits, and deprecated any attempt to ask the Association to sanction by a resolution any general principle.

HIGHWAYS AND LOCOMOTIVES.

Mr. Joseph Lobley, borough engineer, Hanley, read a paper on "The Highway and Locomotive (Amendment) Act of 1878." He pointed out that these Acts became necessary owing to the rapid abolition of turnpike roads, and consequent increase of the rates charged in many districts. The results of the Act were unfair to urban authorities. He urged that the whole machinery of separate accounts, certificates of county surveyor, interference with the work of the urban authority, the distinction between quarter sessions and other urban districts, the distinction between expenses on current rates and those on loans, together with most of the applications for roads to be declared main roads, and the host of doubts as to what the word "maintenance" includes, might all be cleared away by omitting urban districts from the operation of these clauses.

SEWER VENTILATION.

A paper by Mr. Wm. Batten, of Birmingham, was read, on "Sewer Ventilation." The writer stated that in large towns the water-closet was rapidly replacing the old cesspool, privy, or midden, consequently the sewers were constantly being called on to perform duties which, in their original construction, they were never intended for. The result could be plainly seen. The refuse was not carried away with sufficient rapidity, and sewer-gases, which were most prejudicial to health, were produced. Sanitary engineers had attempted by an endless series of inventions to keep these sewer-gases out of our houses, but the results had been of little practical value. They must therefore deal with the sewers themselves, so as in a great measure to reduce, or at least mitigate, the evil. The only practical plan seemed to be that of allowing the gases to rise from the sewers to the middle of the roadway, so as to escape by means of grids, &c., into the open air. The grids were choked up by the solid refuse present on the roads, and he described a ventilator and man-hole which he had invented, the object of which was to prevent the solid refuse from entering, while it admitted water. The construction was such that while the ingress of water and waste was going on, provision was made for the egress of the sewer gases, and thus a constant ventilation was carried on without a chance of being stopped. In the subsequent discussion it was suggested by several speakers that Mr. Batten's plan was more complicated than some now in use.

On Saturday the members visited the Leeds Waterworks, in the Washburn Valley, and another party inspected the Leeds Sewage Works, the destructor and carboniser and the gasworks.

THE LATE J. R. PLANCHÉ.

WE regret to record the death of Mr. James Robinson Planché, the genial and accomplished dramatist, antiquary, and genealogist, which occurred on Sunday at his residence, St. Leonard's-terrace, Chelsea. Born in 1796, he has led a life of ceaseless literary activity up till within the last few months.

In his boyhood he wrote a burlesque for his schoolfellows, entitled *Amoroso, King of Little Britain*, which some years later, in 1818, became a success on the boards of Drury-lane Theatre, and from that time till about 20 years ago, when his connection with the stage ceased, his dramatic industry was untiring; more than 200 extravaganzas and burlesques were introduced in his name, either as original plays or adaptations, at various London theatres. On matters of costume he was an ardent antiquarian, and his encyclopædic knowledge was largely availed of in the "dressing" of plays. In 1834 appeared his "History of British Costume," which was soon recognised as an authority on civil costume, and remains one of the best and cheapest epitomes of the subject; and three years later Mr. Planché utilised the same materials for a more detailed treatment of the subject in Charles Knight's "Pictorial History of England." Last autumn, at the age of 84, Mr. Planché completed the crowning work of his life upon this subject, the "Encyclopædia of Costume," the publication of which had begun in 1876. It is in two quarto volumes, the first a dictionary, the second an historical record. In reviewing this and other works on Mediæval Costume in the BUILDING NEWS for Aug. 8, 1879, Mr. William Burges makes some remarks which may be appropriately quoted here: "One thing has been apparent in all Mr. Planché's antiquarian writings, and that is his sterling common-sense. He has written the most sensible, perhaps the only sensible, book* on what many consider as the vain science of heraldry; and when the late Professor Cockerell had made a sort of iconographical romance out of the statues in the west front of Wells Cathedral, Mr. Planché had the courage to submit the said romance to the crucible of fact, and to disperse the professor's theory into thin air." Some years since he rearranged the armour in the Tower of London. Amongst his purely topographical works, his monograph, "A Corner of Kent: the Parish of Ash-next-Sandwich, in Kent," will be remembered one of the best. Mr. Planché was for very many years a leading member of the British Archæological Association, in connection with which he wrote many valuable papers, distinguished alike by research and a matter-of-fact spirit of inquiry; the last excursion of the Association, in which he took part, was that to Cornwall, in August, 1876, when he accompanied the members during one of the earlier days on a visit to Lanteglos, and other places near Bodmin.

Since 1854 Mr. Planché had been connected with the Heralds' College, in which he succeeded to the appointment of Somerset Herald in 1866—a title that frequently gave rise during archæological excursions to amusing mistakes on the part of provincial reporters, who generally imagined that the tall but greatly bowed-down, slenderly-built, and infirm gentleman, with white hair and beard, on whose opinions his fellow-antiquarians waited with such deference, was, if not the proprietor, at least the editor of a Somersetshire journal.

Those who had the pleasure of acquaintance with the accomplished scholar who has just passed away from amongst us, will treasure as a bright memory the remembrance of his genial conversational powers, of his stores of anecdote and familiar recollections of the best known men and women of three generations, of his accurate antiquarian knowledge, often quietly suggested with the art that concealed art, and of the refined humour, the play of wit and fancy that added a charm to all he said. The funeral will take place to-day at Brompton Cemetery, at 2 p.m.

* "The Poursuivant at Arms; or, Heraldry Founded upon Truth." 1852.

CELTIC ART.

MR. JOHN H. HANCOCK delivered a lecture on "Celtic Art," on Wednesday week, at the Freemasons' Tavern, before the Honourable Society of Cymmrodorion, a society founded under royal patronage in 1751, for the encouragement of literature, science, and art. Mr. Henry Jenner, of the British Museum, took the chair, in the unavoidable absence of the Rev. J. Davis, M.A., F.S.A.

The lecturer explained that although advertised as a lecture on "Celtic Art," his remarks would specially refer on this occasion to Celtic ornament or decorative art. He next traced the characteristics and contrasts of the four great building races of mankind—viz., the Turanian, the Semitic, the Celtic, and the Aryan. While in literature the Celtic races gave good account of themselves, there was—though latent—a power of discovering, appreciating, and executing works of art of the highest order, and in support of this the lecturer quoted the opinion of an eminent authority, Professor Fergusson, who says:—"The true glory of the Celt in Europe is his artistic eminence. It is not, perhaps, too much to assert that without his intervention, we should not have possessed in modern times a church worthy of admiration, or a picture or statue we could look at without shame," &c. And Mr. Gladstone, in an address delivered before this society at the London Institution on "The Potter's Art in Britain," ascribed to the Celt "a very strong natural sense of beauty." To trace the history and influence of Celtic art comprehensively, it would be necessary to trace the history of civilisation in Europe, for which reason the lecturer confined himself to the peculiarities of some forms of art in these islands, but he expressed a hope that the whole subject would yet be undertaken by some competent person. In Europe, three influences would be traced on art—first, the influence of Rome; second, of Byzantium; and the third and supervening influence must be traced to a Celtic source, the mainspring of which was, in these isles, especially in Ireland, which enjoyed much of the privileges of Byzantium, and from whence art sallied forth in those "dark ages" from the fifth to the ninth centuries.

After referring to the Stone, Bronze, and Iron age classification of mankind, the lecturer said that the chief art remains of the Bronze age, which corresponds with the period of Celtic predominance in those pre-historic times, were principally in pottery, some of it of a highly ornamental character (diagrams and illustrations of which were exhibited) and which betrayed sound ideas in the mind of the artist of the true principles of ornament, the styles of which were not superseded, but developed and applied to other forms by their conquerors. By the aid of diagrams, &c., the lecturer illustrated the

characteristics of the stone monuments of these islands, the sepulchral remains possessing great beauty of proportion, and in ornament and sculpture, high artistic merit.

Referring to the work of the early painters in Britain, an examination of the illustrations (which were handed round the room) would show that the style was characterised by excessive elaboration of ornaments, and in colour presented chromatic effects of great beauty, and that while in Italy and Greece, from the fifth to the eighth centuries, pictorial art was all but extinct, and outside these countries it scarcely existed, there flourished a style of art in the British Isles which had been originated, cultivated, and brought to a high state of perfection, and which was distinct from anything which preceded it.

SION COLLEGE AND ARMOURERS' HALL.

THE members of the London and Middlesex Archæological Association visited the City of London on Wednesday afternoon, the general meeting being held in the great hall of Sion College. Here the college librarian, the Rev. W. H. Millman, M.A., read an historical paper, showing that the college is really a guild of clergymen of the City and all parishes touching the boundaries thereof, that it was founded as an almshouse and common meeting-place for the City clergy by charters of 1626 and 1630, in compliance with the will of Dr. Thomas White, vicar of St. Dunstan's-in-the-West, and also prebend of Marlow, treasurer of Sarum, and canon of Christ Church, Oxford, and Windsor. By a curious coincidence, the executors purchased as a site the ground in London Wall previously occupied by Elsing Spital, an Augustinian almshouse, established "preferably for blind and paralysed priests no longer able to say Mass." The present hall and library were rebuilt on the old lines, after the Great Fire, and a few years ago arrangements were completed by which the almspeople were removed from apartments under the library and sent to their homes, their numbers increased, and the pensions augmented. The fellows of the College had now decided to sell the site of the premises and to build a new hall and library on the Victoria Embankment, from the designs of Mr. A. W. Blomfield, whose drawing was now hung at the Academy. The members adjourned to the library, an apartment 120ft. by 25ft., lighted by side-windows and a (modern) continuous skylight, and situated on the first-floor of the adjacent plain brick building. It contains, closely packed in a series of recesses, between 60,000 and 70,000 volumes, chiefly acquired under the former Copyright Acts between 1708 and 1836, but including some Caxton and other early specimens of printing, saved from the Great Fire. The Rev. H. Clutterbuck read a paper upon the adjacent church of St. Alphege, London-wall, which was next visited. It is an uninteresting edifice, standing north and south, and lighted only on two sides, rebuilt in 1777, and interesting only for the fine tower-arches in the porch, which exhibit a triple series of roll-members of Early 14th-century mouldings—the only remnant left of the chapel of Elsing Spital, and for an Elizabethan mural monument to Sir Rowland Hayward, a City alderman, who died in 1595, and containing in three compartments the worthy knight, his two "vertuous wives," and their large families—15 children in all.

From thence the members went to the Armourers' and Braziers' Hall, in Coleman-street, where Mr. Jackson Barron read a paper tracing the Armourers' Company from its foundation in 1327, and the Braziers' Company from 1480, till the present time. The hall was built in 1839-41, and restored and improved in 1872-3. Mr. C. J. Shoppee described the principal objects of interest, including a complete suit of armour damascened with gold, and dating from Henry VIth's reign; armour and pikes formerly worn by the watchguard, and numerous weapons, the charters granted by Henry VI. and Queen Elizabeth, the MSS., court and minute-books, kept since 1497, pictures purchased from Boydell's Shakespeare Gallery at its dispersion, and a splendid collection of gold and silver plate of all periods.

The barracks at Christchurch, Hants, are about to be extended, and Messrs. Davies and Son, of that town, have obtained the contract.

ARCHÆOLOGICAL.

DISCOVERIES AT POMPEII.—An almost perfect house has been lately disentombed at Pompeii. It is probably the best preserved of all the Roman dwellings hitherto discovered. There are two atria and a very spacious peristyle, in the middle of which there is an ornamental fountain. There is also a complete bath, which must assist in clearing up some of the doubtful points concerning the arrangement of Roman baths. The paintings in the interior of the house seem to have been executed with considerable taste, and they are in good preservation. Those on the first floor, representing for the most part marine animals, are especially interesting. The frescoes also which are contained in the wings of the building are excellent representations of scenes from animal life. They are so admirably preserved that they cannot fail to shed much light on the condition of painting among the Romans at the time, although they also give evidence of the influence of Greek Art.

PREHISTORIC REMAINS IN ANGLESEY.—During Whit-week the members of the Manchester Scientific Students' Association spent several days in Anglesey, under the leadership of the hon. secretary, Mr. G. C. Yates, F.S.A. On the way to Roscolyn, the fine cromlechs, which are situated upon a gentle rocky eminence near the road, about one and a half miles south-east of Holyhead, were inspected. They consist of three groups of stones, one of three and two of eight each, some of large dimensions. They are in a comparatively ruinous condition, several of the stones having evidently been removed and others replaced. Sufficient, nevertheless, remains to render them some of the most considerable and interesting Drudidical remains in the island. At Towyn-y-Capel, some of the members were attracted to the noted tumulus which is remarkable for having yielded a rich harvest of human bones for many years past. This mound is situated near the head of the Towyn-y-Capel Bay on the north-westerly side, close to the beach, and consists of a mass of sand of considerable dimensions and irregular outline, and raised some 10ft. above the general level of the adjoining land. Upon the south-eastern face the sea has made considerable incursions, having washed away nearly one half of the body of sand which went to form the original tumulus, thus exposing that it is an ancient burial-place. Upon the face of the denuded mound numerous small fragments of bleached bones were scattered about, and Mr. J. Aitken, F.G.S. of Urmston, discovered, at a depth of six feet, an almost entire human skeleton. From the position of the bones it appears that the body was buried in a sitting posture. It is presumed that the bones belonged to a full-sized old man. Two small vertebræ, apparently those of a child, were also found. After walking round the headland of Roscolyn, the steatite quarry near Roscolyn was visited by a section of the party, where serpentine steatite and other minerals were collected. These and also specimens of greenstone, quartzite, &c., together with the bones obtained during the excursions, where exhibited, after which a discussion took place in which Colonel Sharratt and other members joined.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

DURHAM AND NORTHUMBERLAND ARCHÆOLOGICAL SOCIETY.—The first general meeting of the Archæological and Architectural Society of Durham and Northumberland for the present year was held on Tuesday at Chester-le-Street. The members assembled at the parish-church under the presidency of the Rev. Canon Greenwell, F.R.S., F.S.A. The vicar of Lumley, in the absence of the vicar of Chester-le-Street, gave a description of the edifice, which was originally a wooden structure, demolished in 1050, when Egelric substituted a stone structure therefor. No remains of that building had been traced. They would notice the octagonal shape of a portion of the tower, a style which Billing said was introduced in 1400, and the sudden transition from the square to the octagonal in the tower was the most unexampled instance of the kind on record. The beautiful spire was 156ft. high, and was one of the most graceful of any in the country. Mr. Longstaffe, in referring to the "anchorage," said there was a peculiarity in its being situated at the western end of the church instead of in the chancel, as was usually the case. The President said that though there were no remains of the Saxon church, they had discovered fragments of stones, both sculptured and otherwise; they simply represented headstones, said to be of a similar character, in a very good state of preservation, being still in existence in Penrith Churchyard.— Mr. Longstaffe then gave a minute description of the ancient monuments of the Lumley family now recumbent in the church.—The President said that before they left he wished to say that he had never seen a church that had been so lamentably destroyed by "restoration," for everything connected with the old church was gone.—The company then walked to the Deanery, where the Rev. Dr. Hoopell gave an elaborate and interesting description of the remains of the Roman encampment, which had been discovered in the vicinity, after which they proceeded to Lumley Castle, one of the seats of the Earl of Scarborough, where Mr. Longstaffe acted as conductor.

EDINBURGH ARCHITECTURAL ASSOCIATION.—The closing meeting of the 22nd session of the Edinburgh Architectural Association was held last week. Mr. Thomas Bonnar, the president, congratulated the Association on its continued success and prosperity, and gave a valedictory addresss on "The Treatment of Interior Colouring worthy the study of the Architect." This, he said, was a subject which holds at the present time a very prominent place in the minds of the cultured classes of society. The intention in decorating an apartment or hall was to endeavour to realise those ideas which were associated with the advance of intellectual attainment, and a desire to the increase of personal comfort. The decorator should always bear in mind that the general object of colour treatment is chiefly to serve as a background, and that it is only by the introduction of appropriate tones that richness and harmony can be obtained. He should also have the control of the textile fabrics. They constitute a very important feature in decorative treatment. But when uncontrolled by any effort at consistency, their indiscriminate employment frequently causes great disappointment. Were these and the various elements comprising artistic treatment carefully studied, a perfect correctness of effect throughout could with certainty be realised. The attention of the architect in making his arrangements for the treatment of domestic interiors should be directed to this matter. It would give him an opportunity for the display of his art proclivities in the management of the parts which go to make up the sum of picturesque effect, while restricting the expenditure within limits suitable to average means. On the Continent the co-operation of architect and decorator is found to have most beneficial results. This is exemplified in the complete success of the decorated interiors which are the productions of their joint experience and skill.

THE TEMPLES OF THE JEWS.—On Tuesday night, at the monthly meeting of the Society of Biblical Archæology, Lieut.-Colonel Warren, R.E., read a paper on "The Site of the Temples of the Jews at Jerusalem." Colonel Warren maintained that his explorations at Jerusalem tended to confirm the authenticity of the traditional sites of the Holy Sepulchre and Temple of the Jews, and had completely overthrown the theory advanced by Mr. Fergusson that the Dome of the Rock covered the Holy Sepulchre. He asserted that the Zion to which the ark of the Lord was brought by King David was a totally distinct hill from Moriah, on which the Temple of Solomon was built, and pointed out that the confusion existing in the minds of many on the subject arose from the fact that, of the principal poetical works, the psalms referring specially to Zion were composed by David during the period that Zion was the Holy Hill, while the psalms written after the building of the Temple only refer to Zion in parallelisms. He then pointed out that of the three hills on which Jerusalem is built, there is a general concurrence between the Bible, Josephus, and Maccabees that Moriah, the Temple mount, is that to the east; that to the south-west is the "upper city" of Josephus, and that to the north-west is the Akra, formerly the city of David (Zion), which was cut down by the Maccabees to prevent it dominating the Temple. He then spoke of the stupendous walls by which the sides of the Temple mount are begirt, and showed that the west, south, and east

walls as far as, and together with, the northern edge of the dome of the rock platform, indicated the limits of the Temple courts of Herod; the large marginal drafted stones of which formed the actual walls that existed or were built in his day. It was then affirmed that the threshing floor of Araunah, the Jebusite, was at the top of the hill of Moriah, and historical evidence was brought forward proving that the temple was on the top of the hill. The position of the temple was indicated, and it was maintained that the local indications in favour of this position over all others are numerous.

PARLIAMENTARY NOTES.

A NEW HOUSE OF COMMONS WANTED.—On Thursweek, in answer to Mr. Henry, who suggested that the inconvenience occasioned by the crowded state of the Liberal benches should be remedied by building a new House on the site of the Commons' Court, Mr. Gladstone, while admitting the inconvenience, which he thought, however, might be only temporary, and due chiefly to the natural assiduity of the unusually large number of new members, said it would be a great mistake to enter prematurely on a project which would involve great structural alteration and expense, and which would tend to consequences affecting the convenience of members not altogether contemplated. Later in the evening, Mr. Henry again insisted that the only adequate remedy was to build a new House which would seat all the members, and, among other advantages, would give the reporters better accommodation than the "dens" in which they did their work at present. Mr. Walter also testified to the inconvenience arising from the smallness of the present House, and was in favour of building a larger one on the present plan.

THE NEW NATURAL HISTORY MUSEUM.—Mr. Adam, replying to Mr. Storey-Maskelyne, said, on Friday, the trustees of the British Museum had been informed that they might now proceed to remove their collections to the new Natural History Museum. It was not probable that any residences would be provided for the officers of the Museum. That was a matter which was considered by the late Government, who did not see their way to accede to the proposal.

METROPOLITAN WATER SUPPLY.—In the Commons, on Monday, Mr. Brand having asked what were the Ministerial intentions with respect to the Metropolis Waterworks, Sir W. Harcourt announced that the Government had come to the conclusion that nothing short of an investigation by means of a Committee would satisfy the public mind as to the true character of the provisional agreements for the purchase of the Companies' interests. They would, therefore, move for a Select Committee, but care would be taken that the scope of the inquiry was not so large as to hang up the question indefinitely. It would not be desirable, however, to exclude from the minds of the Committee consideration of the question whether the purchase was, in itself, the only, or the best possible alternative, and whether it might not be more desirable to obtain a regular supply of water from other sources. Another important and fitting subject for inquiry was the basis of the charge for water—i.e., the basis on which the powers of the Companies were founded, and which enabled to raise their water rents without limit, in proportion to the growth of value in houses, and without themselves expending any further means or rendering any additional services.

FIRES AND THE WATER COMPANIES.—In the Commons, in answer to Mr. Spencer Balfour, the Home Secretary said, on Tuesday, none of the Metropolitan Water Companies was under any statutory obligation to provide a sufficient supply of water in case of fire.

ANCIENT MONUMENTS.—The adjourned debate on Earl Percy's motion for a Select Committee to inquire what ancient monuments require preservation was resumed on Wednesday by Lord H. Scott, and, after Mr. Foley, Mr. Ramsay, and Mr. Onslow had made some observations, it was negatived, on a division, by 148 to 63.

The college at Bath has been removed to the new premises abutting on the North-road, Bath-wick. The building covers an area of 96ft. by 60ft., and, like the old headmaster's house, to which it is set at right angles, shows a mixture of the Doric and Ionic orders. A corridor, 80ft. 6in. long, 12ft. wide, and 13ft. 6in. high, runs the entire length of the new structure, and is paved with encaustic tiles in a Greek pattern. On either side are three class-rooms, each 21ft. by 19ft. and 13ft. 6in. high. On the first floor are three other class-rooms, each 21ft. by 19ft. by 18ft. high, and a big school, 56ft. 6in. by 33ft. 6in. and 18ft. high, and lighted by seven large windows. An annexe contains sets of rooms for two unmarried masters, and secretary's office, and detached from the buildings is a laboratory.

Building Intelligence.

EDINBURGH.—On Saturday the Lord High Commissioner laid the foundation-stone of a new church which is in course of erection in Prospect-place, Dumbiedykes, Edinburgh. Designed to accommodate 850 sitters, the edifice is in the Gothic style, and is estimated to cost about £4,000. Owing to the situation of the church in a narrow street surrounded by blocks of buildings rising to a great height, the windows are of very large dimensions. In the south-west corner provision is made for a spire, which will rise to a height of 150ft. The interior of the church is 70ft. long by 50ft. broad, the height from floor to apex of ceiling being 50ft. Underneath the church is a hall capable of holding 500 persons, together with vestry and other retiring-rooms. The architects are Messrs. Shiells and Thornton, George Street, Edinburgh.

HEYTHROP PARK, OXON.—The new church in Heythrop Park (commenced last July) is fast approaching completion in the hands of Mr. Alfred Groves, of Milton-under-Wychwood. Mr. A. W. Blomfield, M.A., Montagu-square, is the architect. The church consists of nave, south aisle, north and south transept, vestry, and massive and lofty tower at south-west angle, the lower part of which forms the porch. The same builder is also making rapid progress with the new rectory-house near above.

IPSWICH.—The foundation-stone of a new district church of St. Michael was laid in Upper Orwell-street, Ipswich, by the Bishop of Norwich on Thursday week. The plan provides for a nave of seven bays, with north and south aisles, west porch and vestry, and would afford, if carried out in its entirety, sittings for 600 worshippers, but only five bays of the nave and aisles are now being constructed, and the sittings provided will be but 370. The nave will be 59ft. by 26ft., the height to under side of hammer beams, from which the arched ribs of roof will spring being 26ft., and to apex of roof 44ft. The aisles will be equal in length to the nave, and 10ft. 6in. in width, and 12ft. in height up to the roof-plate. The style is Early English. The walls will be of brick, with best red Suffolk facings, Portland-stone dressings, and dark red terra-cotta bands. Internally Bath stone will be used, with bands of buff and other coloured bricks. It is proposed to carry up the west gable as a double bell-turret to a height of 64ft. above the ground. The works are being carried out by Mr. R. Girling; the contract is for £2,798. Mr. E. F. Bisshopp is the architect.

PLYMOUTH.—The foundation-stones of a new Wesleyan Chapel were laid at Mutley on Wednesday week. It will be Geometrical Gothic in design. It is to be faced with local limestone, and the dressings will be of lime, Portland, and Bath-stone. The chapel will hold about 900 persons. The elevation towards Mutley is to consist of a high central gable with large five-light tracery window, and this is flanked on one side by a tower containing one of the gallery staircases, and provision has been made for a future spire, which it is not proposed to proceed with just yet as the funds will not permit. The other gallery staircase is contained in an apsidal-ended wing. The chapel has a couple of shallow transepts, and the eastern end of the organ-gallery is contained in an arched recess carried on short marble columns. The building itself will be raised above the level of the road to permit of schools being placed underneath, and rising some 15ft. high. The ground-floor of the chapel will slope towards the rostrum, and there will be two vestries. The gallery is approached from three staircases. In the basement are a large school-room and four classrooms. A special feature in the schoolroom will be the supercession of the usual central row of columns by iron girders across the room. The contract has been taken by Mr. Finch for £6,000, and Mr. H. J. Snell is the architect.

SHEFFIELD.—The Norfolk Drill-hall, at Sheffield, was opened on Wednesday. The building is in the Late Tudor style, built almost entirely of brick. The drill-hall proper is 180ft. long and 90ft. wide, with recesses on one side 6ft. deep. The height to the crown of the ceiling ribs is 40ft. The entrance, or principal front, is through an arched gateway, surmounted by a tower, in which are various apartments required for storage, &c. On the right on entering are the officers' quarters, mess-room, lavatory, and small library. On the first floor, and underneath are the kitchen, armoury, &c. On the left-hand side are the offices for the commanding officer and the canteen arrangements, and underneath are cellars. The whole work has been designed and carried out by Messrs. M. E. Hadfield and Son, architects, and Mr. George Webster has acted as clerk of works. The great hall is lighted by gas star pendants, supplied by Messrs. Hardmann, of Birmingham. The cost of the building is a little over £10,000, including fittings.

WOLVERHAMPTON.—New Bluecoat School buildings are about to be erected from the designs of Mr. T. H. Fleming, of that town, the present buildings being required under a street improvement scheme. They will consist of a centre block with two wings, in the form of the letter H. The main entrance is in the centre block, whilst the wings on each side, that on the south for a schoolroom and dormitory for 80 boys, and that on the north for the girls, the kitchen and teacher's apartments being provided in the rear. In the centre block on the ground-floor is the dining-hall and day-room for the children, and separate lavatories and cloakrooms for the day scholars; also separate staircases to the boys' and girls' dormitories. On the first floor, in the centre, is the master's bedroom. The space under the two wings is utilised for covered playgrounds, also rooms for cleaning boots, teaching carpentry, storing coals, &c. The buildings will be erected in red brick, with moulded brick bands and strings, and the roof covered with brindled tiles. The work is to be carried out by Mr. Lovatt, at a cost of about £3,500.

CHIPS.

In connection with the Conference on the Progress of Public Health, which, it is announced, will be held by the Society of Arts on Thursday and Friday next, it is intended, as in former years, to hold an Exhibition of Sanitary Appliances. These exhibitions, though on a small scale—the Society's premises not affording room for a large collection—have been found very useful in former years, as the Conferences have always been largely attended by sanitarians from different parts of the country.

The Brownhills Local Board have appointed their surveyor, Mr. J. Siddalls, as architect to the new public buildings, and clerk of works to the sewerage works of the Ogley Hay, and Brownhills district. The public buildings will include board-room for local board, offices for school-board clerk, local board clerk, surveyor, collector, and school-board inspector, Assembly-room, magistrates' room, committee-room, with stabling stores, &c., and residence for the surveyor.

The foundation-stone of a new church, dedicated to St. Clement, at Moss Side, will be laid in the last week in June. The structure, which will be of Early English Gothic design, from the drawings of Mr. Henry R. Price, architect, of Manchester, will consist of chancel, nave, and south aisles, with organ-chamber and clergy and choir vestry. The church will contain 750 sittings, and will be erected at a cost of about £6,000.

Last week, the foundation-stone of a new Masonic Hall was laid at Wakefield. The new building will have a frontage of 72ft. The estimated cost of the whole of the works, which have been let to local contractors, is £1,300. Mr. W. Watson is the architect.

The memorial-stones of a Methodist New Connexion mission chapel and Sunday-school, at Hunslet, Leeds, were laid on Saturday. The building; which has been designed by Mr. J. E. Leak, architect, Hunslet, will be built of brick with stone dressings, in the Classic style, and will consist of a chapel to accommodate a congregation of 400 persons, an infants' school-room for 100 children, and two vestries. The building will cost £1,000.

The Metropolitan Board of Works has decided against a proposition, made in respect to the contemplated City railway extensions, that the public bodies should construct the railways, stations, and streets, between the Mansion-House Station and High-street, Aldgate, and that the railway companies should pay to them an annual rental of £50,000.

An effort is to be made to have the shrine of St. Margaret—and the sediliæ which surround it—situated in the Dunfermline Abbey grounds, put into proper state of preservation, at the national expense. The neglected condition of these remains was put before Her Majesty's Board of Works some years ago, but without effect.

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RECEIVED.—W. McF. and Co.—R. W.—R. and E.—S. W. H.—R. B.—H. V. and J.—P. S.—S. W. R.—E. F.

AN ENQUIRER. (A letter is not an indenture, and, besides, the pupil being presumably under age, cannot so bind himself. You must consult a solicitor as to forms of indenture.)—A BRADFORD ARCHITECT. (Received, but we had already given all the space we could spare to the matter.)—ANXIOUS TO KNOW. (Usual, but not compulsory.)—J. B. (Kelly's Directory.)—TWEEDIE. (To fix the drawings, damp the back and lay the paper on the strainer with paste at the edges, care being taken not to stretch the drawings unevenly or too much. 2. As regards the construction of spires, the masonry must be set out full size. The bed-joints may be made horizontal, and the thickness at bottom may be 12in., and at top 6in. or less for a spire of 50ft. Brick spires have been constructed. The thickness of tower walls should depend on the height. At the ground-floor the walls may be 3ft., and at the top 2ft. in a tower for a small church, but we cannot lay down rules without more data.)

"BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED FOR A VILLAGE SCHOOL.—Manx, Veritas Vincit, Tace, Lancaster, Hubert, Jack.

Correspondence.

THE LONDON WATER-SUPPLY.

To the Editor of the BUILDING NEWS.

SIR,—Since I last addressed you on the London Water Supply, the question has entered upon another phase of its existence, one which, if it should serve no other purpose, will, at least, disabuse the minds of persons sanguine enough to believe that the Water Bill of the late Government would be taken up by the present as a matter of course. The Home Secretary has made it quite clear that Mr. Cross's Bill came to an end at the dissolution of Parliament. Nay, more, that "it is quite impossible to take any steps to give validity to the agreements entered into by a former Ministry without a full and searching inquiry into the real character of the agreements and their actual relation to the value of the property to be acquired under them." So far, the public mind is set at rest, for nothing short of a thorough investigation will be satisfactory to the ratepayers, who must eventually be called upon to pay "the piper." It is no small relief to know that Parliament will appoint a competent committee to carry out this inquiry, and, at the same time, that the interests of the metropolis will be fully protected by the joint action of the Corporation of London and the Metropolitan Board of Works. It will certainly be inexpedient to give the inquiry too large a scope, as certain points of difference between the companies and the public have been already pretty well thrashed out; but it will be of very great importance to the public that the proposed terms of agreement to purchase the works of the water companies should receive a full and careful consideration. It is just as important to consider whether we have no alternative to fall back upon; whether it would not be better to look about for a supply of water from a purer source, and at a cheaper rate. Without any desire whatever to prejudge the question about to be submitted to the decision of a committee, I may point to the scheme I propounded last week, namely, the chalk-hills,* and which I am now assured by competent authority will afford a practically unlimited supply of pure water for London. But as two or three schemes of a somewhat similar kind have been before the public, it will be as well to offer a few remarks upon them.

First, a word on a too-prevalent belief that the Public Health Act of 1875 effectually protects the existing water companies against all competition, and that a new supply cannot in consequence be brought into London unless their rights and privileges are first bought up. This clause in the Act, it will be found, applies to the action of local and municipal authorities, who are prohibited from constructing water-works within certain limits, so long as such company is able and willing to supply water proper and sufficient for all reasonable purposes for which it is required by the local authority. The Act, however, in no way shuts out private enterprise, and capitalists may combine, and, having obtained the sanction of Parliament, may bring in a new supply at any time, for the companies have no monopoly of the water. A new company will only be allowed to divide a profit of 6 or 7 per cent, whereas the present companies are not satisfied with anything less than 10 per cent. It would hardly be possible to utilise the existing mains of the old companies in any new supply distribution. They are laid too near the surface, the joints are faulty, and the sockets one-third filled-in with rotten spun-yarn, which has a deteriorating effect upon the quality of the water. The joints of the service-pipes are equally bad, the connections faulty, and would too often prove unequal to the pressure of a constant service supply. There would be no practical difficulty whatever in laying a new set of mains 8ft. or 10ft. below those of the present companies.

Amongst other sources to which public attention has been directed in connection with the question of a new water-supply, the scheme that received most attention was that proposed by Mr. Bateman, spoken of as the "Welsh Scheme." This gentleman proposed to gather the water from the Welsh mountains and the River Severn into appropriate reservoirs, and convey it by gravitation, through open aqueducts, to London, and, without filtration, deliver it to consumers. If this scheme were adopted, he thought it quite possible to dispense with nearly the whole of the present pumping and filtering-works of the various companies, that is, supposing they were purchased and their mains utilised. The estimated cost of a new supply from North Wales, the Severn, &c., constructing aqueducts, reservoirs, &c., was estimated at £10,850,000. Mr. Bateman's detailed estimates went to show that, by substitution of the Welsh for the present supply of the companies, a considerable economy would be effected. For further details I must refer your readers to the Royal Commission on Water, 1869. I would simply content myself by remarking, that any proposal to send water so many miles through an open aqueduct would naturally lead to a very serious amount of deterioration and contamination; when delivered in London it would be found to be no better than Thames or Lea Water. Another scheme is that of impounding in large open gather-grounds, either near to or at a distance from London, the available rainfall, and thence distributing to London. But this, for various reasons, presents difficulties of an impracticable nature; and any amount of filtration would not deprive it of infective germs. Neither would it be possible to remove the vapid taste, which is not the least objectionable element of all rain-water, and which most people think very unpalatable. Rain-water also acts chemically upon the lead supply pipes and house cisterns.

There is just one other question referred to by the Home Secretary as a fitting one for inquiry—that of "the bases of the charge for water, on which the powers of the companies are founded, and which enables them to raise their water rents in proportion to the growth of house valuation, and without themselves expending any further moneys or rendering additional services." This, if it were legal, would be unjust; but we are assured that assessment is only an element of evidence of value, and that the legal right possessed by the companies is to take their rent upon the *actual value*, whether the assessement corresponds to it or not. There can be no justification for the present City assessment, which it is said amounts to £120,000 a year, whereas twelve years ago, when the resident population exceeded that of the present day, the water assessment amounted to only one-half the sum—£60,000 a year. City men residing away from their offices are paying at the rate of £4 or £5 a year upon a rental of £100; and for their City offices, where much less water is consumed, they are called upon to pay £40 or £50 a year.

It is a comforting assurance, come what may out of the proposed inquiry, to find that the companies have no monopoly in the supply of water to London; that the Government have not adopted any agreements entered into by their predecessors, neither do they promote or support them. Finding them in existence, they are, however, willing they should be fully inquired into. The committee will find it difficult to reconcile any difference of opinion arising out of the supposed contract made by Mr. Cross towards the end of last year, when in answer to Mr. Fawcett he distinctly said that, "If the Government did undertake a scheme which might be recommended, they would not have regard to any prospective addition to the value of the stocks of the water companies. They would take those stocks as they found them on such a day, as, say, the last day of the last half-year, and no speculative change in the value of stocks or the action of the companies would have the slightest weight with the Government in any proposal they might have to make; that he wished to be most clearly understood by all those who might desire to deal in the stocks of the companies either by buying or selling." Such was the distinct declaration of the responsible minister of the day. Nevertheless, his words are said to have had no serious meaning in them, and water stocks, it is well-known, were run up from 30 to 55 per cent. in a very short time. It will afford a curious comment on the instability of Parliamentary utterances, or rather of the baffling influence of speculators in determining that a minister should not keep his word to the public, if I append a comparative Statement of the Original and Present Prices of the Shares of the London Water Companies, and the price last July, the time at which Mr. Cross's Bill was supposed to have been calculated upon:—

* As evidence of the certainty and feasibility of obtaining a pure water supply from the chalk, it is of special interest to know that this has been successfully accomplished at Wokingham, and through the same formation as that on which London stands. The engineer of the company reported that water would probably be reached at 350ft. It was struck at 345ft., and a very fine supply obtained at 405ft. The water suddenly burst up through the bore pipe, filling the well-shaft to within 30ft. of the surface, and yielding some 360,000 gallons a day. The water is described as very pure and bright, so that the discovery of so fine and copious a spring is a subject for congratulation and encouragement, as it will enable a large range of country to be provided with one of the first necessaries of life at a comparatively moderate cost. The water is derived from the chalk hills to the north of Twyford.

	Original Price of Shares. £	Price in July, 1879. £	Present Price. £	Increase per Share. £
Chelsea	100	153	207½	107½
East London.....	100	163	210	110
Grand Junction ..	50	87½	119½	69½
West Middlesex ..	61	145	177	116
Kent	100	210	290	190
Lambeth	100	155	211⅓	111
New River	100	326	370	270
Southwark and Vauxhall	100	130	227½	129½

Note the original price of the shares in the estimate of the increase in value.

We have now the assurance of the Home Secretary that the Government "will lay all these matters impartially before the committee, neither as attacking, nor as supporting the agreements, but prepared to deal with them as they seem best, after their *true value* has been definitely ascertained."—I am, &c.,

JABEZ HOGG.

1, Bedford-square, June 1, 1880.

HAYMARKET STORES.

SIR,—I regret it is necessary to ask you to allow me to reply to the letter of Mr. Thomas Verity on the above subject in your last week's paper, as it contains statements concerning myself which are untrue.

As regards the summons against Messrs. Kirk and Randall for not producing drawings of the buildings, 28, Haymarket, for my inspection, I find I have been inadvertently led into an error.

I quite understood at the time that the magistrate allowed me to withdraw the summons; but I have to-day inspected the summons-book at the police-court, and find that the magistrate has marked it dismissed. Since my letter to you the drawings have been produced by Messrs. Kirk and Randall at my office, but no information was given on them concerning the internal iron construction, and this, I understand, as Mr. Verity states in his letter, he still refuses to submit to my inspection, and this is the *real point at issue;* and as an official charged with enforcing the laws for public safety, I am determined to prove whether the law gives me power or not to examine the drawings of such work.

The last summons was dismissed on the plea that I asked for the drawings to be produced "*at my office.*" I shall now serve a fresh notice on the builders to produce the drawings, *including iron construction and floors*, on the building, for my inspection, and fight the question out. I think your readers, and the public generally, will agree that I am right in my determination.

The whole of the interior of the buildings in question, and part of the external walls, consist entirely of iron construction, and it is almost puerile to assert, as Mr. Verity does, that the district surveyor has no right whatever to examine or see the drawings of such work. The mere arrangement of the plans, and design of the elevations, can be of no interest whatever to an officer who is charged with a duty of reporting on the stability and safety of buildings; and what motive any architect can have in refusing to allow his builders to submit the drawings showing the constructive principles on which his building is erected, including the question of its internal tie, and the strength and supports of the floors, to the district surveyor's inspection, it is impossible to imagine, unless, as the magistrate remarked, there is some *reason* for concealment.

With regard to Mr. Verity's other statements, the following are the real facts:—

In December last my attention was called, on visiting these works, by *some of the workmen*, to what they considered the dangerous character of the iron construction, which consisted of independent iron cross-shaped stanchions, with projecting caps, carrying wrought-iron girders 20ft. long, running from the back of the building to the front wall; these girders have only a bearing of 1⅞in. in some cases, and 1½in. in others, on the projecting *cast-iron* caps, and they are each bolted together with four wrought-iron bolts at each end.

I spoke to Mr. Verity several times on the subject. He referred me to the engineer who designed the ironwork, and I saw that gentleman, who promised to send me his detail drawings and see me about them. This he failed to do, as he now informs me, by Mr. Verity's orders. At last, on March 5, after repeated efforts to get the construction amended, I reported to the Board of Works that it was necessary, under the Dangerous Structure sections of the Act of Parliament, that an order should be made to strengthen or secure the internal iron-tie of the building, and I wrote a special report on the question. This was referred to the Building Act Committee of the Board, when Mr. Verity and myself were asked to attend. Mr. Verity did not do so, but a solicitor appeared for him, and the engineer who designed the ironwork also attended. The matter was heard at great length, and a resolution passed that the Board retain counsel to support my view of the case. I next received a letter from Mr. Ward, the Board's solicitor, asking me to suggest the names of the witnesses it would be desirable to call to support the dangerous structures notice, but upon the matter again coming before the committee for instructions as to the prosecution, it was resolved that Sir Joseph Bazalgette and Mr. Vulliamy be asked to make a survey, and give a joint report on the construction. This they did; and Mr. Verity, who *refused*, and *still refuses*, to submit the drawings of his iron construction to me (*the legal responsible official*), says that as an act of courtesy he submitted them to them. Please note—those gentlemen had no responsibility whatever in the matter; but it was assumed at the late Haymarket catastrophe, three doors from the site in question, that I had. Mr. Verity says my unwarrantable proceedings have collapsed. If he will inquire at the Dangerous Structure Office of the Metropolitan Board of Works, he will find he is in error, as they are still pending.

The two following clauses from the joint report of the engineer and architect to the Board will, I think, prove that there was good ground for my interference. Those gentlemen's report contains the following clauses:—

"It is desirable that three rows of wrought-iron tie-rods should be carried from joist to joist, from the front wall through the rolled joists back to the second stanchions, being a distance of 42ft. from the front wall. So far as we have been able to ascertain from a cursory examination of the drawings, the works are generally designed of sufficient strength, but it would seem that since the design was prepared, it has been determined to place very heavy weights on the fourth and fifth floors, and the joists should be strengthened accordingly."

The matter, by the last resolution of the Building Act Committee, I am informed, now stands thus:—That if the Stores do not execute the works proposed in their architect's and engineer's report, the Board proceed with the Dangerous Structure notice.

It is with pain I am compelled to publish this statement; but after Mr. Verity's letter, I have no alternative. While the proceedings were pending Colonel Hogg wrote to me to meet him on the building and explain its construction, which I did; this is the only occasion when I have met any member of the Board on the subject.

My whole connection, as district surveyor, with the buildings for the Haymarket Stores has been one of constant litigation and worry, which has been *literally forced on* me, as the following statement will show:—

In January, 1877, an accident happened to the premises in Oxenden-street, when several adjoining houses partially fell down, and a number of people had to be removed from them by the police, and, in consequence, numerous Dangerous Structure notices to be served. In March, 1879, an order was made by Mr. Newton to compel the Stores to tie down a heavy, dangerous cornice, which they had erected in Oxenden-street; this took several weeks' litigation.

During the last month the Stores have been convicted of erecting irregular wooden buildings, and ordered to take them down. They have also been ordered to make their buildings comfortable to the Act as regards fireproof separation; but from this they are now appealing.

Summonses have also on several occasions been taken out against them for erecting ironwork fronts to their buildings without submitting plans and obtaining the sanction of the Board of Works, which they have afterwards been compelled to obtain; and I need scarcely refer to the heavy litigation which has so constantly taken place with regard to old dangerous party-walls and other matters which have been so often mentioned in your pclice reports, and I submit that the attempt to achieve notoriety in connection with building act cases, as regards the Stores, has been initiated by Mr. Verity, and not your humble servant, who has no alternative but to do his duty.—I am, &c.

ROBERT WALKER,
District Surveyor of St. Martin-in-the-Fields.
21, King William-street, West Strand, W.C.

ANOTHER INSULT TO THE PROFESSION.

SIR,—In answer to Mr. Gough's letter in your last issue, permit me to explain that the Tottenham School Board "propose" building four schools all from one set of plans. The architect is, therefore, to receive four per cent. on the first building, and two per cent. on the remaining three (all the buildings are to be proceeded with at once), a point not *easily* ascertained from the conditions of appointment, and which I think Mr. Gough is probably unaware of. I received this information from the clerk to the board, in answer to a letter asking if such was the case, which I presumed from the report to the board meeting in the local paper; and as it makes so much difference in the "insult," I have taken the liberty of troubling you with these few lines. As to practicability of the terms, I leave Mr. Gough as an architect to judge; at the same time they are those under which forty applications have been made, I hope not entirely from "the black sheep of the profession," and from among whom I trust the board will be able to select one "honest man."

I inclose my card, which you are at liberty to forward to Mr. Gough if he wishes it.—I am, &c.,

A.R.I.B.A.

PORTLAND CEMENT AT THE SYDNEY EXHIBITION.

SIR,—I have the honour to inform you that the undermentioned six brands of Portland cement sent to the International Exhibition in Sydney, 1879-80, were tested there by order of the jury with the following results:—

SEVEN DAYS' TESTS.	TENSILE STRENGTH PER SQUARE INCH. Neat Cement.	1 Cement 2 Sand.
1. Portland Cement Fabrik "Stern," Toepffer, Grawitz & Co., Stettin ...	634·2	325·8
2. J. B. White & Brothers, London	490·2	216·8
3. Stettiner Portland Cement Fabrik (Lossius), Stettin	416·8	206·6
4. J. C. Johnson & Co., London ...	414·6	197·2
5. Schifferdecker & Sohne, Heidelberg	413·8	184·6
6. N. Jozson de Langle, Antwerp ...	394·7	163·7

These figures corroborate the encomium passed upon "Stern" Portland Cement by the great American cement authority, General Q. A. Gillmore, C.E., presiding judge at the International Exhibition in Philadelphia, 1876, where—according to the testimonial of the jury—"*No Portland cement superior to 'Stern' was exhibited.*"—I am, &c.,

GUSTAV GRAWITZ,
Sole Agent.

133, Leadenhall-street, London, E.C., May.

DECORATION AT THE ROYAL ACADEMY.

SIR,—You will see, by the later editions of the Academy catalogue, that there has been an error both in my name and the title of one of my drawings, favourably critised in your paper of the 14th of May, under the above heading.

The drawing (1128) was described as an "Altar Piece," and by Mr. E. Hampton. It really is the design for the frescoes in the Sacrarium of St. Jude's Church, South Kensington, painted by myself in the autumn of last year, the subject being the Adoration of the Lamb, taken from the iv. and v. of Revelation. My attention has only just been called to it, having been away on the Continent. If you will kindly insert this in your next issue, you will do me considerable service.

The "error in the catalogue" must be my apology for thus trespassing upon your valuable space.—I am, &c.,

EDWARD FRAMPTON.

10, Southampton-street, Strand, W.C.

PROBUS CHURCH TOWER.

SIR,—In your issue of the 21st ult., Mr. Ashworth recounts an old wives' fable about Probus Tower, how it was designed for Truro, but the Evil One broke down the waggons with the stones at Probus, and so the tower was built there instead. "Probus Tower," your correspondent adds (and the sting of his interesting letter is in its tail), "looks well on paper, but its details (Late Perpendicular) are very coarse, and will rather disappoint visitors." Now, with all deference to Mr. Ashworth, I would say, on the contrary, the tower

looks well, not only on paper, but where the Devil allowed it to be placed; furthermore, its details are no coarser than granite obliges them to be, and I think that every visitor who does not value art by its chronology will not be disappointed with a visit to Probus.

I am not surprised that Mr. Ashworth should have some charge of some sort against a Late Perpendicular erection, but it so happens that the point he refers to only illustrates the superiority of the period against which he inveighs. The earlier Cornish architects of the thirteenth and fourteenth century invariably used Polyphant or other soft stone, and shirked the use of granite because they could not express their tiny mechanical rolls and fillets in so brittle a material. But the later men take this noble material and give it just the bold treatment it was adapted to receive—a treatment very similar to that of the Cornishman's Breton brother at Dinan and elsewhere—and I am coarse-minded enough to delight in the details and sculpture of Probus Tower. I have no more prized pages in my sketch-books than those which illustrate them. Probus Tower is indeed a noble conception nobly carried out. It is the finest and the richest tower in Cornwall, the best tower erected in England in the sixteenth century, and in every way fit to be compared with the best towers of any date in any part of England. And I can only explain your correspondent's uncalled-for disparaging remarks by connecting his own evil-speaking of to-day with his story of the erection of the tower in the sixteenth century.—I am, &c.,

JOHN D. SEDDING.

18, Charlotte-street, Bedford-square, W.C.
June 1.

Intercommunication.

QUESTIONS.

[6137.]—**Silver Work.**—Will a correspondent give any hints how to get approximate weight and cost of hammered, cast, and chased?—J. H. S.

[6138.]—**Purchase of a Provincial Architect's Practice.**—Will any intercommunicant kindly inform me what I should pay for the purchase of a provincial architect's practice where the average income has been for the last eight years—say, £300, £400, or £500 per annum, and on what principle is the purchase money arrived at, and oblige?—ALPHA.

[6139.]—**Measuring Brickwork.**—Will some reader inform me the proper method of measuring brickwork for labour and mortar only? I have been told no openings should be deducted. Is this correct? Also in measuring the beds and joints of stone-work, what is understood by the phrase "one face measured for two"? Does it mean one face of the two (faces) that butt against each other?—STUDENT.

[6140.]—**Underground Cistern.**—Will any of your correspondents tell me what is the most convenient and economical method of forming an underground cistern to collect rain-water from roofs, and also the simplest description of filter which may be combined with the same?—W. B.

REPLIES.

[6133.]—**Crickets.**—Crickets infest the fireplaces, &c., of country places, and cockroaches those of seaport towns. Like the Hanoverian rat, which has exterminated the English rat, the American immigrant seems to be exterminating all weaker vermin. Like most evils, cockroaches have their advantages. They eat up all insects within their reach. Bugs, for instance, may be extirpated by introducing cockroaches, so presumably they will devour all crickets. Among old-fashioned people it is considered ill-luck to kill a cricket, though, if in great numbers they make great havoc by eating away the mortar from the walls. They, as well as cockroaches, are very good scavengers, eating up all the dirt and rubbish, unconsumed refuse of food, &c., which may get into places which the housemaid's brush never reaches. They are considered a great delicacy by hedgehogs, so that one hedgehog will soon destroy all the crickets if you can prevent him from getting away, as he is very shy. They may also be destroyed by quicklime, putting a lump of quicklime into a damp corner and allowing it to slack itself; by carbolic acid, or, best of all, by sprinkling a little of Vicat's "Insecticide."—A. H. B.

WATER SUPPLY AND SANITARY MATTERS.

METROPOLITAN WATER SUPPLY.—A deputation of members of Vestries and District Boards of the Metropolis waited on Tuesday upon the Home Secretary upon the subject of the Metropolitan Water Supply. They asked that the powers of the Water Companies to raise the rents should be suspended to the end of next Session. Sir William Harcourt, in reply, said that he looked with grave doubts upon any interference with the rights of property, which a suspension of the existing powers of the Companies would be. One of the objects of the Committee to be appointed would be to inquire into the powers of the Water Companies to raise their rents, and the manner in which that power had been exercised, after which the Government would be better able to deal with the question.

SINKING FOR WATER IN THE WOKINGHAM DISTRICT.—The subject of the water supply of the Metropolis is attracting so much attention that the following description of the deep well now being sunk at the town of Wokingham, through the same formation as that on which London stands, is of special interest:—In the year 1878 an Act of Parliament was obtained, incorporating a company for the purpose of supplying this district and the neighbourhood with spring water. Acting on the report of Mr. J. W. Grover, the engineer, which showed that the chalk might probably be reached at a depth of about 360ft., and that water would probably be struck at about 400ft., the company proceeded about 12 months ago to commence their well, and the result of their operations has been to confirm these anticipations in a very remarkable way, for the chalk has been reached at 345ft. depth, and a very fine chalk spring has been struck at 405ft. This result was obtained last Friday, when, after passing through about 60ft. of chalk which was comparatively dry, the water suddenly burst up with great violence through the bore-pipe, filling the well shaft to within 30ft. of the surface, and yielding some 360,000 gallons a day at a depth of 70ft. from the top. The water is very pure and clear, as is generally the case with that derived from the chalk; but attempts which have hitherto been made in this district to obtain water from the chalk have not proved generally very successful, so that the discovery of such a fine copious spring is a subject for congratulation, as it will enable a large range of country to be provided with one of the first necessaries of life. The well consists of a brick shaft 200ft. deep and 6ft. diameter, at the bottom of which comes the artesian boring down to the chalk. The formations passed through are the London clays and the Reading sands. The water in the chalk is supposed to be derived from the chalk hills to the north of Twyford.

Our Office Table.

THE annual meeting of the Sanitary Institute of Great Britain was held on Saturday afternoon at the Society of Arts' room. Dr. B. W. Richardson, F.R.S., occupied the chair. The statement of accounts for the year ending Dec. 31, 1879, showed a great increase in the balance of funds in hand as compared with previous years. Two examinations were held during the past year under direction of the Council, for local surveyors and inspectors of nuisances. Nine candidates offered themselves for examination and seven passed. The following gentlemen were elected on the Council:—Dr. A. Carpenter, Mr. W. Hopton Ellis, Mr. R. B. Grantham, Mr. George Palmer, M.P., Mr. T. Salt, and Mr. W. Crookes. Mr. G. J. Symons, F.R.S., has been elected Registrar in place of Dr. L. Marsh. It was stated that arrangements were nearly concluded as to the occupancy of more commodious offices. The Chairman in moving the adoption of the report expressed his satisfaction at the progress achieved, and said voluntary efforts must now wait for Government. They had been sorely disappointed in the performances of the late Government, which had resulted in a voice and nothing else, crying solemnly loudly, "Sanitas sanitatem omnia sanitas," and there was much for a new Government to accomplish. They must begin on a new basis. All the present divided interests and offices of health connected with Government must be brought under one department, with a responsible Minister of Health at its head. The Health Departments of the Local Government Board, of the Home Office, of the Privy Council, of the Registrar-General (with a registration of disease), together with the official Meteorological records, and other similar or allied functions, required to be put under a central Board, with efficient directors for each section, and a competent energetic presiding chief over the whole. Then, in a few years, the life history and the life value of this nation would be understood with a discernment and understanding of which at present we had no conception, and with results which would be as momentous as they were unexpected by the masses of the people.

THE Company of Painter-Stainers gave a *conversazione* on Friday night in their ancient hall, Little Trinity-lane. The company were received by the Master (Mr. John Gregory Crace). A short account of the company, just written by the Master, contains much curious information concerning the growth of the guild and the purposes it has served in the past. The Painters' Company, though they receive and pay away large sums yearly, have very limited corporate funds. They are, however, desirous of exercising to the best of their ability the influence of their guild for the advancement of the art they represent. They were the first of the City companies to open an exhibition of works of decorative art. They propose from time to time to give lectures suitable for the technical education of young men in industrial art, and they are endeavouring to an intercourse with the working men, which they trust may be attended with useful results.

WE hear Mr. John S. Rawle's connection of fourteen years with the Nottingham School of Art is about to cease, that gentleman having accepted the Headmastership of the new West London School of Art. Mr. Rawle's departure will certainly be a loss to Nottingham, but his successor, whoever he may be, will doubtless be encouraged by past results to carry on Mr. Rawle's work with spirit and success. The position achieved by the Nottingham School has been a very enviable one during Mr. Rawle's headmastership, and our readers have had frequent opportunities of judging for themselves of the quality of the work done by the pupils. We give two designs this week, and trust we shall hear again in future years from Nottingham, and also from Mr. Rawle when he is established in his new quarters.

A COLLECTION of ancient helmets and other armour, both foreign and English, was opened yesterday to the inspection of visitors at the rooms of the Royal Archæological Institute, in New Burlington-street. The articles exhibited are about 200 or 250 in number, and range from the tenth century before Christ down to the Stuart era in our own country. The examples are arranged chronologically; there are several specimens of Etruscan and Grecian art, and still more of Roman and Oriental workmanship. Of these, the most interesting, perhaps, are a brazen helmet of the time of the Roman occupation of this island, found at Witcham Gravel, in the Fen Country, and exhibited by Mr. Vipan; a Persian helmet of the seventeenth century, exhibited by Mr. John Latham, F.S.A.; four Etruscan helmets of bronze, and another found in the Tigris, near the supposed passage of the "Ten Thousand," sent by Mr. Bloxham; some pikemen's helmets of the time of Charles I., exhibited by Mr. H. Ferguson; a Florentine casque with three combs, exhibited by Mr. John W. Baily; an open casque of Italian steel *repoussée* work, by the same. There are also a variety of morions, beavers, close helmets, lobster-tailed helmets, early Indian head-pieces, spider helmets, casques, tilting helmets, &c. Some German fluted helmets, "casquetels" with movable visors, and Italian visored helmets of the early sixteenth century are well worthy of inspection, and so are Sir Richard Wallace's "peak-faced" helmet, of the time of Richard II., and Mr. Burges's spider helmet, which is said to have belonged to a regiment of horse formed by Henry IV. of France. Among the most curious specimens of armour, perhaps, is the banded mail, exhibited by Mr. William G. B. Lewis, constructed of iron or steel rings sewn strongly into cloth or leather. A large variety of these is to be seen in a glass case in the back-room. The collection has been arranged under the care, and, to a great extent, by the hands of, the Baron de Cosson and Mr. Burges.

A COMPETITION was decided, on Saturday last, for the surveyorship of the Goldsmiths' Company, for which there were about thirty candidates. The post was rendered vacant by the recent death of Mr. Hesketh, who had filled the position for many years. Eight names were chosen for a final selection, and these included Messrs. T. Blashill, Grüning, R. Norman Shaw, R.A., J. J. Cole, T. H. Watson, and J. W. Penfold. After a ballot, the surveyorship fell to Mr. J. W. Penfold, of Westminster, an associate of the Royal Institute of British Architects of twenty years' standing, and a surveyor of good practice and position. Mr. Norman Shaw held the second place, we hear, in the number of votes recorded. The work of the post chiefly consists in re-arranging the leases of the Company's properties, as they fall in, and similar duties, requiring considerable personal attention, and the post is worth from about £500 to £800 a year.

THE BUILDING NEWS.

LONDON, FRIDAY, JUNE 11, 1880.

THE HEALTH CONFERENCE AT THE SOCIETY OF ARTS.

THE annual conference opened yesterday at the Society of Arts commenced with a programme which does not attempt the discussion of new subjects, but rather endeavours to formulate the facts and suggestions of former conferences. The subjects include the long-contemplated formation of county boards, the value and utility of which we believe few sanitarians will be inclined to question. That the Local Government administration needs strengthening we have repeated evidence in the conflict between local authorities and the Board. The meeting did not so fully as might have been expected avail themselves of the opportunity of discussing the powers of the county boards as regards the conservation of rivers and the prevention of floods, or, in the words of the programme, "that such county boards or combinations of them should *inter alia* be charged with the conservation of rivers, including the prevention of floods, and the storage of water; and be empowered to put the Rivers Pollution Act, 1876, in force upon the complaint of any local sanitary authority or person aggrieved, and to charge the cost of the proceedings upon the county rate, or to sanction proceedings of sanitary authority or of any aggrieved person for such purpose." The enlarging of the functions of local authorities of urban and rural districts, and the power of combining districts for certain purposes; election by ballot, and the appointment of county health superintendents were found topics of sufficient importance to occupy the whole of the first day's meeting. The mapping out of England and Wales into a few large areas, each under a staff of inspectors, will certainly commend itself to those who are looking for some more comprehensive mode of obtaining data; and the proposition to establish an Inquiry Department for the investigation of scientific processes and the collection of data will be a step towards the collection and methodising of that large fund of miscellaneous knowledge which authorities and sanitary officers find it so difficult to obtain when they need it. Under the "amendment of the law," we are glad to see that Mr. Alcock's resolution of May, 1878, with reference to conferring powers upon local authorities with regard to the construction of sewers and connection of house-drains is to be discussed, and that there will be some probability of house-drains being properly connected with the sewers by the local authorities, at the cost of the owners, both of old and new houses. The amendments of sections 299 and 23 of the Public Health Act are sure also of receiving hearty support, and the wants of scattered and detached dwellings in rural districts without water-supply and drainage will, we are glad to say, receive consideration. But, to the architect and builder, the resolution proposed by Mr. C. N. Cresswell will have most interest. Its object we may best give by quoting the resolution itself: "That it is expedient that the Metropolitan Board of Works within the metropolis, and the County Board within each county, should be empowered by the Legislature to make provision for the inspection and sanitary classification of dwellings, upon application being made by the owners thereof; and to grant certificates of healthworthiness in different categories, for terms of years, according to the perfection of sanitary equipment and fitness for habitation of such dwellings, and to determine the scale of fees to be paid for such inspection during construction and repair, and also upon delivery to the applicant of the certificate of classification awarded to such dwelling." As far as we can judge, the registration of houses will give an impetus to sanitation, and, if conducted with care, will tend to promote a healthful rivalry between inventors. Owners and builders of houses will naturally endeavour to acquire the highest certificates obtainable of the condition of their dwellings, and those who keep boarding-houses and let lodgings will vie with each other in keeping their houses above the reproaches often levelled with justice against them. There will doubtless be some difficulty in arranging the categories of sanitary efficiency, especially where old systems of drainage are prevalent, and in setting up a standard where so many systems exist. Practical illustrations of sanitary inventions and schemes will, on this account, be of extreme advantage. An opportunity was offered to the members of the conference of visiting Spencer House, St. James's-place, a perfect model of sanitary arrangements, according to Mr. Robert Rawlinson, as we briefly notice elsewhere. It is to be regretted that so few of the visitors availed themselves of the chance of testing the success of the undertaking.

In the room set apart for sanitary appliances we noticed yesterday the improvements and processes of several well-known manufacturers and sanitary engineers in connection with drainage, water-supply, and kindred objects. Stoneware traps for intercepting grease, and giving free escape to sewer-gas are, as usual, abundant. We notice among them Bailey and Co.'s traps, Hellyer's patent V-dip trap. Messrs. Boyle and Sons contribute models of their admirable ventilators, and in the same class we may mention exhibits by Messrs. Kite and Co., Mr. Lawrence, Hill and Hey, and others. Messrs. Sharp and Co. show their improved system of ventilation by inlets and vertical tubes, by which a circulation of air in rooms can be produced and easily regulated. Appliances relating to water-supply and purification are numerous. Bishop's spongy iron filters are shown in a variety of pleasing forms. Bailey's filters, and the London and General Water Purifying Company exhibit a variety of forms which appear to answer the requirements of the most exacting. Messrs. Bowes, Scott, and Read send a model of Field's Self-acting Annular Siphon, for the periodical flushing of sewers, and Messrs. Carter and Co., of Coleshill-street, an excellent patent closed cistern for storing water. Hancock and Heath's liquid meter, H. Braithwaite's siphon for cisterns, the Sanitary Appliance Company's Bower's gastrap and their pipe-joint, Norton's Abyssinian tube-well and driving apparatus, Gibb's and Canning's Robbins's patent joint, are all worth inspection by the water and sanitary engineer. Among recent improvements we may particularly draw attention to Mr. W. Batten's full-size manhole cover and ventilator, lately described in these pages, which is simpler and more suitable than other plans we have seen. Messrs. Doulton and Sons send specimens of their closet and sanitary ware, and Messrs. Smeaton and Sons of their closets and lead trap. Moule's Earth-closet, and models of the self-acting cinder-sifting ash closets of the Salford Sanitary Appliances Co., Jewell's patent closet, &c., are among the collection. We notice, also, Currall's door inlet ventilator, Turner and Robertshaw's dividable closet-guard and deodoriser, Messrs. Tonks' door-furniture, and a variety of other objects of general interest, about some of which we may have something more to say next week.

WORKS IN HAND.

FURNITURE and needlework are so closely allied, that, with the object of developing the latter art, the School of Art-Needlework, in Exhibition-road, at Kensington, have invited the co-operation of manufacturers of furniture, and the rooms formerly occupied by furniture of Queen Anne character by Mr. Lascelles are now filled with contributions by Messrs. Bertram and Son, of Dean-street, Soho; Mr. Christie, of George-street, Portman-square; Messrs. H. and J. Cooper, of Great Pulteney-street; Messrs. Lazenby and Co., of Regent-street, &c. Messrs. Bertram have a display of furniture chiefly in the styles known as those of Sheraton and Chippendale. We remark a wardrobe in rosewood, with splayed sides and centre mirror, in a more modern spirit than other examples of the school. The dressing-table and screens are excellent. We remark a screen worked in embroidery, with a ground of dark green, and yellow-and-white silk flowers. The chairs, with embossed leather backs and seats, are in good taste, and the screen in painted leather and gilt, labelled "Spanish," has a rich effect. Another with embroidered foliage and flowers and birds, on a dark satin-cloth, arranged in Japanese style, and mounted on an ebonised frame, is an exceedingly beautiful specimen of needlework. Among other pieces exhibiting a true spirit, we notice some chairs, copied from the old ones of Queen Mary, covered with rich Utrecht velvet and embroidered with a boldly-designed thistle pattern, relieved by gold, and a corner cabinet of satin-wood. The wall hanging displayed on one side of the room is a cleverly-treated design by Mr. Walter Crane, executed by the ladies of the school. It is worked in crewel, in shades of subdued greens and browns. The design shows panels with emblematic figures, a frieze adorned with festoons, and an attic over with figures in an arcade. The side pilasters are enriched with arabesques in crewel-work. We notice also a pair of rich plush velvet curtains, peacock blue in shade, with a bold scroll border in gold embroidery; the design and colours are in excellent harmony. At the farther end of room is a carved chimney-piece and mirror in the rococo style of Louis Seize, with a grate by M. Feetham. Mr. Christie, of Portman-square, exhibits several walnut chairs covered in a pinkish chintz of a quiet, conventional pattern, and we must draw attention to a corner cabinet, with carved panels and mirrors, for the display of china, unique in design. Bookcases and other furniture, in a freely-treated Jacobean, are to be seen, but they have a more modern feeling than we occasionally find. The specimens both of Messrs. Bertram and Mr. Christie are enhanced by being set off by hangings and carpets of quiet blues and greens; and by the embroidered work of the school, such as sunflowers, folial patterns on blue ground, and needlework in brown and drab. The folded screen of satin, worked with some delicate hawthorn and acacia and other sprays of foliage, call for notice; but we pass on to another smaller room, fitted up by Messrs. H. and J. Cooper, of Great Pulteney-street, in a style suited for a drawing-room or boudoir, in which the most notable object is a carved stained-oak chimney-piece, called the "Darby and Joan," of Chinese character. It has a head or canopy supported by rather weak columns, standing on pedestals, and projects sufficiently into the room to cover side seats, which have opening curtains of crimson at the sides. The Chinese chimney-piece, with a number of small porcelain

painted panels, is more curious than pleasing from an art point of view, but we think the charm of this unique collection is greatly due to the fine carpet, specially imported, and the rich hangings and embroidery of green and gold. Our eye rests also upon an oak couch, with panelling of Gothic design; and upon a few fire-screens and other "fancies." Messrs. Robertson, of Norwich, contribute a few ebonised chairs, work-cabinets, &c., in modern English, covered with taste; and we must not forget the neat lobby, with its Oriental collection by Messrs. Lazenby, Liberty, and Co., of Regent-street, who show a pair of fine Canton vases, Japanese hanging cabinets, leather wall-hangings, and a variety of textiles and bric-à-brac. But the main attraction, after all, is the work of the school, the spirited design, the rich harmony of colour of the fabrics, and the delicate handwork of the lady artists.

After the hard and mechanical ornamentation seen in the showrooms and shop-windows of our leading thoroughfares, it is a relief to turn to the work of the true art manufacturer, in which design and colour have been studied in a thorough spirit. Messrs. Morris and Company, of Oxford-street, do not cater for the taste of that large class of the public who have money enough to buy anything in fashionable taste, but who have not the discriminating power to judge of the difference between art originality and mere imitation. Every one of their designs bears the impress of artistic culture and feeling. The handmade rugs of that firm and their so-called "Hammersmith carpets" are a special feature, to which we may call the attention of all who can really enjoy harmony of colour and design. The attempt of the manufacturers is to make England independent of Eastern workmanship, which is rapidly declining. The rugs are of Persian character, and the patterns have been conceived in a truly Eastern spirit. Each thread of the pile has been tied by hand and cut off, so that the fabric is as much a work of art as a piece of tapestry. We notice several charming blendings of colour in which a dark indigo-blue is made the ground for conventionalised foliage and flowers of lighter shades of blue, green, and rich autumnal tints. One has a buff ground, with a beautiful blending of colour; another a blue indigo ground, upon which are worked scrolls of conventional form, with a light border of flowers and leaves; another has a rich border with a clouded centre of buff and rose tint, but subdued; while a fourth is a rich and harmonised study of varied shades of green, and the whole rendered in a thorough conventionalised Eastern style. We cannot leave the textile fabrics without mentioning a nice blue Kidderminster "three-ply" carpet with a quiet pattern, and especially a rich altar-cloth, of vellum tint, embroidered with a design of singular boldness and originality, in which tulips and peonies are introduced; the border is brocaded with silk and gold, and the colours are admirably selected; also a portière and a coverlet of equally suggestive designs, silk-stitched on a plain cotton ground. Messrs. Morris's "Cortisene" floor-cloth is a nice warm material for the feet; it is a kind of linoleum. Visitors to the studio will see a very pleasing pattern in one laid; it consists of a quiet, conventional design of intercepting semicircles, with flowers flatly treated in three complementary shades of colour. In Ceramic art we noticed two fine vases of Oriental design and glazing, a Spanish lustre; they were all three of bold design. The Dutch tiles made by Messrs. Morris are excellent in pattern, and are painted, we are informed, in Holland, in blues and greens, and other tints of a subdued shade. Those who wish to hang their walls with a material artistic and washable cannot find, we are sure, anything better than the block-printed chintz designed and made by this firm. One of the patterns we saw was particularly good in design and colour, a treatment of peonies and honeysuckles on a rich blue ground, characterised by considerable boldness. We have seen few wall-papers to equal those of Messrs. Morris. The patterns have a freshness and originality about them we do not often meet with, and they are all conventional renderings of natural foliage and flowers, boldly treated, in tints of greys, greens, and blues. A rapid glance over the studios is sufficient to convince one of the spirit of individuality and unity which pervades the work of this firm; we do not see a variety of conceptions in different styles, nor a number of patterns by various artists; all the work is exceptionally good, and is due to Mr. Morris himself we believe.

Ceiling decoration has of late been largely developed, owing to the introduction of features in Elizabethan and later styles. Messrs. Jackson and Sons, of Rathbone-place, do probably the largest business in this way, in the Italian Renaissance, the Adams, and other styles. The firm have in hand the elaborate ceilings for Kenhill, Norfolk, from designs by Mr. J. J. Stevenson, whose interior we lately noticed in the exhibition at Burlington House. A rich design, composed of spreading stems and foliage, with flowers of conventional form, cover the ceiling in low relief in one case, while for another room the style is more Classical. We find the Adams treatment adopted with an octagonal panel and wreaths in the angles, with festoons and other devices of the style. Messrs. Jackson and Graham, close by, are engaged upon a ceiling for Mr. Brunell, Westmoreland-terrace, in which an Elizabethan treatment has been adopted. The panels form geometrical figures in low relief, and an enriched cornice surrounds the room. Low relief and subdued light tints are becoming the style again, if we may judge from the indications to be found in new buildings, and probably no desire to return to the Elizabethan or Stuart age, will supersede the chaster design and treatment of the Adams Brothers and the Wedgewood-like plaques of colour introduced into the ceilings of the end of the last century.

Those who have a taste for Japanese furniture will be interested by a visit to the show-rooms of Messrs. Holland, Mount-street, Grosvenor-square, where a bedroom suite of furniture of rather unique design is to be seen. The suite consists of a wardrobe, pedestals, a toilet-table, and chairs, chief material being walnut. The wardrobe is particularly worthy of notice, for its commodious size and extreme simplicity of style. It is divided into three panels or cupboards; the centre has a mirror, and is carried up a little higher than the side divisions. These are surrounded by a plain reeded moulding, which is rounded at the upper corners and carried down to form legs. In the side doors the framing has been cleverly adapted to receive painted panels of Japanese workmanship. The subjects are representations, drawn in the quaint conventional style, of frogs, birds, and foliage, and these are painted in low relief upon light and dark wood of handsome grain. Open or pierced bracket-pieces or ramps are introduced at the upper angles, and between the legs, and the whole design is in good keeping. The handles and hinges are of nickel-silver. The toilet-table and glass is designed in harmony; there are lockers on each side of the mirror, kneehole and cupboards in the form of pedestals below the table and drawers. The chairs are exceedingly light and simply-framed, the mouldings in all cases consisting of reeds. We also noticed a wardrobe and chest of drawers combined, with glass on one side in which disc-shaped panels with carvings are introduced, and a light peartree-wood plaque of foliage in low relief over the doors. Sideboards are generally exceedingly heavy and overwrought pieces of furniture, but Messrs. Holland have one on view of quiet Classical design, of mahogany decorated with inlays of satin-wood, &c. In the centre is a mirror with a pediment over it, and side-shelves. Another we saw, of more costly and elaborate character, was made of the finest Spanish mahogany, with marquetry of satin and tulip-wood, &c. The sideboard has rounded corners, and is enriched at the top with festoons in inlaid work, after the style of Sheraton, and in a thoroughly Louis Seize taste. This work is, we understand, a close copy from an old one, but in beauty of execution the workmanship is even superior to that of the old. The firm have a large assortment of other furniture in all the fashionable styles of art design; their wall-decoration, an admirable substitute for painted decoration, we have before called attention to, and those who are about to furnish their houses artistically cannot do better than pay a visit to the extensive showrooms of this firm.

A very superb example of decorative furniture has lately been brought to our notice. It is a grand pianoforte, executed by Messrs. John Broadwood and Sons, of Great Pulteney-street, enriched by painted subjects by Mr. E. Burne-Jones. The name of the accomplished artist is sufficient to stamp this work as something above the ordinary kind of decoration, and without doubt the design and treatment of colour display an originality of conception equal to anything we have seen of Mr. Burne-Jones. The case of the instrument is of oak of the usual form, but it rests on a stand of antique construction. The inside of the case surrounding the instrument is richly gilded, the soundboard is painted with sprigs of roses, and the ironwork, or frame, is relieved by a diaper of very simple and characteristic pattern, the colours here being bright; but the piano-lid has afforded the artist a splendid opportunity for displaying his powers as a decorative painter. The inner surface of the lid shows a beautifully-painted allegory representing "Earth, Mother of Good and Evil," in a scrollwork of blue foliage, among the branches and tendrils of which appear children—Gluttony, Mischief, and others of virtuous character. On the upper side is a Muse, introduced amid sprays of evergreen, with a scroll, and a poem in praise of Spring, the whole composition being painted on a grey ground. The sides of the instrument are painted with a series of circular panels, telling the story of Orpheus, the mythical poet of the Greeks. Beginning at the key-end of the piano, we have a trio of circles united, representing Eurydice, Proserpina, Pluto, and Orpheus; others showing incidents in the story, as Orpheus enchanting with the strains of his lyre, winning back his wife Eurydice from Hades; while at the end of piano is a panel showing the death of Orpheus, his body surrounded by the Muses. These subjects, in all eleven, are painted with telling power and feeling; the figures are graceful, the drapery hangs in numerous folds, and the colouring is neutral in tone. Between the circular medallions are plain panels in two or three shades of neutral brown, which fill up the sides of the instrument, and the whole has a striking and harmonious effect of colour and design, which places it considerably above the work of the ordinary decorative artist.

Norwich has been selected as the head-quarters for the annual excursion party of the Architectural Association this year. The dates fixed are from the 16th to the 21st of August. Those members who propose joining the party should send their names to Mr. C. R. Pink, 22, Great George-street, S.W., the hon. sec. for the excursion.

THE MANUFACTURE OF PORTLAND CEMENT.

No. 3.—GRINDING THE CLINKER, AND PREPARING THE CEMENT FOR MARKET.

(*Continued from page* 621.)

WHEN the kiln has been perfectly burned, and its contents converted into a clinkered mass, a short time is allowed for cooling, when the bars or grating at the bottom are withdrawn, and the whole mass drops down into the drawing, or kiln hole.

If the kiln has been carefully filled with good-proportioned, well-mixed slurry, and the requisite amount of fuel used, there will be little, if any, of the burned product which may not be used for grinding into powder; Generally speaking, however, the top, and sometimes a portion of the bottom, are imperfectly burnt, producing both yellow and "pinky" pieces, which are comparatively worthless, and, if mixed with the clinker, produce a powder of dangerous character. The influence of imperfectly-burnt raw material is to impart a tendency to expansion in any mixture with which it may be incorporated. Although the proportions of the clay and chalk may be accurate, and their mixture irreproachable, still the yellow or pinky pieces have not been sufficiently burnt, and, therefore, neither has the desired silicated result been reached, nor the carbonic acid gas completely expelled. Such portions of this faulty description are readily picked out by the experienced workman when time is allowed him to devote the required attention to the task. In most cement works, however, the position of the drawing-holes of the kiln are imperfectly lighted, and that, together with the dust from the small pieces, caused by the handling and shoveling of the dried slurry on the drying-plates, makes it difficult to pick out these objectionable and dangerous pieces. The contents of a kiln, when being drawn out or emptied, indicate, by its appearance, the character and quality of the cement which may be expected, when ground. Until quite recently, the first knowledge of an imperfect mixture appeared at the kiln-hole, when the clinker was taken out, and a hurried sample made. Better arrangements now generally prevail, and the sample, kiln, and preliminary tests are more in requisition than formerly.

The contents of a kiln, which have been burnt from an overclayed mixture, generally dusts freely, and the clinker remaining after the spontaneous elimination of the dust by the action of the air is exceedingly hard. But in an immoderately over-clayed mixture, the whole contents of the kiln are speedily reduced to powder, which, when mixed with water, frequently sets quickly, and maintains its normal form in water, but never reaches any high indurative value. The colour of such a mixture is brown, and resembles in appearance and character some of the ordinary qualities of Roman cement. An over-limed mixture requires a greater amount of fuel to burn it, and the appearance of the clinker, when drawn from the kiln, is dark, almost black, in colour, exhibiting shiny or glazed surfaces when fractured. Such quality of clinker produces a cement rough to the touch, slow in setting, and incapable of withstanding the action of water. Sometimes the amount of excess of lime is so trifling that by exposure to the air, and frequent turning, the cement becomes "purged," as it is technically described, and may be used with comparative safety, more especially if it be finely ground and mixed with large proportions of sand, or other aggregates, when being used in building. The true Portland cement clinker resembles neither of the two kinds we have described, but is of a bronze or greenish tint, somewhat porous in texture, and breaks freely, without producing much dust. The powder, when mixed with water, sets moderately quick, and, when exposed to the action of water, withstands its decomposing influence.

From the character of the mixing or combining operation, it is seldom that, with those precautions which now prevail, the clinker is invariable in quality. In extensive manufactories it is the practice to tip the clinker, when ground into powder, in layers on the floor of the cement warehouse, so that when the finished heap has to be filled into sacks or casks, a fairly-blended mixture will have been secured. Such a means, however, of overcoming blunders of initial manufacture is not to be commended, for it indicates, when the necessity for its practice occurs, that some defect in management exists.

The clinker is wheeled, elevated, or otherwise conveyed to the crushing machinery, which is now generally a Blake's stone-breaking machine or rollers, both serrated and plain. From this point the clinker, when crushed to the desired size (fractural dust and all included), is elevated direct to the hoppers of the horizontal millstones. French burrs of a special kind are generally used in the building of the millstones, and the size or diameter of those employed range from 4ft. 6in. to 5ft. in. diameter.

The arrangement of machinery for grinding, now prevailing in the London district, is somewhat primitive in character, and generally consists of a reducer of some kind to prepare the clinker for the horizontal millstones. When passed through the stones the resulting powder is wheeled to the warehouse, and acccumulated ready for putting into packages, after due seasoning. Under the present system of manufacture, the heaps so arranged are tested in a somewhat arbitrary manner, according to the taste or intelligence of the controlling agent of the works. Excessive testing is by no means the practice, and a dozen or two briquettes broken in a day are considered sufficient as a guide, and those are usually confined to the finished product. It would be regarded as insulting to test at each stage of the manufacture; for the practical manager and his faithful henchmen, the wash-mill men, have full confidence in their manipulative dexterity to mix and wash correctly. Any errors in manufacture must have arisen at other stages of the process, and is generally ascribed to all manner of causes, such as "badly burnt," "badly ground," "too much dust," "too little dust," or anything else that may occur by the way of excuse or remonstrance.

From whatever cause, however, the cement, on leaving the kilns is beyond cure, for, if bad, no subsequent treatment can possibly make it a *good* or *pure* Portland cement. Therefore it reaches the crushers with all its shortcomings, and after passing through them, is raised by elevators to the hoppers of the millstones. The crushing agency, of whatever kind, is placed on the bottom floor of the grinding-mill, and its position so arranged that its output can, by means of horizontal screws or creepers, be taken to any desired point in the hopper floor of the works. If the process of crushing is performed by a Blake's machine, a large amount of fractural dust is produced, which passes on to the hoppers. It would be better if such fine dust could be withdrawn from the bulk, for its presence in the millstones is rather injurious; at all events, it does not require grinding, and, in our opinion, interferes with the profitable reduction of the larger pieces, by interposing itself between the rough surfaces of the broken pieces of clinker. The cost of preparing the clinker for the millstones is very fluctuating, and depends on the character of the reducer, and the speed at which it is worked. Rollers (plain and serrated) are still used in some manufactories; but the difficulty experienced in maintaining their surfaces true adds greatly to the cost of working and controlling them. The produce from the millstones is, to a great extent, influenced by the size of the pieces of the clinker delivered into the hopper. Before the introduction of preparatory machines, and when the clinker was broken by hand, it was necessary to have what is technically called a large amount of throat, or swallow, in the running or upper millstone. Such an arrangement was imperative, because the size of the pieces sent to the hopper were too large to be beneficially acted upon by the flat, or rather furrowed faces of the millstones. The swallow was intended to reduce, by a kind of conical action or arrangement, the rough pieces before entering between the true grinding surfaces. The extent of the swallow, from its unavoidable position, interfered prejudicially with the profitable action of the stones, for it absorbed a large amount of the stone's surface, and so limited the extent of the "skirt" dress. Besides the waste of power and capacity of reduction there was another disadvantage which was inevitable under such circumstances, namely, the difficulty, if not impossibility, of getting a powder fine enough in quality. Hence, until recent years, the cement, in England especially, was very coarse and rough in character.

The introduction of intermediate reducers has altered the whole system of grinding, and we are now able to command, comparatively speaking, fine cement without any very extraordinary effort on the part of the manufacturer. The quality of extra fineness of powder is one which receives but little encouragement from cement-makers, for it involves, under existing arrangements, more cost to them than they consider desirable or, indeed, requisite. This important question, however, travels somewhat beyond their control, and must receive its eventual solution at the hands of consumers. That finely-ground cement — other necessary conditions being secured—is an advantage cannot now be controverted, and it is only a question of time, when the whole subject will adjust itself to meet the difficulties now unhappily prevailing. If fine cement must be found, and all consumers are unanimous, the manufacturer will then readily meet whatever reasonable conditions may be imposed upon him. Until, however, engineers, architects, and builders are in accord, and mutually agree on the lines by which they intend to travel, no cement-maker can be expected to provide for an amount of discordance as to what are the real tests and conditions of supply. At present, cement-makers are compelled to provide against the most varying specifications and, we might almost say, whimsical conditions.

The grinding division of the cement-manufacture can only be regarded as a mechanical one, and no influence through its agency can be imparted of a beneficial character except that of fineness of powder. Some very enlightened and old-fashioned makers proclaim that to over-grind cement is to "kill" it. Some reason attaches to this notion from the fact that cement of excessive fineness does not realise so high tensile values as a coarse cement. But we think the idea is not adopted from the cement being too fine, but rather because grinding it by the ordinary method exceedingly fine means to a large extent grinding the burr stones too. There is no other process recognised at present for effecting fine results but by keeping the faces of the millstones close together. That reprehensible practice is not only a most expensive one, but it introduces by its practice another factor of danger in the shape of increased frictional warmth, and it is this heat which must be credited with the blame of "killing" the cement.

Fine cement is obtained in Germany very economically by a sensible system of grinding

followed by a sifting process. Cement very much finer than anything we are accustomed to in England, is supplied readily, and the cost of so doing not much increased. In one of the most advanced cement works in that country the system at present in vogue is to elevate the clinker to the highest point in the grinding-mill, where it is deposited in hopper above the rolls. These rolls are of three sizes, and gradually reduce the clinker so that when it emerges from the finest or lowest pair of rolls it enters the hoppers of the millstones. This subdivision of the means of reduction is attended with excellent results, and without imposing an undue strain on any of the series of rolls. The clinker is reduced to such a size as to insure its being ground at the lowest cost and with the best results. The dress of the millstones is of an S form and very little if any swallow is provided for thus securing the most profitable arrangement of maximum skirt. The cement is not finished when it leaves the millstones, as at that stage it is too coarse for use. From the spouts of the millstones it falls into revolving sieves, where the coarser particles are eliminated, and raised again by elevation to the millstone hoppers and re-ground. From the time the reduced clinker leaves the lowest tier of rolls it is not again seen until it emerges from the sieves, to be packed in casks and removed to the warehouse for immediate shipment. The guiding mind of such a manufactory feels satisfied that the whole of his daily produce is of uniform weight and quality, for he had secured both by the care and attention he had bestowed on the initial operations of his industry. The manager of such a works has an advantage over his troubled brethren in this country, for he will not make cement for any engineer or architect with a "bee in his bonnet," but limits his thoughts and exertions to the standard quality, unanimously agreed upon by consumers in Germany. Uniform weight (112lb. per bushel), uniform fineness (3 per cent. rejected by a 2,500 mesh sieve), uniform tensile strength (not less than 500lb. per square inch), and all apparently produced with an accuracy which fully recompenses for the care and trouble expended in its realisation.

A manufactory such as that we have described has no warehouse, upon the floors of which are deposited in careful layers the produce of each kiln, to provide against accidents of careless or blundering manufacture, neither are there "bins" where different qualities are carefully seasoned and their diverse contents certified by the agents of this or that engineer. In fact, the visitor to such a works sees no powdered cement at all, and, indeed, scarcely any dust, for all the machines are carefully clothed or boarded, so that all passes to the market through the sack or cask. There is a striking dissimilarity between an English cement-work and such as that referred to, and in addition to what has been said, we should observe that no gas-coke is used, neither is there any attempt to utilise the waste heat of the kilns, and the materials (chalk, marl, and pit clay) are not by any means equal in quality to the chalk and clay of the Thames or Medway.

The system of manufacture which produces these satisfactory results differs but little in character from that originally practised by Aspdin. Thus, the coke is made in ovens, and the slurry dried through their waste, or surplus, heat, and the kilns, are similar in point of form, but somewhat larger. It is in the details, however, where increased accuracy is secured. Not one of the subordinate points of the processes are clumsily or carelessly performed. The slurry is converted into convenient brick forms, and the coke is carefully broken to a uniform size. Thus, no dust of raw material, neither is small coke, introduced into the kiln, to disarrange its accurate combustion, or prejudicially affect the quality of its well-clinkered contents. As far as possible, therefore, every precaution is taken to secure good results, and, although, perhaps, the extra cost incurred in doing so is considerably increased, it secures a good, reliably uniform quality of first-class Portland cement.

Hitherto, a strong prejudice has prevented the use of sieves for securing fineness, owing, no doubt, to the absence of the proper form of sieve, and the want of knowledge as to the speed at which they should rotate. Oscillating sieves have been experimented with, and all kinds of wire used; but the wear-and-tear was too considerable to warrant their adoption for cement-making purposes. Finely perforated, specially prepared steel plates have, however, been used for sifting with much success, and, when the speed of the rotating sieve has been carefully regulated, much of the objections to expense which usually attends this part of the process has been overcome. Some cement makers believe in reaching the desired points of fineness by double-grinding; but any results from such an arrangement must result in disappointment. Even if the cost incurred in wear and tear of millstones were disregarded, it will be found that evenness and regularity of finish of the powder is practically impossible, owing to the difficulty of securing an invariably parallel distance between the faces of the millstones. Another difficulty against advance (?) in this direction is the caking of the powder from the heat caused by the too-close contact of the grinding surfaces of the stones.

Some theoretical cement-makers have suggested that the clinker should be stored some time before being used, and, by this means, it would slake, and be more readily ground. To keep clinker would be simply to increase the difficulty, for, however carefully stored, it would absorb moisture, and add to the dangers of caking during its passage through the millstones. Those who advocate the use of such a remedy lose sight of the important fact that to accumulate clinker would, while securing no advantage, greatly increase the cost of manufacture. We have shown that the whole operation of reducing and grinding should be continuous, and that no interruption of the process is desirable, not even to accumulace powder in a warehouse. What is so succcessfully practised in other countries is now almost impossible in England, for many reasons, and, amongst others, the reprehensible practice of some engineers and architects specifying that Portland cement is to be kept for weeks, or even months, before being used; while others again insist upon cement being used fresh from the kiln. A variety of purposes also demand varied qualities to suit the circumstances of each consumer, such as the "ship cementer," who requires a quick-setting cement to meet the difficulties of using it in a position unavoidably low in temperature, and in which no external beneficial influences can be secured. Such exceptional uses to which cement is applied need not prevent its improvement to meet the wants of advanced constructive engineering and architecture, which are of paramount importance in this question.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE closing meeting, for the present Session, of the Institute was held on Monday evening, and was marked by a large attendance. The President, Mr. John Whichcord, occupied the chair. The following new members were elected:—As Fellow: Vincent John Grose, of Railway-approach, London Bridge; as Associates: Geo. D. Stevenson, of Alexandra Villas, Hornsey-Park, N., and Edward Vigers, Parliament-street, Westminster. The President announced that the Council have decided to establish a Charitable Fund, which will be managed in connection with the Architects' Benevolent Institution; the members of the Council, and other friends, have already subscribed towards the new fund £180. Mr. MOCATTA, as one of the oldest managers of the Architects' Benevolent Institution present, expressed the satisfaction he felt at the new step taken for helping the less fortunate members of the profession.

ARCHITECTURAL EXAMINATIONS.

The Secretary (Mr. WHITE) read the report of the examiners on the recent architectural examination. Ten gentlemen presented themselves for examination in the preliminary class, and ten in the proficiency class, and the following gave satisfaction:—Proficiency class. Passed in both sections.—P. J. Marvin, of London; Frank Johnson, Nottingham; H. R. Kemp, Bowden, near Manchester. Passed in Scientific Section.—F. T. W. Goldsmith, Newport, Mon. (passed in Artistic section last year); Joseph Hall, Leeds; L. G. Summers, Nottingham (passed in Artistic section last year). Passed in Artistic section.—W. R. Thorpe, Leeds; J. B. Gass, Bolton (passed in Scientific section in 1877). Thus Messrs. Gass, Summers, Goldsmith, Kemp, Marvin, and Johnson had fully passed, and were entitled to receive certificates. Preliminary class, passed.—E. H. Dance, Farnham; J. E. Kingham, Farnham; E. G. Dawber, Lynn; E. Herbert, Brixton; and R. Elsey Smith, Forest Hill. The examiners considered that the work of the candidates had been fairly well done, but they were unable to recommend any one candidate as specially deserving of the Ashpitel prize. The comparative failure was not in want of knowledge or of skill, but was shown as much in the drawing as in other work. Professor DONALDSON expressed satisfaction that so many young men had come forward from the provinces, and had distinguished themselves in science at the examinations. The SECRETARY read a series of recommendations from the examining body, with reference to the future. They reported that it was desirable that the voluntary architectural examinations be again held in 1881; that they should be based on the same lines as the obligatory examinations which would come into force in 1882; and, lastly, that it should be arranged that those candidates who have passed either in the scientific or artistic section, should be allowed, in 1882, to enter in the remaining section, but that all other candidates be required to go through the whole examination.

PRESENTATION OF THE ROYAL GOLD MEDAL.

The PRESIDENT said the time had now come for the most interesting proceedings of the evening—that of the presentation of the Royal Gold Medal, which the Council had, with the approval of the members and of the Queen, decided to award to Mr. John Loughborough Pearson. The President continued: Perhaps, to many here present, it will be mere supererogation for me to state why and wherefore Mr. Pearson is entitled to this compliment, the highest that the Institute can bestow upon anyone, either within or without its ranks. That a few will be glad to hear something about him has been proved to me by a slight but amusing incident which occurred only the other day. I chanced to overhear, quite involuntarily, a conversation between two architects on this very subject. One complained that the Royal Gold Medal was this year to be given to a Mr. Pearson, of whom nobody had ever heard, and whom nobody knew; while the other, who had written to a newspaper for information of this Mr. Pearson, declared that the Council chose him because he was one of themselves. Not being an impulsive man, I did not thrust myself upon those two gentlemen. But had I asked them whether, some thirty years ago, when the architecture of the Middle Ages was not understood as it is now, they remembered the erection of the Church of the Holy Trinity at the foot of Vauxhall-bridge, or the Church of St. Peter, built some seventeen years ago at Vauxhall, I am quite sure they would have declared themselves familiar with both. They would have known, notwithstanding the hugeness of London, the Church of St. Augustine at Kilburn, and the new Church of St. John the Evangelist in Red Lion-square. But the fact is, they had not cared to inquire who the architect of those works was, and he had never, even in these pushing enterprising days, ostentatiously identified himself with those buildings; or loosened, even for a moment,

the old-fashioned bond of modesty and merit. I happen, however, to know that when this church I have mentioned—the Holy Trinity, Westminster—was rising, the future success of its architect was predicted by no less an authority than Augustus Welby Pugin. He was a frequent visitor during the progress of the works, which he considered to be in advance of anything then accomplished under the Gothic revival. Indeed, commencing, as Mr. Pearson did, his professional career in sight of the towers and almost within the walls of Durham Cathedral, his natural abilities were early consecrated to the study and practice of Mediæval architecture. An Associate of the Royal Academy, his promotion to the higher grade is necessarily at hand. Architect to the Abbey of Westminster, to the cathedrals of Peterborough and Lincoln, he has just seen laid the foundation-stone of Truro Cathedral, about to be erected from his designs and under his direction; and thus, silently and perseveringly, a proud and an enviable position had been surely attained. I present you, Mr. Pearson, with the Royal Gold Medal, as a tribute not only of just admiration for the noble works of architecture which you have designed, but also of sincere respect for your professional and private virtues.

Mr. PEARSON, A.R.A., who was greeted with continued and hearty applause, spoke with evident difficulty. He said, Mr. President and gentlemen: I never felt more embarrassed in my life than at this present moment. I am quite unable to express my thoughts and feelings. I know not how to thank you for having bestowed on me this compliment. I hope you will be content to receive my hearty thanks, and to believe they are accompanied with very warm feelings. To her Majesty I owe my thanks for having been good enough to adopt your recommendation in presenting this honourable token and distinguished mark. To you, gentlemen, I owe my heartfelt thanks for the way in which you have received me, and this evening will be ever remembered as something to have worked and laboured for, something never to be forgotten.

The Right Hon. A. J. BERESFORD-HOPE, M.P., said he felt most happy and honoured in being able to join his brethren of the Institution giving congratulations to Mr. Pearson, and to express his sense of the wisdom and instinct the Council had shown in making this recommendation. He had learned alike of the difficulties and delicacy of the choice the Council had to make during the two years which he had the honour of occupying the chair of the Institute. This year the choice had been almost too perfect; for, like the Eastern king of old story, a Council learned to tremble when all spoke well of it, and yet what ill could befall them when they selected for the medal such a man as Mr. Pearson? He was himself one of those who had fought, if, not shoulder to shoulder, at least, a little behind Mr. Pearson, in defence of the glories and grandeur of our Mediæval architecture. To *ars Gothica* had Mr. Pearson ever been faithful, never having yielded like some others to the smirks and leers of the romps of naughty Queen Anne. Indeed, he did not think Queen Anne *was* dead; there was a German story concerning a man who lost his wife and raised her to life again by necromantic arts, only to find himself wedded to a vampire. So it seemed to be with Queen Anne, whose advocates claimed the right to combine in their "Free Classic" the rigid lines, just proportions, and subtle entasis of the Parthenon, with the broken pediments and irregular gables of Amsterdam. Mr. Pearson had not built new streets in Chelsea or in Brompton, or anywhere else, but had designed the Cathedral of Truro, and when it was built, whether or no Providence saved the architect's life to lay the topmost stone of the spire, as Wren was spared to lay that of his dome at St. Paul's, future generations would give credit to the architect for a design which in material size, visible grandeur of form and material, and beauty of design approached the older cathedrals. Having referred to the church at the foot of Vauxhall-bridge as a building in which dignity, majesty, and grace were combined, Mr. Beresford Hope said if he were to blame Mr. Pearson it would be that in his subsequent work he had not produced a better church in the next style—that transition from the Second Pointed into the Third, that graceful ogee style which foreigners took up and vulgarised into the Flamboyant. He trusted the next cathedral Mr. Pearson designed would be in this style, of which Exeter was an excellent model. Then Mr. Pearson developed the beauties of French Gothic, but did not follow these to extremes of heaviness, in his later well-known and highly-original Church of St. Augustine at Kilburn. Indeed, in his three churches of St. Peter, Vauxhall, St. Augustine, Kilburn, and St. John, Red Lion-square, they had a trilogy of beautiful and appropriate buildings. Truro Cathedral would, he believed, be an honour to our times, and the name of its architect would hereafter be amongst the foremost in the land.

PRIZE DISTRIBUTION.

The President then made the annual distribution of medals, prizes, and certificates as follows:—Pugin Travelling Studentship (£40 with certificate): awarded to Leonard Aloysius Scott Stokes; Medals of Merit: Frederick Hemings and Mark John Lansdell. The Soane Medallion: Edward Harnor; Medal of Merit: Charlet Edward Sayer; Certificates of Honour: Sydenham W. Richards and Frank T. Baggallay. The Tite Prize (£30 with certificate): Leonard Brisbane Broun. The Grissell Gold Medal: Jasper Wager. The Institute Silver Medal and Five Guineas (Drawings): William Niven. Certificates of Honour: Arthur Percy Gunston, Herbert Goodall, and R. Douglas Sandilands, of Glasgow. The Institute Silver Medal and Ten Guineas (Essays): George H. Blagrove; Certificate of Honour: T. R. Hooper; Honourable Mention: Laurence Sayer.

Professor DONALDSON called attention to some beautiful specimens of gilded and embossed leather hangings exhibited on the walls of the room. He said he had purchased these hangings, which dated from the fifteenth and sixteenth centuries, in the Pas de Calais, and in Belgium, many years ago, and begged leave to offer them for the acceptance of the Institute, as illustrations of wall-decoration. In reply to a vote of thanks for this unexpected gift, which was heartily adopted, on the motion of Messrs. Street, R.A., and C. Barry, the veteran professor expressed his gratification, remarking that, from its very commencement, he had taken a deep interest in the Institute, and this would continue throughout the remainder of his life, short, now, as it must be.

THE LION OF CHÆRONIA.

Professor DONALDSON then read the following communication from M. Lysandros Kaftangioglou, hon. and corr. member, Athens:—

I hasten to give you very interesting news in reference to the ancient history of Greece and to Art also. You know well the Lion of Chæronia consisting of different hollow blocks of stone, held together by iron cramps. The greater part of the description of travellers were hitherto erroneous and inexact. Some said that the lion had been blown to pieces by powder. It appears, on the contrary, that it had fallen to pieces (having been constructed after the burial of the bodies) through the bad construction of the foundations and the badness of the material of which the pedestal is composed, it being a friable stone. You know that the Archæological Society had decided to set up the lion on its old pedestal, of which there existed only the underground part. But before undertaking the work, they ordered excavations to be made around the pedestal (which they then believed to be complete in itself), and which had been set up as an honorary monument to the brave heroes who had died for the liberty of Greece. But this operation brought to light the fact that the pedestal of the lion formed an essential part of a parallelogrammatic inclosure, 23·50 metres long, by 14·92 metres wide. The Society then ordered the excavation of the whole inclosure of the Peribolus, which was scrupulously carried out by the inspector, clearing away the soil to the lowest course of the pedestal, and even a little lower all around the foundation. This, however, brought nothing to light except six small buttresses projecting interiorly from three sides of the inclosure. The Society having expended 7,000 francs (£280) in this operation, were discouraged by the absence of any discovery to counterbalance the expense, but they decided, before undertaking the setting-up of the lion itself, to examine and verify the existing parts, and to study how it had been put together originally. M. Phytales, one of the best sculptors of Athens, was charged to make further researches, particularly of the artificial soil of the foundation of the pedestal and in the middle of the inclosure, and on digging 18in. below the previous openings bones were discovered and skulls. Other holes were then made at six different points, and skeletons were found placed parallel one to the other and covered with a blackish earth, arising probably from the decomposition of the bodies, and the skeletons solidly adhering to the soil. In one of the holes an iron lance was found, and a strigil used by bathers to clear off the perspiration from the skin. In others were pieces of ivory and bronze buckles. This unexpected discovery proves that the inclosure was nothing else than the polyandrion, or cemetery, in which had been interred the remains of the brave heroes killed at the battle of Chæronia. We hope to find many interesting objects among the skeletons, and possibly an inscription, indicating the precise epoch of the erection; for as yet no inscription has come to light. But we are assured that the famous lion of Chæronia was part of the funereal monument of the dead heroes. I have to tell you that M. Condostarlos, president of our Archæological Society, has just been appointed our ambassador at London. He is highly respected here, and a great partisan of the liberal policy of your great Canning.

Professor DONALDSON suggested that the president should call upon M. Condostarlos, the new Greek Chargé d'Affairs, and request him to be the medium of communication between the Institute and the Archæological Society and architects of Athens. The president promised to adopt this course, and closed the session by a formal adjournment till the first Monday in November.

THE ANNUAL REPORT OF THE METROPOLITAN BOARD OF WORKS.

THE report recording the work carried out by the Metropolitan Board of Works during 1879 is a thick post octavo of 176 pages, treating upon a wide variety of subjects. In a ratio with the increased, now multifarious, duties laid upon the board so the expenses grow, and the budget for 1879 deals with an expenditure of £3,341,592 3s. 8d. Under the title of "Sewerage and Drainage" reference is made to the measures adopted to prevent flooding in Battersea, and to drain the Balham district. This consists of the extension of a main sewer 7,357ft. in length, and 5ft. by 3ft. 4in. in diameter, from the Bedford Arms, Clapham-road, through Balham, to near Tooting-common, at a cost of £18,000; the increase of pumping power at the Crossness pumping station, and the provision of engines and pumps at the Falcon Brook and Effra outlets. New sewers have also been provided in Kilburn. The board have, however, determined on more extensive works of storm relief and sewering for the metropolis, estimated to cost in all £708,000, of which the largest items are £196,000 for storm relief line for the Ranelagh and King's-scholars-pond sewers, and £170,000 for intercepting sewer from Putney to Clapham, and these works will be carried out with as little delay as possible. During the year plans for 46 miles of sewers, varying in size from 5ft. by 3ft. 4in. in brickwork to 6in. pipe, were submitted to the board by vestries and district boards, and in addition 495 branch sewers were connected with the main sewers under the superintendence of the board's officers. The Thames Floods Prevention Act, passed last session, is epitomised, showing that all works necessary to prevent the overflow of the Thames within the metropolis are to be done by the owners of premises in accordance with plans prepared or approved by the board, the board to carry out the works if the parties liable neglect or refuse to do so within 28 days, allowing disputes to be settled by a standing arbitrator. Under Street Improvements it is mentioned that the 17 plots remaining of the 78 into which the surplus land on the Chelsea Embankment was originally divided, have been let to one tenant, but that no fresh lettings have been effected in Northumberland-avenue, in which only 8 out of 31 have been disposed of. The Wapping and Shoreditch improvements have been completed during 1879—the first by the widening of Lower East Smithfield, the second by the formation of a new road from High-street to Bethnal Green-road. Of the street improvements to be effected under the Act of 1877, the Mare-street, Hackney, and

the Angel and Goswell-road widenings have been completed, those in Jamaica-street and Union-street, Bermondsey, were commenced; and property trusts and interests have been purchased for the Oxford-street to Piccadilly-circus, the Coventry-street, the Gray's-inn-road (since partially carried out), the Tooley-street, the Camberwell and Peckham, and the Deptford-bridge improvements. Under the Artisans' Dwellings Act only one official representation was received during the year, that relating to an area in Limehouse. The eastern Limehouse and Whitechapel area, between the Royal Mint and Upper East Smithfield, was sold to the Peabody Trustees for £10,000; the Old Pye-street and Great Peter-street, Westminster, the Pear-tree Court, Clerkenwell, and the White-cross-street areas have also been sold to the Peabody Trustees; the Little Coram-street scheme is being carried out with the co-operation of the Peabody Trustees and the Duke of Bedford; while the Bedfordbury, Great Wild-street, and High-street, Islington, schemes have been settled, and since the report was drawn up the sites have been cleared. The report states that "the cost of the schemes which have been carried into effect has hitherto largely exceeded the estimate. On the six areas which have been sold to the Peabody Trustees, it is estimated that the Board will lose the large sum of £643,461, which, however, will be reduced by about £81,400, the value of the land retained for recoupment." The Board will not prepare any more improvement schemes until experience has been gained of the working of the Amendment Act of 1879, by which the scale of compensation is reduced where the property has become so unhealthy as to become a nuisance, and also enables accommodation for displaced persons to be provided in some other locality than the condemned area or its vicinity. The freeing of the second division of metropolitan bridges, consisting of Lambeth, Vauxhall, Chelsea, Albert, and Battersea bridges, from toll, and their opening on the 24th May last by the Prince and Princess of Wales, is referred to, and it is added that the remaining three bridges, those of Wandsworth, Putney, and Hammersmith, will be freed before the end of the first half of 1880. Regret is expressed at the failure of the Tower High Level Bridge scheme. The open spaces available for recreation, and which are under the control of the Board, were increased in the year by the addition of Wormwood Scrubs, a piece of common land 193 acres in extent, raising the total area under the Board's management to 1,676¾ acres. Extensive drainage works have been in progress on the wettest part of Clapham-common, some 85 acres in extent, at a cost of £1,600, and Plumstead Common has been improved, and a military portion fenced off. The strength of the fire brigade at the close of the year is reported at 452 men of all ranks and 52 fire-engine stations, one movable station, 113 fire-escape stations, 4 floating stations, 106 miles of telegraph lines, 130 fire-escapes and scaling-ladders, 37 steam and 118 manual fire-engines. The fires of 1879 show an increase of 59 on those of 1878, but the proportion of serious losses, 159 to 1,559, is unusually favourable, and the chief officer expresses the opinion that the value of property destroyed by fire in London during the past year was less than in any other year since the formation of the brigade. Reference is made to the extension of the electric-lighting experiment on the Victoria Embankment, from 20 to 50 lamps, and to the fact that the additional light is obtained with the engine and magneto-electric apparatus previously in use. The question of water supply is alluded to tentatively, Mr. Cross's unfortunate scheme not having been developed at the period of the report; but it is mentioned that the water companies are gradually giving effect to the provisions of the Metropolis Water Act, 1871, as regards the establishment of a constant supply. The new tramway schemes were last year unusually numerous, but only one obtained a provisional order from the Board of Trade, that of the North London Suburban Tramway, and three others obtained Acts of Parliament—the London Street, the South London, and the Southwark and Deptford Tramways schemes. By an Act passed last year, provisionally sanctioning the use of steam-power on tramways, it is now competent to any tramway company in the metropolis to apply to the Board of Trade for a licence to use mechanical power, after having obtained the consent of the Metropolitan Board of Works and of the vestries and district boards concerned. A summary is given of the district surveyors' returns for 1878, showing that in that year 10,445 new building operations and 8,350 additions and alterations occurred, the gross fees received being £21,553 18s. 4d. and £10,400 7s. 7d. respectively. During 1878 fees amounting to £1,496 2s. 6d. were remitted or lost, and the office expenses of the district surveyors for the same period is stated by them to amount to £8,976 15s. 9d. The value of the 64 districts varies considerably. The gross fees received in 37 districts ranged from £98 to £583. In two of those districts the receipts did not amount to £200, in seven the receipts were less than £300 each, in three less than £400 each, in 11 less than £500 each, and in 14 less than £600 each. In 24 other districts the receipts ranged from £605 to £3,416.

NOTES FROM EDINBURGH.

ANYONE who wishes to see Edinburgh at its best should see it now, when westerly breezes have returned with sunshine, and the verdure of the early foliage. The authorities charged with the supervision of the public parks and gardens, have been lately making a judiciously liberal outlay in their department. Acting on the advice of the old Scotch laird who told his hopeful heir to be aye putting in a tree, as it would be growing when he slept, a great many ornamental trees have been planted where they were much needed. All along the south side of the Regent-road, which forms the principal approach to Edinburgh from the east, the pedestrian has the prospect of a cool avenue of shade, instead of the noonday glare and heat. The northern side of this thoroughfare is well clad with the trees and shubbery of the terraces which crown the tail of the Calton Hill, and Brankfield Links, the golfing park of the city has, from time immemorial, had too much the aspect of an ill-tended village common, but its limits are now well defined by a selected variety of forest-trees. Clumps of trees and shubbery are placed at corners, and the only road for carriage traffic which traverses the park has also been bordered with trees. The same experiment has been attempted in the Lothian-road, where a broad strip of soil, not required for the foot-pavement or the thoroughfare, has been planted, and now shows a goodly line of green. The plants, which may be about 15ft. or 20ft. in height, appear to be very healthy, although their growth probably can never be very vigorous or make their proportions an inconvenience to the street. The recent improvements effected in Princes-street and the Gardens will be more apparent now that they may be said to be completed, with the dressing of the ground about the entrances, and the erection of a handsome pavilion for the accommodation of musical bands. Their acquisition is a great addition to the amenity of the city, and there is no prettier sight than that presented by their appearance upon Sundays, when the sward is dotted over with groups in holiday attire, evidently enjoying the opportunity of making it a day of rest outside as well as within doors. The part of the city which is now the least attractive is the wealthy suburb of Merchester, where the proprietors seem to have done little or nothing in the way of clothing the landscape. It presents the appearance of nothing but a not very elegant medley of large and often shapeless structures environed by long stretches of wall, without the continuity of street architecture, and with some of the worst roadways in the district.

Extensive walks have been constructed for the Arboretum; but it will be long till the Grange will be able to show something approaching the picturesque variety of its neighbour, the Botanic Gardens. Its capabilities, however, are great; there is much modulating surface and something like a hill, and if arrangements could be mode for it, these grounds also should be thrown open to Sunday visitors. Another attraction has been added to the City in the opening of a large hydropathic institution in the west, for which there is easy access by rail for parties who do not care to walk.

The grounds of St. Mary's Cathedral have been laid with turf and larger portions sown up. The street thoroughfare has been completed on the north side, and now a good view of the edifice can be obtained from any of the three open sides. The trees, planted by Episcopal hands so as to overshadow the "Bishop's Walk," begin to help to hide the ugly gap between Manor-place and Palmerston-place. The building is already toned down to the tint of the neighbouring streets. The view from Chester-street is undoubtedly the best; on this side the fine clerestory of the choir and the beautiful transept gable are seen in conjunction with some fine trees of the old Scotch House of Drumsheugh. From this point, too, the tower and spire are seen to the best advantage, for it must be confessed that this notable feature, the design of which, according to the BUILDING NEWS, captivated Edinburgh from the first, is now allowed on all hands to be somewhat disappointing near or far away. It is true of this spire, noble in its proportions as it is, that it has not a graceful outline. The transition from a tower of such great dimensions—43ft. square, by a lofty lantern or belfry stage, octagonal in plan, with pinnacles which hardly clear it, and the tips of which are never visible against the sky but only in the line of a diagonal, give an aspect of clumsiness, which the sloping lines of the spire proper do not improve, and it is only when the prospective at a nearer distance conceals this aspect of the structure that the graceful outline of the spire appears. There were doubtless good reasons for designing such a belfry-stage, but the public cannot be expected to have much understanding on the point, and it pleases them perhaps to remember that Homer sometimes nods, and that if the Cathedral spire is not the *facile princeps* they expected, it is only another instance of the truism, "Nil est ab omni parte beatum." This cumbrous aspect of the spire does not improve the appearance of the east front to Melville-street; there is a painful preponderance of vertical lines in the front itself, and the addition of a Lady-chapel or something of the sort would have completed the natural illusion presented by such large vertical lines when they appear to spread, as they recede from the ground. Many people also cannot understand the reason of the diagonal buttresses, and their pinnacles standing up in solitary grandeur, their apparent purpose being to keep the monster tower upon its legs.

Perhaps there is no part of the exterior so unexceptionably beautiful as the choir and north and south transepts. The recession of the entire west front under a deeply-moulded arch, though probably an original device, does not succeed in giving the appearance either of a solid wall, or of one large window. The deeply-recessed clustered panels of the doorway, which would be intelligible as supporting a gable-wall of great thickness, really support only the gable of the doorway—the wall-face being far behind. This western front, however, is designed for the adjacent towers on either side; but the effect of the receding wall may be compared with that of the transepts, where the fenestration is not dissimilar, and yet the whole appears to much greater advantage.

Next to the Cathedral in importance as an architectural addition to the city, the New University buildings deserve notice. The southern portion, so far as the mason-work is concerned, has been finished, and the workmen seem to have been proceeding very leisurely with the roofing. This is of low pitch, and covered with pantiles of large size, having a broad border of slating next the eaves. The effect of this roof is very pleasant, contrasted with the foliage, over the tops of which it can be seen. The design is one of the many forms of the Italian style, but one which varies in many essential points from the style commonly so-called. It has nothing of the severity of the old Classic, and nothing of what may be called its cumbrous superfluity of ornamental detail. This feature, and the picturesque arrangement of the plan, make up the principal charms of the design. The architect has been very happy in his elevation to the west, where there is a rather steep gradient, and the appearance of this portion is very much better than the perspective drawing could have led one to expect. The altitude, at some part, is considerable, and the fenestration has no monotony in its design. Arcaded, grouped, circular-headed, lights in the uppermost floor, and the contrast of plain wall-surface with windows grouped for special uses, and not for symmetry, form an agreeable contrast to the orthodox pedimented and pilastered openings. The masonry is polished ashlar, with exception of the lowest portion, which has ashlar blocks, with bevelled horizontal joints. The work on the cornice of the

eaves is similar to that of the music-class room adjoining, and is the only moulding with great projection in the building, and the ordinary dentilled cornice. The work of the northern portion is begun, but makes no appearance for remark.

The authorities at Portobello have been experimenting on the ventilation of the public sewers, very much to the annoyance and alarm of some of the inhabitants, who have no stomach for the odours emitted at the gratings, which have been put over openings all along the line, where practicable. The outcry prevailed to get a commission from the Board of Supervision to inquire into the safety of the experiment that has been made. The inquiry is not concluded, but some amusing and contradictory evidence was elicited. The sewage is expelled and bottled up again with each returning tide, and many parties testified to the nuisance of smells when the tide was coming in. Dr. McAdam, the well-known analyst, testified to the fact of having been unable to detect a smell at all when other parties had turned away with the usual symptoms of a disagreeable sensation in the olfactories. When the alarm subsides, as it will probably do, people will come to see that it is better to have a bad smell out of doors on occasion, than have it perpetually present in their cesspool traps, and coming up with every disturbance of the contents. This nuisance, it appears, has very much abated since the aëration of the sewers, and the sensible conclusion seems to be that the openings, instead of being closed, should be increased in number.

Professor Jenkyn has published a very useful little handbook on this subject, and the lack of proper information on it is the great obstacle to the carrying out of the system tried at Portobello and other places. The system he proposes to adopt where public sewers are not ventilated is a very simple contrivance, the same in principle with the various schemes proposed at various times in the columns of the BUILDING NEWS. The junction with the main sewer is trapped in the usual way, and the connection with the house-drain (also trapped) is broken by an open channel about 3ft. long, which may be formed of a semi-circular piece of pipe. At this point there is a well-hole to the surface of the ground.

SEWAGE DISPOSAL AT WEST DERBY.

THE following paper by Mr. E. H. Allies, Assoc. M. Inst. C.E., Engineer and Surveyor to the West Derby Local Board, was read before the Association of Municipal and Sanitary Engineers and Surveyors at their Dewsbury meeting, and contains information which may be of great use to Sanitary Authorities who have under consideration the disposal of their sewage:—

"The sewage of the greater part of the population of the township of West Derby, which is a suburban district of Liverpool, until the year 1872, was allowed to discharge into Tue Brook, and pollute the entire course of that stream. An injunction in Chancery was at that time obtained by a gentleman, through whose property the polluted stream ran, to restrain the Board from discharging its sewage into the stream. The Board had, therefore, to consider the question of disposing of the sewage of the district without causing a nuisance, and various schemes of sewage disposal were discussed. One of the schemes proposed was that the sewage should be carried down to the mouth of the Mersey, and discharged near Rimrose Bridge, beyond low-water mark in the tideway of the Mersey. This scheme, however, fell through, owing to the opposition of the Waterloo and Great Crosby Local Boards, and all hopes of obtaining an outlet seawards being abandoned, it was finally determined to dispose of the sewage by irrigation for agricultural purposes. Under the advice of Mr. Bateman, C.E., and the late Mr. Orridge, C.E., then surveyor to the Board, it was decided to acquire the land at Fazakerly, which forms the sewage farm. It having now been in operation for some years, a short description of the farm, the works in connection therewith, and the results obtained, may be of some interest to the members of the Association of Municipal and Sanitary Engineers and Surveyors.

"A provisional order was obtained in the year 1870, the land purchased, and under the direction of Mr. W. Hope was laid out for irrigation. The Board obtained loans amounting in the aggregate to £63,350, for the purpose of buying the necessary land, laying it out, and constructing the works. The area of land purchased was 207 acres, and the sum paid for this was £36,134 18s. 7d., being equal to £174 11s. 3d. per statute acre. The amount paid for laying out and developing the farm was £16,948 18s. 11d., being equal to £81 17s. 7d. per statute acre; and the total cost of the tanks, engines, pumps, boiler, and engine-house was £6,717 18s. 3d.; making a total of £59,801 15s. 9d.

The soil which had to be operated upon was not all of the most suitable description for sewage farming, about two-thirds of it being clay and the remainder a sandy loam. The whole of the land which was to receive sewage was drained to an average depth of 3ft., the effluent water discharging into the river Alt.

The population of West Derby is about 34,000, but the sewage of some 7,000 of this number is discharged into the Liverpool Corporation sewers. The West Derby Local Board have, therefore, to deal with the sewage of a population of 27,000 persons, whose number is constantly increasing. To convey this sewage to the farm, two main outfall sewers were found to be necessary. The western outfall sewer, 12,775 yards in length, carries the sewage of some 20,000 persons, and discharges it by gravitation over that part of the farm irrigated by it. It is a brick culvert, 5ft. 3in. by 3ft. 6in. at its largest part, with gradients varying from 1 in 1,056 to 1 in 211, the estimated daily flow of sewage being 600,000 gallons. The eastern outfall sewer, which conveys the sewage of about 7,000 persons, is 11,033 yards in length. Like the western outfall sewer, it is a brick culvert, 4ft. 6in. by 3ft., with a daily flow of sewage of 210,000 gallons. It discharges its sewage at the farm at too low a level for it to flow over the land; and it is therefore received into two tanks, which are of a sufficient capacity to contain the ordinary flow of sewage of the district from Saturday evening to Monday morning, and it is thence pumped on to the land. The tanks are 156ft. long, 21ft. wide, 19ft. 6in. deep, are two in number, covered with 14in. brick semicircular vaulting, and the sewage, which discharges from the sewer into catch-pits, is thence turned into either tank at pleasure, a grating at the entrance retaining any solid matters. The tanks not only act as receivers for the sewage during the time it cannot be pumped, but also as settling tanks to allow the sludge to deposit. This, however, is a questionable advantage, as the sludge has to be constantly cleared out of the tank; and if the sewage were not allowed to stagnate, the whole could be passed through the pumps and on to the land, as in the case of the other outfall sewer.

The sewage is taken from each tank by a floating pontoon grating which rises or falls with the sewage, the object of this arrangement being to keep the sludge from getting to the pumps. The pumps, which are by Tangye Brothers, are three in number, and each capable of lifting 25,000 gallons of sewage per hour, to a total height of 40ft., 17ft. 6in. of this height being below the ground level at the pumping station. The steam cylinders are 21in. diameter, pump plungers 10in. diameter, with a stroke of 24in., and the suction and delivery pipes are 8in. The pumps are all similar in design, and so arranged that each pump may be worked independently, so that either may be stopped for repairs without in any way interfering with the working of the remainder, which can be run, if necessary, at a greater speed, and raise an increased quantity of sewage. They are supplied with steam from a horizontal boiler 24ft. long, 5ft. 1in. diameter, which is fed with water by a Cameron's steam pump. These pumps have since their erection in 1875 given great satisfaction.

The sludge which accumulates at the bottom of the tanks is cleared out from time to time, a large portion of it being lifted by a 6in. chain pump, worked by a ploughing engine, which is stationed at the tanks for that purpose, men being sent into the tanks to stir the sludge and sweep it towards the pump. The remaining part of the sludge which cannot be reached by this means is removed by hand labour, and this has to be done about once in the year. The sludge is spread over parts of the land near the tanks, and is dug in; this is found to be the most advantageous method of getting rid of it. The main carriers throughout the farm are of concrete, of a square section and 18in. in width; the minor carriers or distributors are formed of the soil, and attended to by men who regulate the supply of sewage as it is required.

The effluent water after passing through the soil is discharged by the subsoil drains into the river Alt and other streams which bound the farm. This water is very clear, and is fit to be turned into any watercourse; no complaints have been made of any pollution of the stream below the farm. If time had permitted, the author would have given the results of analysis of effluent water taken in dry and wet weather, as he believes they would compare favourably with effluent waters from most sewage farms, and a comparison of them with the results obtained elsewhere would be of interest.

The principal crops which are grown on this farm are rye grass, mangolds, potatoes, cabbage, clover and rye grass, wheat, oats, and barley, a large breadth being always laid down in rye grass, which is cut from six to seven times in the season. The proximity of a large town like Liverpool offers a good market for all sorts of produce, but crops are frequently sold to customers at a much greater distance.

There is no stock kept on the farm other than the horses required to work it. The whole of the agricultural work is done by ten horses, it not having been found advantageous to use a large quantity of expensive ploughing and other machinery which was purchased when the farm was commenced. It is questionable if the full profit can be got out of any sewage farm unless a sufficient quantity of stock is kept to feed off the principal part of the grass and root crops which form a large proportion of the crops annually raised. The profit made on the feeding of these crops, grown on a sewage farm where no stock is kept, of course goes into the pockets of the persons who buy such crops; and the cartage to market, which is always a very heavy item, is also lost to the farm.

The cartage from the West Derby Farm to market averages about seven miles, and the carts load back with manure. The whole of this cartage and the price of the manure would be saved to the Board were stock kept, as the manure would then be produced on the spot.

This farm commenced working in the year 1872-3, but the whole of the sewage of the district was not then brought to it, nor was the whole of the land under crop. It can only be considered as in full working order since the year 1876-7, the financial year ending on the 25th March. In the year 1876-7, the income exceeded the working expenses by £912 14s. 11d. In the year 1877-8 the working expenses exceeded the income by £48 4s. 4d., and in the year 1878-9 the income exceeded the working expenses by £775 12s. 0d.

Thus in the last three years the income of this farm has exceeded the working expenses by £1,640 2s. 7d.; and since the commencement of the farm in 1872 the income account exceeds the expenditure by £230 4s. 2d. The undertaking was not entered into as a commercial speculation, but solely as a means of getting rid of the sewage of a district, and it must be admitted that the disposal of the sewage at West Derby has so far been a success.

HAMPTON COURT PALACE.

THE last visit for the present session of the Architectural Association was marked by an excursion to Hampton Court. A large number of members availed themselves of the excuse for an outing to Bushey Park and to the quaint buildings, the pictures, and trim gardens of the palace, and were enabled to see many portions of the buildings not open to the general public. The visitor were received in the great Hall by Mr. Edwin Chart, the clerk of works, who exhibited plans of the palace, showing that it forms an irregular oblong, pierced by three large and several smaller courts, the larger sides and the axis of the great hall ranging north and south. It consists of two buildings of very different characters and styles; the two western quadrangles being left of the lordly pleasure-house commenced by Cardinal Wolsey in 1515, and "given" by him, eleven years later, to Henry VIII., who completed the structure; and secondly, of the additions made on the eastern side, for William and Mary, by Sir Christopher Wren. At the present time Wolsey's palace, and the ground-floor throughout, is inhabited by ladies and gentlemen by

favour of the Crown, the state apartments being hung as picture-galleries and thrown open to the public. In reply to questions, Mr. Chart said, the great hall in which they were assembled was one of the additions made by Henry to Wolsey's palace; it had, until within the memory of the present generation, a second staircase and entrance on the north, as well as that on the south side at the west end. The hall was thoroughly restored by Willement about 40 years since, when the present scheme of stained-glass was arranged, but the elaborate hammer-beam roof, with its heavy gilded pendants and fan ribs, was the original woodwork, with the exception of some minor panelling. The door at the east end, leading into the withdrawing room, is a modern substitute for side-doors, now hidden behind the arras. The old painted glass in the withdrawing-room, containing fine portraits of Wolsey and Henry VIII., and also the oak chimneypiece and mantel, deserve mention here as worthy of note. Having glanced at the Flemish and German tapestry hung on the walls, and noted the shallow bay at the south-east angle of the room, the minstrel gallery at north end, and other features, the members were conducted over the quaint buildings of Wolsey. In the tower opposite the hall entrance has been re-erected the famous astronomical clock, which has been repaired by Messrs. Gillett and Bland, of Croydon, and again records the age of the moon, the signs of the Zodiac, the day of month, and the hour, &c. It bears the date 1540, but the records do not show the maker's name. Till within the last two years the dial was lying forgotten in a workshop, but is now again resplendent with gilding. On the tower is a terra-cotta panel of figures, and on the walls of this and the next court are a series of finely-executed medallion busts of the Roman emperors, a present from Leo X. to his Cardinal-legate, and the work of Lucca della Robbia; recently these have been cleansed from paint, and are good specimens of Early Italian Renaissance. Passing through the building and out to the south or garden-front, a charming Late lead cupola, ogee in outline and richly crocketed, was seen, and Mr. Chart drew attention to the junction between Wolsey's and Wren's work, the latter being built into the older walls without regard to the lines of windows. He had made, he said, careful research for ancient plans or documents indicating how Wolsey's palace was originally finished on the east, but had not been able to discover any reference thereto. The kitchens of Wolsey's palace were located on the north side, and beyond these were the workshops. The members then visited, by permission of the tenant, the largest of these Tudor kitchens, now filled with broken boxes and other rubbish. It is a large hall, with deep recesses, each some 16ft. wide, on the south side, formerly used as fireplaces, and on the opposite side almost equally spacious ovens; these fireplaces are covered in with fine brick arches, in deep rings and very large stone keystones, and the whole construction is extremely solid. The roof is a wretched modern structure, but one principal and the corbel holes of a hammer-beam roof remain. In the passage are hung some long poles with pulleys affixed—early specimens of fire escapes. Stepping outside, the members found themselves in a narrow court, with the whole north range of the old palace before them—a picturesque series of weathered red brick-work, rising into plain gables, the outline well broken by projecting crow-stepped buildings and by twisted and moulded brick chimneys. These buildings are still used as the workshops. Professor Kerr criticised the way in which the windows, which had been altered into plain square-headed brick and wood-work, are now being restored into two-light stone mullions, remarking upon the mechanical character and hard lines of the chamfered edge. The work is being done in Bath stone, whereas the few old ones that remain, from which these are closely copied, are in Ryegate stone. The same process is being carried out in the little court to south of chapel, where a brick embattled parapet has just been set up, and some efforts made to restore the dilapidations of several generations. Having peeped into the very narrow and picturesque Fish Court, overhung with high gables, the members entered the Court chapel. It is a highly-decorated structure of four bays; the walls and the four centred window openings are of the Cardinal's time, but the flat fan-traceried roof and all the fittings are those of Wren. The altar is replaced by a lofty screen, flanked by a pair of Composite columns, which carry a pediment richly coffered in the soffit. Beneath is an oval frame of foliage inclosing a plain parquetted surface, having a meaningless purpose and appearance. The whole of this composition is in oak, and is elaborately carved with the egg-and-tongue ornament, and with swags of flowers and fruit. The work is ascribed to Grinling Gibbons. Similar columns divide each bay. The pendants of the ceiling are ornamented with cherubs nestling in flowers, and are keyed up to the roofing by ironwork; these bosses, as well as the ribs, are profusely gilded, and patterned in gesso-work. The reveals of the windows, and the general surfaces above the dado, are decorated with large stencil patterns in bright colours. The benches are modern, and in pitch-pine, and so fill up the measure of incongruities. Over the screen at west end is the Royal gallery, which is approached by a wide staircase and by passages from the first-floor of palace. On leaving the chapel the members looked at the exterior of Wren's palace, noting the excellent face and pointing of the red brick-work, and the good condition of the Portland-stone carving, which is remarkable for its excessively fine undercutting and variety of good design, some of the keystones on the south front being very remarkable in this respect, while the swags and other carvings to the circular lights and spandrels over the arcade in the fountain court deserve special attention. An interesting visit was concluded by an ascent to the roofs of the palace, which are uniformly covered with large sheets of 10lb. lead, which, although there has been some buckling, is still in good preservation, and seems to have been little repaired during the past two and a half centuries.

ARTISTS' COLOURS.

THIS subject was discussed at the Grosvenor Gallery on Tuesday evening, under the presidency of Sir Coutts Lindsay, who explained that the meeting was convened as a result of Mr. Holman Hunt's paper, read at a recent meeting of the Society of Arts. Artists must always consider their reputation even above the money value of their work, and if the material used should fade so much that their pictures ceased to be what they were when painted, he thought that not only artists themselves but the nation must suffer in such a case. He believed that through a misconception, both on the part of the colourmen and on that of the artist, many colours had gone by wrong names. For example, there was a colour which every artist constantly used under the name of "Naples Yellow." That was a natural pigment, and was highly prized by Italians in their flesh tints; but it had disappeared entirely from England, the colour used here under that name being a preparation of lead possessing but few of the good qualities which the original contained. Mr. Holman Hunt stated as his experience that since 1860, artists' colours had come to be gradually more and more mistrusted. Artists wanted to know what was the character of the colour called by a certain name, so that it might be discarded in cases of impurity. The present system confused them beyond limit. Mr. Hunt exhibited some canvases painted in various colours at long intervals, and explained the extent to which they had deteriorated. Professor Church, as a chemist, pointed out that the colourmen were entirely at the mercy of the oil-crushers, who allowed inferior seeds to mix with the linseed, the result being that impurities were found in the oil. Mr. G. Wallis thought that the best plan would be to submit the question to a body of practical chemists, who should decide what colours, were permanent and what colours would mix without injuring each other. The Chairman, in summing up the discussion, confessed that artists were not altogether free from blame in the demands which they made upon colourmen to produce certain tints from pigments which were altogether unsuitable for the purpose, and he trusted that the subject would be further investigated in the interests of art by all whom it might concern.

It has been decided to erect a statue at Birmingham, in memory of the late J. S. Wright, M.P.

"BUILDING NEWS" DESIGNING CLUB.

REVIEW OF DESIGNS FOR A TOWER AND SPIRE.

WE have received three or four designs for this subject which fairly meet the requirements we had in view, namely, a tower and spire suitable for a Village Church. The work of "Binny" certainly takes the first place as a design; it is massive, and quietly treated in the lines of tower and spire, without unnecessary or expensive detail. The tower consists of two stages, the lower forming the entrance-lobby, and the upper, the belfry. The former part is quite plain, constructed of rubble or flint, with quoins at the angles; over it there is a set-off, the belfry windows being recessed between angle and centre buttresses of slight projection, intended to be built with rubble or shingle, and stone dressings. Above this is a plain, deep, broached spire, rising directly from the tower. Simplicity is the chief charm of the design, which is Early English in character. The belfry windows form bold lancets with simple splays to the jambs; the doorway has also boldly-splayed jambs, the mouldings of the arch dying into them, and there are no buttresses below, but a stair-turret in the inner angle of tower. The author has shown a stone spire, instead of one of shingle; but the design is equally adapted for one of oak. "Edwin" sends also a characteristic sketch. The tower forms a large porch, and there is a clock-chamber and belfry above. The entrance-doorway is wide, enriched with jamb-shafts and the dog-tooth ornament; above it are two low pointed windows, and the belfry has a double-light window, composed of two lancets, separated by small shafts. We cannot admire the heavy corbel-table over the belfry, nor the meagre buttresses at the corners, which are not half wide enough. The spire, of shingle, is of the broach kind, but rather narrow above the angle-splays. A stair-turret leads to the belfry. "Sub-Rosâ" is conceived in a Late Gothic style; the belfry window is of two lights, square-headed. There are no buttresses, but an octagon stair-turret gives access to the belfry at one angle, and is finished below the roof with open traceried sides of timber. The author has chosen a spire of quadrangular shape on plan, the hips being set in the centres of the sides of tower, and the angles of tower covered by half-pyramids. The section of spire shows two tiers of purlins, 7in. by 5in., strutted and braced; with hips 9in. by 3in., and rafters, 4½in. by 3in., with a centre-post 5in. by 5in. "Alfred" sends a boldly-drawn elevation and section, with a pleasingly-proportioned shingle-spire, well braced internally; but the tower, admirable as is the grouping indicated in the pencil-sketch, is overpowered by the prodigious angle buttress, and by the massive stair-turret at the other corner. The arches and doorway, and centre lancets are not well proportioned: they are too acute, though the detail indicates Late Gothic. "Alfred" has run into the opposite extreme to that fallen into by "Edwin." He has overdone his buttresses as the last-named has stinted them. In other respects, the design has the merit of being simple in outline and grouping. A vigorous ink-sketch by "Jack" claims notice rather for clever detail produced in almost wanton profusion than for any characteristic excellence. The tower is shown open by arches on two of its sides internally; a small porch, with flat over, projects in front, and a stair to ringing-chamber is made a feature on one side of the entrance. The advantage of this arrangement must be on the score of economy of space. We cannot see much to admire in the too-clever arcade, with short shafts over the belfry-lights; why the sudden transition from extreme plainness to elaboration; nor can we see the use or beauty of the small openings above the cornice, and the corner finish over angles of tower. The design has a restless look, and is certainly too ambitious for a village steeple. "Con Amore" is a design with some merit; the tower is made to group with a semi-circular baptistry, and there is a more modest treatment. The belfry-window has a wide four-centred arch, and, above, is a series of pierced openings, possibly for sound, though unnecessary for that purpose, and we think two or three lancets, grouped or singly, would have been preferable. The timbering is well shown. The entrance has a bracketed gable of wood, but the detail is poor. An alternative slip is given of the spire, but we prefer the original form. A massively treated and grouped design bears the

motto "Better Late than Never." The tower is large, the upper angles being canted, and the buttresses finish with a half-pinnacle against the splays. The style is Perpendicular, and the entrance-porch has an arch of ogee form, with finial, and a series of panels above. The spire is square, the splayed upper corners of tower being bevelled off to it as a broach. Drawing is rather poor in detail, but neat. "No. 90" is a square tower, finished with an octagon lantern and spire; the design is suitable, but is not so appropriate as a plain spire. The timbering of spire, and the wooden lantern of louvred openings, are well shown. Cross-struts from the hip rafters are indicated in section, but we do not see how they are to cross in the centre. Very much like the last is "Sub Silentio": the belfry is an octagon, pierced with lancets in the sides, but the author has omitted to show how the square corners of the tower below are to be covered. As shown, they must be flats, and the angular view of tower would show an octagon rising out of a square tower of low proportions, a picturesque, though somewhat inelegant, mode of finish. The quatrefoil band and the triple lancets over the entrance would have been better treated in a plainer manner. The spire is effective, and well constructed. "Ap Adams" shows a pleasing type the spire is a square pyramidal roof of high pitch, and the angles of tower are emphasised by octagon pinnacles, which break through the roof. The general proportions are better than the details; we hardly like the circular opening over the entrance. "Mustapha" is appropriate in general treatment: there is a battlemented parapet, with gutter between spire and tower, and the detail is rather Late Gothic in spirit, and somewhat commonplace. The construction is well shown in section, and the purlins, 6″ × 6″, are supported by raking struts notched to the finial post, which is of the same scantling. The section and timbering of "Mot" are carefully shown, but the design and detail are rather hackneyed. Less broken and more massive buttresses would have been better than so many stages. The spire is square; the rafters are specified to be 4½in. × 2½in., hip rafters 9in. by 3in., with double ties and finial post out of two 3in. × 6in. pieces; purlins 6in. × 6in. and 4½in. × 3in. struts to post. The spire is proposed to be boarded and covered with roofing felt and cleft oak shingles 4in. wide. "Toledo": This set of drawings is well prepared; the porch and bell-chamber are 9ft. 6in. square internally, and there is a plain square spire of shingle; but the detail and proportions are below par. The circular light in the ringing-chamber would have been better a plain lancet, and the belfry windows lengthened. Design with motto, "D'Ewes," is well-proportioned in the buttresses, but a more obtusely-pointed doorhead, and a belfry-window without the inner arches to the lights, and the omission of the clock, would have improved it. The spire is covered in herring-bone fashion, and appears rather over-timbered. "Our Praises are our Wages" is a trifle attenuated, and the treatment is more suited for a small town-church or chapel. There is little to suggest the sturdy simplicity of a village-church steeple, and we may also question the propriety of bevelling the upper angles of tower unless a regular octagon is formed. "Gemshorn": This is a design of too much pretension, and such features as the square-headed openings and the small windows in belfry show a want of study of requirements. The belfry should always have the largest windows, so that the sound of the bells may be dispersed in every direction. The clock recess has spoilt the elevation, as clocks generally do, unless they are made to project from the tower. Great attention has been paid to the bracing or tieing of the spire, which has an open lantern half-way up, but the wind-bolts are unnecessary if the plates are properly bedded and bolted down, and the inverted arch, shown in the foundations, is not of much use when a good bed of concrete is laid. The author has spent a deal of time in hatching-in the stones which might have been better occupied in looking at a few good drawings of church-towers. The same advice we might give to "Ernest," "Clansman," "W in W," and "Palmam qui meruit ferat," whose designs, here named in order of merit, fall short in detail and practical knowledge. Better than drawings would be a personal inspection of the charmingly simple structures of this kind to be found in Sussex and Hampshire, and also in Kent and Surrey, and careful sketches and measured drawings of detail and mouldings from the actual examples themselves. Until such personal observation of old buildings is made, the student of Gothic detail can hardly appreciate the differences between good and bad, or estimate the fitness and beauty of detail especially in the absence of the influence of a good office, or when he is not brought into contact with modern work of acknowledged repute.

AMERICAN ENGINEERING.

THE American Society of Civil Engineers have been of late engaged in discussing "Inter-Oceanic Canal Projects," the work on the Panama Canal being the chief topic. A special meeting was held in New York in February last to welcome M. de Lesseps and other eminent engineers, and to discuss the subject. Among the points of interest taken up by M. de Lesseps in his address was the supposed difference in the levels of the two seas, which upon examination was found to be imaginary, and was due to ebb and flow of the tide, which differed on the two sides of the Isthmus; another point was raised by Mr. Ashbel Welch, namely, the expense of making a sea-level canal across the Isthmus when a canal with two or three locks on each side of the deep cut could be made more cheaply. In reply to the latter, M. de Lesseps said he would not have anything to do with a locked canal except for small ships; for vessels 500 or 600 feet long there would be a difficulty and expense in constant repairs, and he considered such an idea inconsistent with a grand inter-oceanic canal. In reply to another question, it was stated that the length of the canal will be 45 miles, and that a certain part of it will be a deep cut of about 7 miles, and the deepest excavation about 180 feet. In a separate paper Mr. Ashbel Welch pointed out the great saving that would be effected by putting in three locks, each of 20 feet lift on each side of the deep cut, and that the detention of vessels by the locks will be small in proportion to the saving. Mr. Welch's paper entered into other details and calculations, and showed that the lengthening of locks may be done inexpensively, and that the cost of six locks 600 feet by 80 feet would be seven or eight millions of dollars. In alluding to the construction of dams, Mr. Welch recommends them to be made of timber cribs filled with stone, sunk on any kind of bottom, with an apron below of crib work 5 or 6 feet deep filled with stone, except near the lower end, covered with logs parallel to the stream, carried down stream 150 feet to keep the excavation made by the water in the bed of the stream at a safe distance from the dam. One of 100 feet base, 80 feet high, with apron 150 feet long, 6 feet deep, would probably cost 500 dollars per foot lineal. The same authority speaks of the steam "lock operator," an apparatus which removes all objection to locks, and enables a single expert by levers to manage the largest ship.

Another paper in the *Transations* of the Society deals with the progress of the work at the East River Bridge, which was begun in 1877. The approaches on the Brooklyn and New York sides are considerable, and the width will be 100 feet. The streets in Brooklyn will be crossed by box and plate girders, others will have trussed girders and arches of masonry. An architectural problem of some difficulty was presented. It was desired to utilise the spaces below the arches for stores, which required that they should be of some width, while a certain height was also necessary to produce effect. The author, Mr. Collingwood, describes how this was met by a modification in the form of the arches, suggested by a commission of architects. The arches are of the Florentine style, that is made deeper at the key and narrowest at the springing, so as to give a pointed extrados, by which expedient also the spandrel space was reduced. The fronts of structure are of granite, and the spandrels are of darker granite rock-faced.

The results of experience in the use and testing of steel, as detailed in the paper, are important. As regards steel wire it has been demonstrated "that no satisfactory test of the elastic limit, or amount of stretch, can be made on wire drawn and coiled in the ordinary way, on account of the set induced by coiling"; that the elastic limit of straight wire was 50 per cent. of the ultimate strength; that galvanising had the effect of increasing the strength of fully drawn wire about 15 per cent.; that steel wire can be had of a tensile strength of 160,000lb. per square inch, with a stretch of 2½ per cent. in breaking in 100-foot lengths, or of 4 per cent. in breaking in 1-foot lengths. Ordinary sizes as required for ordinary bridge members have a strength of only 70,000 per inch, and an elastic limit of 40,000lb. The tests for impact show that the longer the wires or members are the safer it becomes to use high grade material. The difficulties of adjusting cable wires are detailed by the writer, the deflections differed much from each other, due to slight differences of weight and diameter of the wires, and it became necessary to try a number of coils, and to select those of uniform weight and size under a certain temperature. The method of joining the coils of wire, and the observed irregularities in the strength of joints, the adjustment of the wires, owing to differences of weight, &c., are considered in detail.

AN ANALYSIS OF ORNAMENT.

UNDER this title Mr. H. H. Statham lectured at the Royal Institution on Friday evening. On the walls were hung specimens of real and false ornament. The lecturer said he would include in the signification of the word "ornament" all that was added to an object beyond that which was intrinsically useful. The first step taken by man to ornament his surroundings would be the mere drawing or sculpturing of natural objects, for instance, fir-cones or leaves, and these would not be artificially grouped. Then symmetry would present itself as a more pleasing arrangement of the figures used. This principle of symmetry was probably drawn from that presented abundantly in the forms of life existing around us, especially by the vegetable world, one of whose main features was a central stem giving off radiating members. This would result in the formation of such an ornament as the so-called honeysuckle.

The next step in adding to ornament would be to present a puzzle to the eye, illustrated by the key pattern, and again by the Egyptian pattern of interrupted squares.

These forms of ornament had no fixed relation to the object whose effect they are intended to add to. Another class of ornament might be called functional ornament, *i.e.*, ornament which had some definite relation to the object it adorned. A Corinthian column presented functional ornament; the pedestal, by reason of its shape, drew attention to the idea that it was intended to support weight. Passing to modern ornaments, he showed that any floor-pattern which indicated perspective was in bad taste, because a floor was a flat surface, and its ornament should give the idea of a flat surface. Japanese ornament, now so much in vogue, was not, he considered, in the best of taste; it was, perhaps, rich and piquant, but it was not sufficiently true to nature. The Chippendale chair did not present true ornament—it gave the idea of weakness where strength should be. In favourable contrast to this chair the lecturer showed another of the same age, which showed strength just where the quality was needed. He had recently been asked by a friend to pass his opinion on the ornamentation of a ceiling, on which festoons were represented with their convexity towards the walls. Such an ornament was not functional ornament, for it had no true relation to its surroundings. A festoon would presuppose either the action of gravity, and therefore of a force acting vertically, or the action of gravity modified by a centrifugal force; such centrifugal force, however, was not apparent in the room, and therefore the festoons were out of place. Mr. Statham proceeded to lay down what he deemed the true principles of ornament, illustrating his remarks by a series of sketch designs from natural foliage. The principles to guide us in designing ornament were few and simple. The ornament should not impress the mind with ideas which are unnatural, and yet, on the other hand, it should lend itself to its surroundings—if the apparent irregularity of vegetation could not be represented over the whole surface ornamented, it should be stamped with a certain amount of regularity; repetition of large and of angular figures was not desirable.

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OUR LITHOGRAPHIC ILLUSTRATIONS.

RALEIGH MEMORIAL CHURCH, STOKE NEWINGTON.

THIS building is being erected at the corner of Milton and Albion-roads, for the Congregationalists worshipping in the iron church in the Milton-road, who formed the first of several stations opened in connection with the ministry of the late Dr. Raleigh, of Canonbury, and attained the position of a self-supporting Congregational church, under the ministry of the Rev. J. Johnston, eight years ago. The building consists of a large lecture-hall in the basement, seating about 600 adults, and about the same number of children in Sunday-school classes, and an infants' room for 100 is arranged under the front portion of the building. The raised platform at the back of the hall is divisible into class-rooms when required. On either side of this are a superintendent's room and library, and scullery for preparation of tea, &c. Underneath the platform is a heating-chamber and store-cellar, the system of heating intended being small-bore high-pressure hot-water pipes. The upper portion of the building consists of a church with galleries on three sides, seating 1,000 persons, with an organ and choir gallery at the back; the pulpit, of hard woods, being placed in front thereof. Under the organ are two vestries, with separate access from the outside. A slight alteration has been made in the design of the exterior by a revised gallery staircase, and the addition of the covered porch over the front steps. The materials used are red Essex bricks for the walling, with Bath stone dressings, Welsh slates for the roofing, boarding internally for the roofs and walling, and Beart's white bricks for wall-facings. The work is now being carried out by Mr. Chessum, of Highbury.

WEST BROMWICH CONGREGATIONAL CHURCH.

THE shell of this building has been in use for about twelve months, and it is now intended to complete the same by the insertion of the galleries, vestries, and other omitted portions. Complete, it will seat nearly 1,000 persons, and is, in general arrangement somewhat similar to the building just described, except that the schools will be built in the rear instead of under the church. The materials used are best pressed bricks for the walling with Bath-stone dressings, Welsh slates for the roofing, with plaster for all internal surfaces. The total cost of this building will not exceed £4 per sitting.

AVELING MEMORIAL CHURCH, REEDHAM, SURREY.

THIS building is designed for the use of the inmates of the Reedham orphan asylum, situated about three miles from Croydon, and was erected in recognition of the many years' interest and service of the Rev. T. Aveling, the honorary secretary. It seats about 350 children, and 100 adults, all on the ground-floor, and as the building is on a hill, it was designed as shown in the illustration, so as to avoid too much exposure to the weather, and to minimise the difficulties of cartage. The plan consists of a nave and side-aisles, with a single marble shaft, and two wide-spreading arches on either side. As the institute is unsectarian, a pulpit only is provided, and this of marble and Bath-stone. The materials adopted externally, are Rag-stone and Bath-stone, and tiling for the roofing; internally, walls are faced with white bricks, and the roof boarded. The work was carried out by Messrs. L. H. and R. Roberts, of Islington, and this, together with the two preceding buildings, are from the designs of Mr. J. Sulman, A.R.I.B.A., architect, of 16, Furnival's Inn, Holborn. E.C..

DESIGN FOR HOUSE AT AIGBURTH.—GARDEN FRONT.

THIS house is designed to provide, on a somewhat limited space, large reception-rooms on the ground-floor, viz., dining-room, drawing-room, and morning-room, besides a good-sized hall and staircase. The kitchen offices are arranged round a court in the rear. The bedrooms are comparatively few in number, a billiard-room being on the first-floor over the dining-room. The materials are local brick with stone dressings for the walls, the upper part being covered with weather tiling, with a considerable quantity of half-timbered work in the windows and gables. The architect is Mr. J. M. Brydon, of 98, Gower-street, W.C., from whose drawing in the Royal Academy (finished by Mr. M. B. Adams) our illustration is taken.

BOARD SCHOOLS AT BYKER.

THESE Board Schools have been erected at Byker, near Newcastle-on-Tyne, for the School Board of that town, from designs by the architects, Messrs. Austin, Johnston, and Hicks.

SOANE MEDALLION, 1880. DESIGN FOR PICTURE-GALLERIES AND MUSEUM.

THESE drawings illustrate the design submitted by Mr. Sydenham W. Richards, Cardiff, and for which he was awarded a certificate of honour. By giving a little attention to the drawings they will be found to be sufficiently explanatory without going into any particulars here. In the critique of the Institute Competitions when on exhibition, the critic, in describing these drawings, made an error which should be corrected. In drawing attention to the open arcade, shown in the perspective, he says:—"There is an open arcade along the first story of *art gallery*, the reason of which is not apparent, except to give relief to the front, and to afford the groined arcading in the gallery of antiquities below." Now, if the plans had been a little more attentively examined it would have been seen that it is an *art library*, not an art gallery, so that the arcade immediately explains its purpose as a means of obtaining quietness for the library, and as a promenade for the weary readers.

SKETCHES AT ST. LO AND LISIEUX.

THE timber-house is a specimen of what is commonly found in the towns of Normandy; it shows a rather more decorated front than many, and I should say had been one of the better class. It is a little remarkable, as being filled in with brick and not plastered, which I fancy was unusual in those days. The old stone pulpit outside St. Lo Cathedral is a relic of times long since passed away. It appeared to me a good specimen of a Flamboyant type, though I am afraid my sketch gives very little of its delicate feeling. The other two sketches are bits of the fine old cathedral at Lisieux, and are, I think, too well known to need description; they illustrate two distinct dates in the building.—A. L. TATE.

THE HEALTH CONFERENCE AT THE SOCIETY OF ARTS.

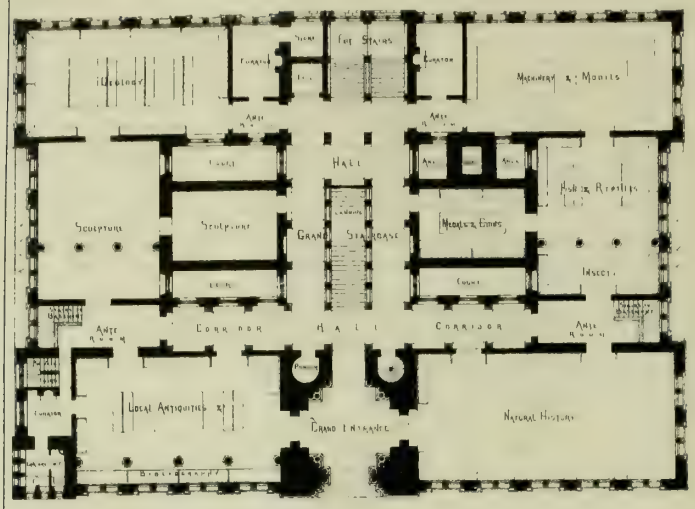
THE Fifth Annual Conference on the Progress of Public Health was opened at the Society of Arts yesterday (Thursday), and will be continued to-day. The chairman, the Right Hon. James Stansfeld, M.P., ex-president of the Local Government Board, opened the proceedings by a lengthy address, in which he lucidly traced the growth of opinion amongst sanitarians as expressed in these conferences, and urged the necessity for the enlargement and consolidation of local authorities, and the appointment of county boards. He declaimed against centralisation and compulsory legislation on public health as injurious to local bodies, as tending to keep them in leading strings, and advocated that the true aim of sanitary legislation should be to educate the local authorities in self-government, and the creation of larger bodies, so as to ease the labours of Parliament and to secure Home Rule for England. Mr. Ernest Hart read an epitome of the labours of the joint committee of the British Medical and Social Science Associations during the past nine years, and of the conclusions arrived at by them, which included the uniform application of sanitary laws throughout the country, the powers being made compulsory, and the treatment of the county boards. Mr. Cresswell pointed out that although during the past nine years the minds of sanitarians had been made up on the main points of the programme, the law had not been amended since 1871, and asked the conference to agree on a series of conclusions as axioms of 1880, not to be reopened, but to be made starting-points for future progress, and for influencing public opinion outside. After a discussion on the scope of the suggested county boards, in which Messrs. Cresswell, Chadwick, Adolph Smith, Bond (Gloucester), Alcock (Sunderland), Robinson (Dover), Gould (Kingston-on-Thames), Gale (Reading) joined, the Chairman proposed the following resolution:—"That this conference confirms the resolution passed by the conference of 1878 in favour of the institution of county boards to conduct the ordinary administrative and financial business of the county. This conference is further of opinion that such [representative] county boards should be instituted with the least possible delay, and that the functions entrusted to them and the powers conferred upon them should be wide and full, and conceived with the view of enlarging, elevating, and re-invigorating the principle of local self-government in this country; and, further, it is the opinion of this conference that such county boards or combinations of them in preference to newly-constituted authorities should be charged with the conservancy of rivers, including the prevention of floods, the storage of water and the preservation of rivers from pollution; and, lastly, that such county boards should also be charged with the appointment of county health superintendents in each county." The word within brackets was inserted in consequence of a discussion of the comparative evils of direct and indirect representation of ratepayers raised by Mr. Gould, and the resolution, having been seconded by Professor Way, was carried *nem. con.* Dr. Bond proposed that it is desirable that all local authorities should, as far as practicable, be constituted the local governing bodies for all purposes for which their area is fit. This was supported by the Chairman, Messrs. Cresswell, Domville, Alcock, and others, but objections were raised by Captain Galton, Messrs. R. Rawlinson, Gould, and Mason, and Drs. Tripe and Carpenter, and Dr. Bond withdrew it. Mr. Gould moved that—County and all other boards be directly elected by the ratepayers; that these should be held on one and the same day of the year, and a desultory discussion on simultaneous elections of all local bodies, and the comparative efficiency and economy of voting papers and the ballot. Both the resolution and a more general amendment proposed by Mr. Alcock of more general character were lost, each by a majority of one.

The members then visited Earl Spencer's house at 27, St. James's-place, S.W. Mr. Robert Rawlinson, C.B., and Mr. Robert E. Griffith, C.E., described, and showed the new system of drainage carried out for the house and stables. Till recently, Mr. Rawlinson said, Lord Spencer's town residence was one of the worst specimens of bad drainage to be found in London—it was honeycombed with cesspools, the drains were laid irregularly and at all levels, and were found on examination to be nearly choked in several cases with soil. Plans of the old and present systems of drainage were exhibited side by side. About nineteen months ago Mr. Griffith rearranged the drainage. The drains, it was shown, were all laid in straight lines with uniform falls, and led into each other at acute angles or gentle curves: a double system of disconnection was adopted; manholes provided for ready access at the principal junctions; all traps were outside the house; Stanford's pipes, simple bent siphons, and specially designed open pipes used; and ventilating shafts carried above roof. The result appeared satisfactory to the visitors, and was stated to have been practically demonstrated by the improved health of the dwellers in the house, and also of the horses.

SOANE MEDALLION COMPETITION 1880: DESIGN

CERTIFICATE OF HONOUR AWARDED TO SYDENHAM W. RICHARDS

AN ART GALLERY & MUSEUM &c



GROUND FLOOR PLAN.

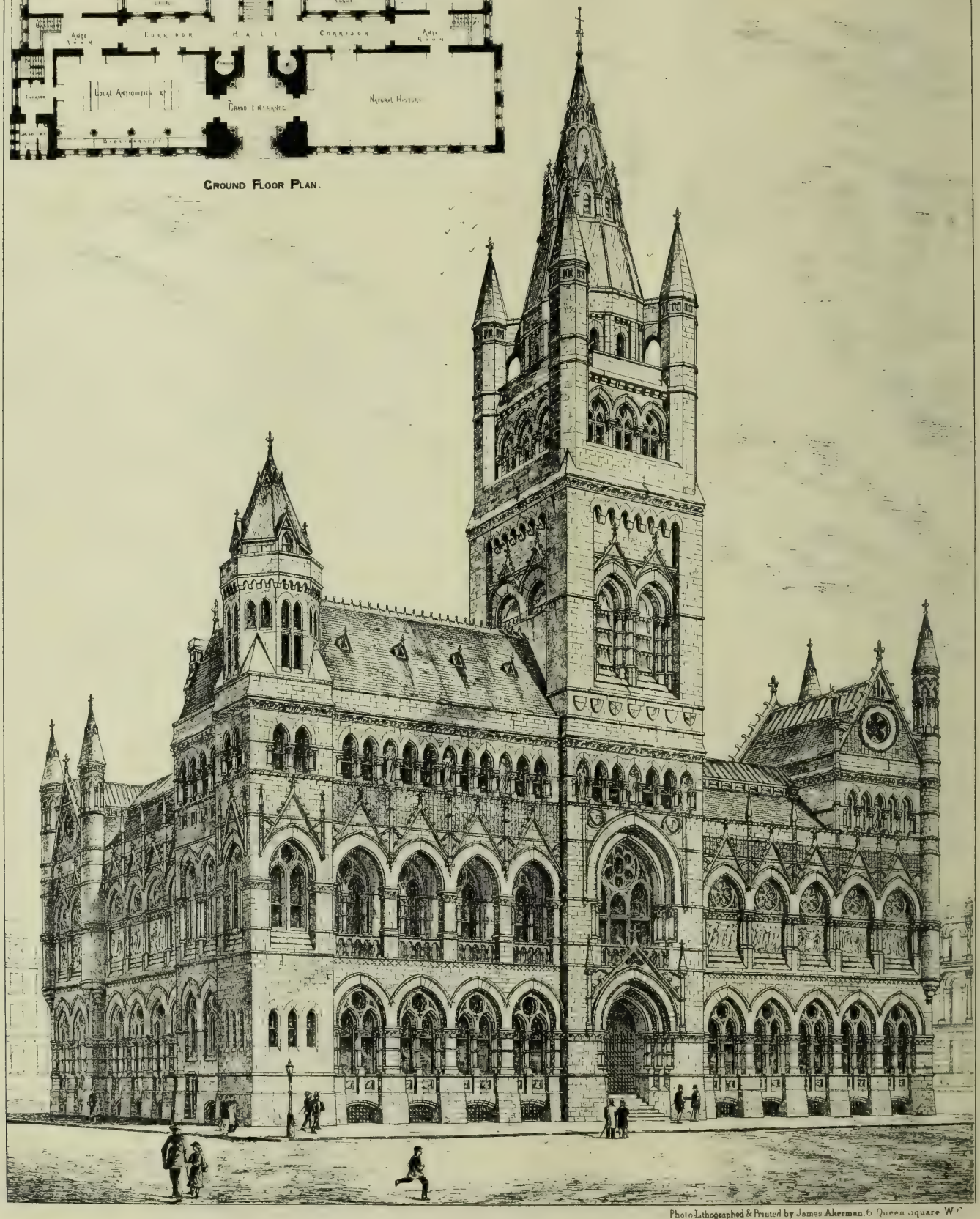
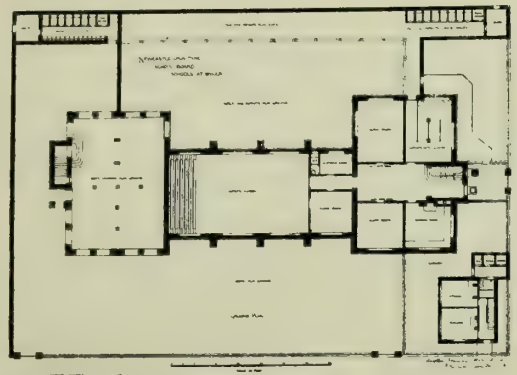


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PERSPECTIVE VIEW.

NEWCASTLE UPON TYNE SCHOOL BOARD.

SCHOOLS AT BYKER.



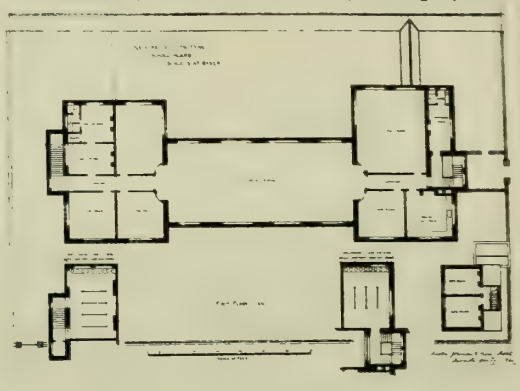
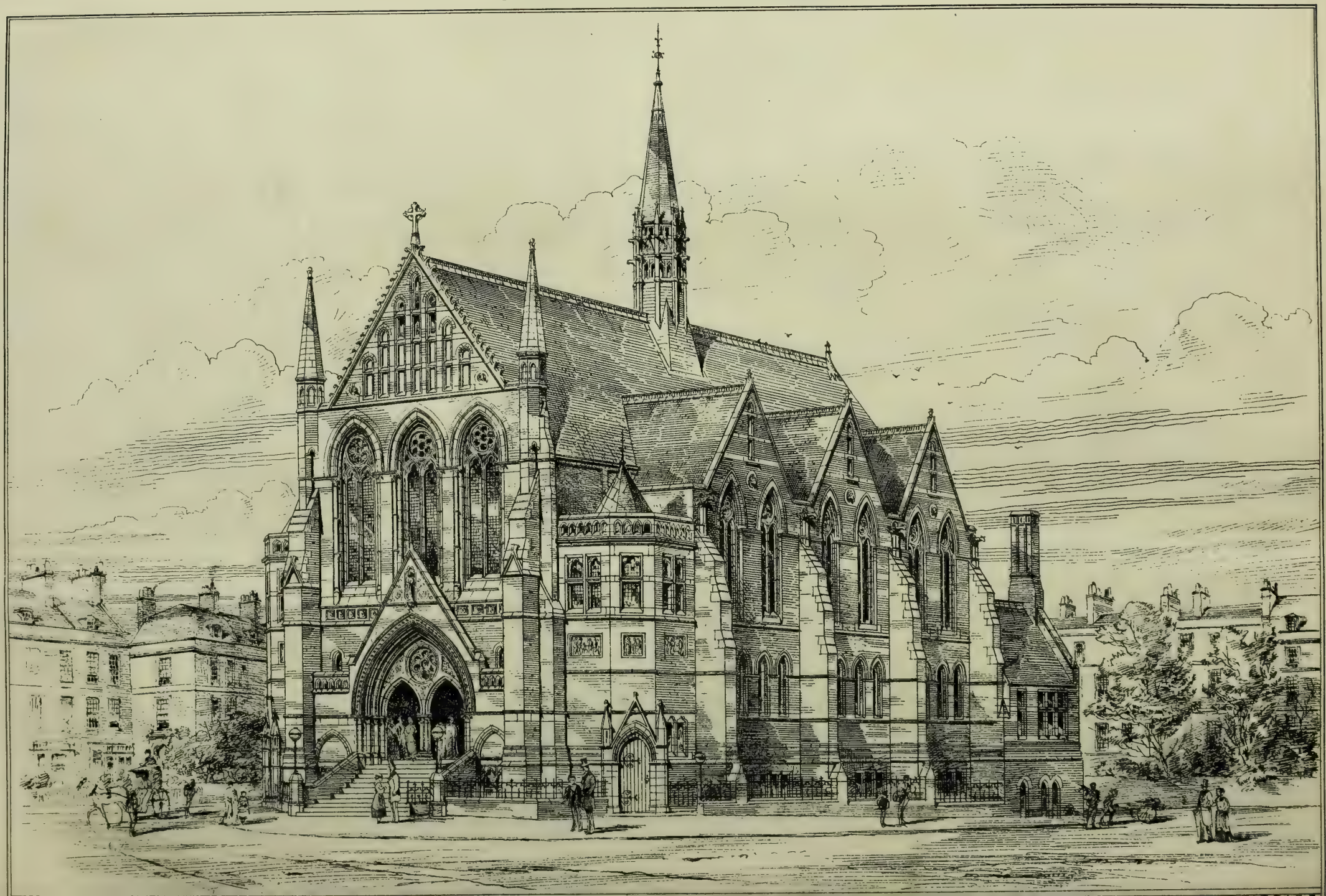
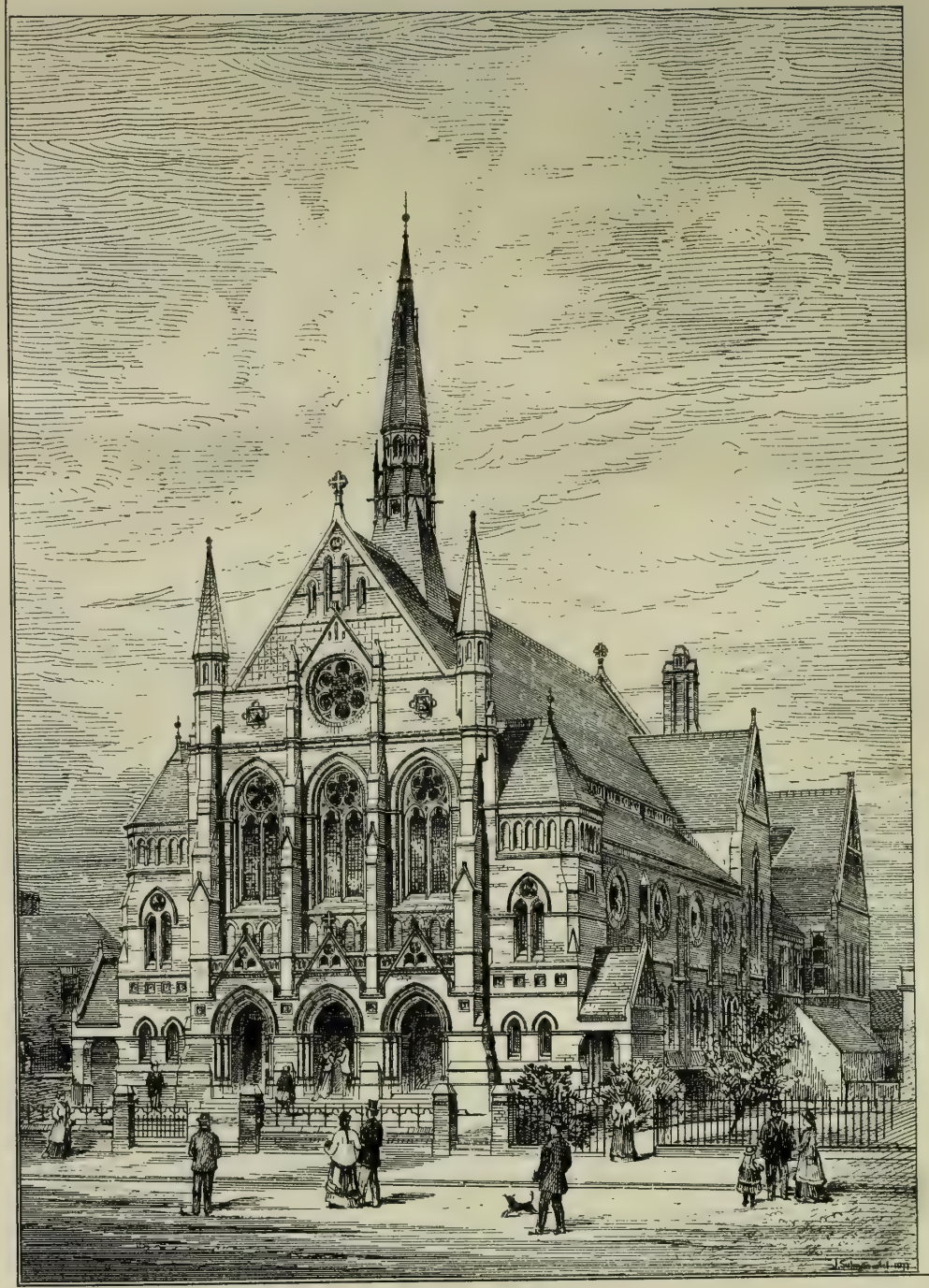




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Austin Johnson & Wells Architects
Newcastle upon Tyne. 1880.





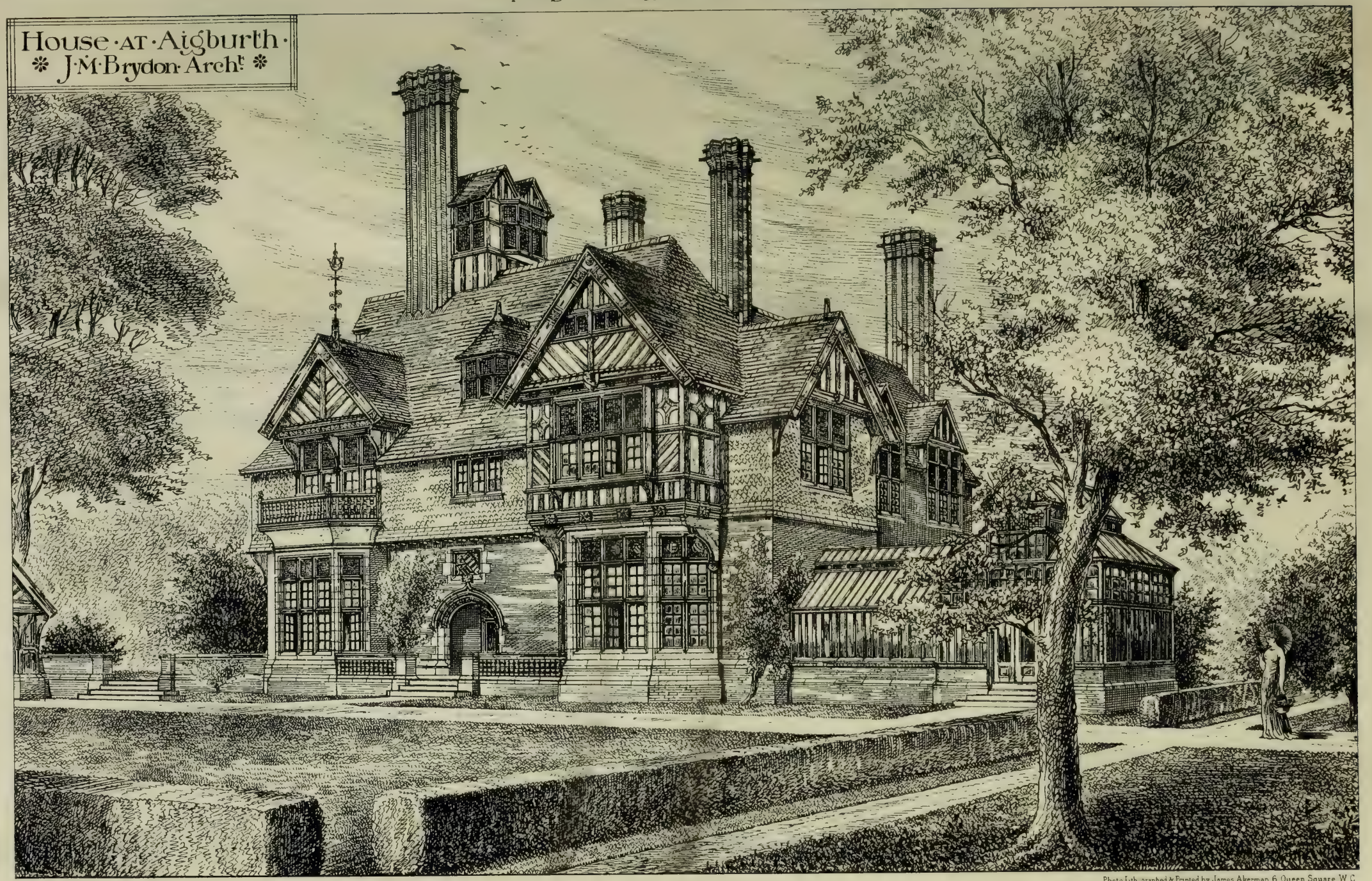


J Akerman, Photo-lith London

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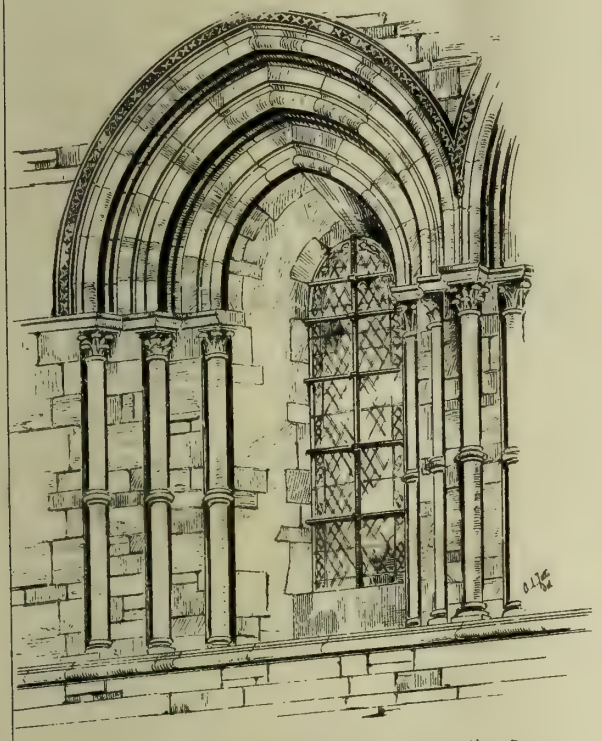
House · at · Aigburth ·

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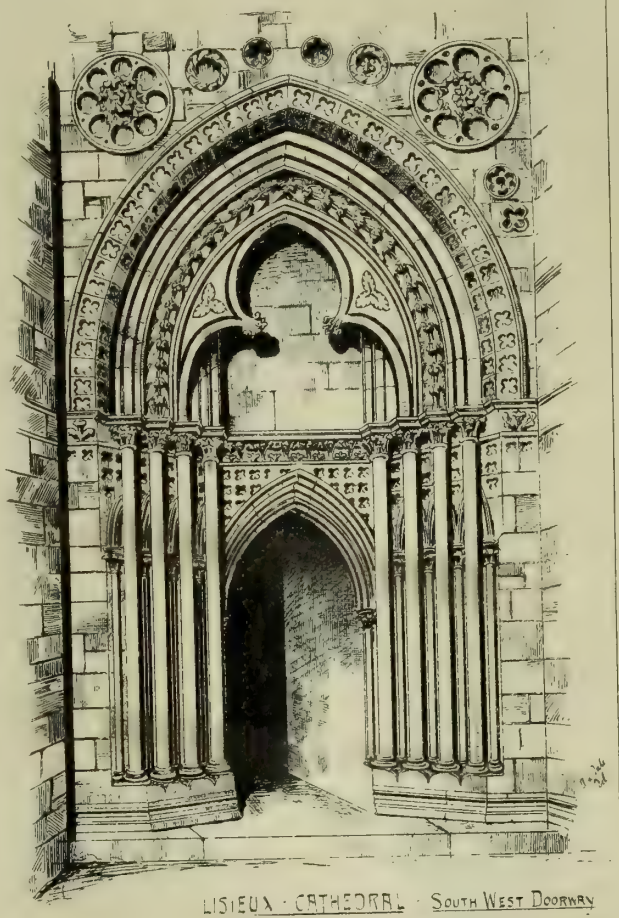


MAURICE B ADAMS DEL

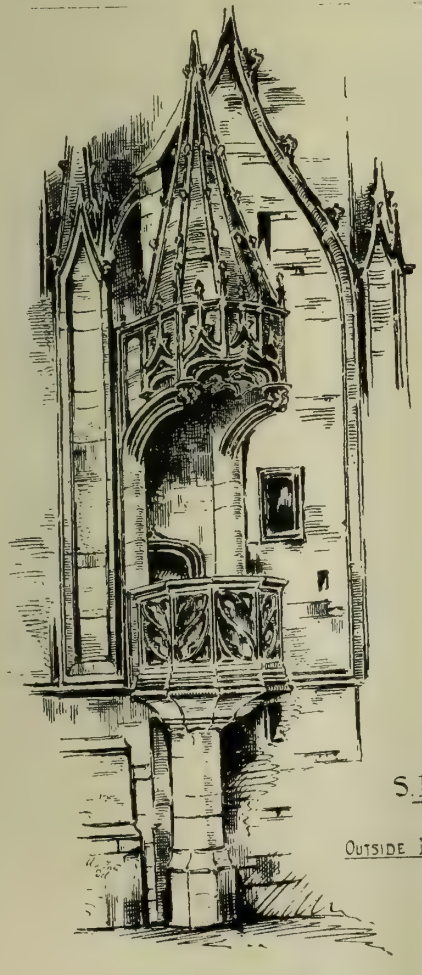
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LISIEUX · CATHEDRAL · WINDOW IN NORTH TRANSEPT



LISIEUX · CATHEDRAL · SOUTH WEST DOORWAY



S. LO. CATHEDRAL
21/9/78.
OUTSIDE PULPIT.



OLD TIMBER HOUSES LISIEUX.

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AMERICAN HOUSE CARPENTER.*

AMERICAN works on architecture are sometimes rather discursive, and include a variety of other matter more or less connected with the subject; in this respect they follow the works on building and architecture published early in the present century, such as Ware's "Body of Architecture," and Nicholson's "Principles," which treatises, besides giving us rules for drawing the Five Orders, enter into the principles of arithmetic, geometry, conic sections, mechanics, and other subjects. In the early stage of architectural literature, this comprehension in treatment had its advantages, as books on technical subjects and mathematical principles were few, and had little reference to architects' requirements. The late Mr. R. G. Hatfield, a fellow of the American Institute of Architects, and a member of the Society of Civil Engineers, published a work, some years ago, quite as universal in its way as those we have mentioned, and we have now before us the eighth edition, rewritten and enlarged, edited by his son Mr. O. P. Hatfield, F.A.I.A. We regret that the late Mr. Hatfield, who was an able practical architect, and had done excellent service in his time, and was the author of an admirable book on "Transverse Strains," reviewed by us some time since, had not omitted from his otherwise useful textbook the first few sections on architecture and styles, which looks like an unnecessary interpolation or intrusion into the main subject-matter, and our regret is somewhat intensified by finding that this part of the author's labours is quite unequal to the other parts, and is more misleading than otherwise. Of what use or purpose, for instance, is the allusion to the Tower of Babel, the short sections on Architecture in Greece and Rome, and the mixing up of Classical with Gothic architecture in alluding to the architecture of England? The proportions of the Five Orders may be useful to students and workmen, though the details given in some of the engravings are not very accurately shown, and the Roman Doric without a base is not a good example; nor can we see the object of showing an Egyptian column proportioned by modules, or the use of repeating the old tradition about the invention of the Corinthian capital told by Vitruvius. With much that is useful there is also a great deal that would have been better left unsaid in the sections on buildings and fitness of style. The plans given for a town house are compact. On the upper basement, the dining-room and kitchen occupy the front and back with a store-closet, pantry, and china-closet between. On the first-floor (or ground-story), is a very long parlour 34ft. by 15ft., and a dining-room behind 23ft. by 16ft., the corners of the room being cut off for a dumb-waiter or lift, butler's sink and closets. On the second-floor there are convenient dressing-rooms, wardrobes and cupboards between the bed-rooms, and certainly attention is paid to necessary adjuncts, while the staircase is lighted by a skylight. A series of exquisitely engraved views of historic buildings are given in Mr. Hatfield's book, some of much beauty, as the engravings of the Chateau of Chambord, the Louvre, the façade of St. Peter's, &c., but they have been rather unconnectedly distributed through the work of 600 pages, which, with the exception of the brief architectural sections of about 50 pages, is occupied entirely with construction, and the details of stairs, doors, and windows, geometry, algebra, &c., and hence the views appear lost and entirely out of place. In the sections of construction the student will find every useful problem with worked-out examples. Thus we see an example worked out showing the load that may be distributed on floor-joists, assisted by bridging, and every other kind of strain in carpentry is considered. Iron construction is entered into; the roofs with stress diagrams will be found of service, as they show many ordinary kinds of truss. Domes, bridge-construction, and other details of carpentry are given, after which the author deals with the principles of stairs and handrails, doors and windows. These sections are profusely illustrated with diagrams. Mouldings and their geometrical construction follow; but the designs for cornices, &c., are below the average, and would have been better omitted. Part II is a compendious treatise on mathematics, in which the elements are well explained by the aid of examples. This part occupies about half the book. On the whole, Mr. Hatfield has produced a manual of practical value to the young architect and building artificer who wishes to make himself a master of the mathematical principles of his work; in artistic matters it does not profess to guide, and we consider it would have lost nothing if the earlier sections had been omitted. The fact of the book having already passed through seven editions speaks volumes in its favour. In America where timber enters so largely in construction, it has a special value for the architect and artificer, and we may fitly term the book the American Nicholson.

* American House Carpenter: a Treatise on the Art of Building, &c., &c. Eighth edition, re-written and enlarged, by R. G. HATFIELD, architect, edited by O. P. HATFIELD, F.A.I.A., architect. London: Trübner and Co.

PROBUS.

"DOWN-ALONG" in Cornwall, 250 miles from London, and upon the main road to Truro, is the little village of Probus. It is half a dozen miles from the new city just named, and the same distance from the English Channel. The ground upon which Probus stands is more than 300ft. above the neighbouring sea, and so it happens that its church occupies one of the most commanding positions in the district. This church is dedicated to SS. Probus and Grace—a married couple—and is celebrated in the Western parts for its noble tower. The tower in question is over 120ft. high, and of fine proportions. It resembles a Somersetshire tower more than it does the general run of its Cornish neighbours, and, in some respects, reminds one of the Magdalen Tower at Oxford. It was erected in the middle of the 16th century; but although an undoubtedly magnificent tower occupying a superb site, it is questionable whether the majestic old Perpendicular tower of St. Andrew's at Plymouth—built nearly a hundred years before—is not quite as good a one. It was by the bells in St. Andrew's tower, by the bye, that the joy-peal was rung when the news first came that our plucky little fleet had thrashed the Armada of the blustering Spaniards. Certainly, it (Probus) is not so graceful a one as that of St. Pancras, at Widdecombe - on - the - Moor, another granite tower of about its own height, and of which I have the authority of the late Sir G. Gilbert Scott for defining as the most beautiful tower west of Exeter.

Cornwall is unique; it is separated from the rest of England by history, by geography, race, climate, natural features, and local industries. Its coast-line is superb; everywhere a hundred clefts and inlets break into the green rampart of the hills with lovely little bays, wherein the blue and silver sea sleeps, whilst outside, the big billows burst in clouds of spray beneath the shadow of the bleak cliffs. Down by the Lizard, where the serpentine comes from, the very stones in the road are so many jewels, whilst in such romantic spots as Kynance Cove, the rocks and boulders, polished by the action of the ever restless waves, glitter, bright as any lapidary's work, here all green and crimson, and diversified there by the more sombre tones of the soap-stone, and the china stone, and the greyhorn blende. Again one sees, especially upon Cornwall's north coast, vast sands and sweeping bays, whilst, further inland, are bare, rolling moorlands, broken by countless furnace chimneys and mountains of mining waste. Therein lurk the veins of copper, of tin, of ironstone, and of lead, which the enterprising old Phœnicians came so far to seek, and which is still sought for, although not profitably, alas! until this very day. Cornwall is the land of legends and superstitions, bred by isolation from the immediate neighbourhood of two oceans, and from the old language and faith of its inhabitants.

Hence, when in your issue of the 28th ultimo, Mr. Edward Ashworth recorded the curious old story, which seemed, in a quaintly humorous way, to account for the important church of St. Mary, Truro, just converted into a cathedral, having so poor a tower, and the poor little church in the neighbouring hamlet of Probus having so dignified a one, we were all, more or less, interested; and remembering Captain Cuttle's advice, "When found, make a note of it," most of us did, no doubt, proceed to make a mental note of the fact, and stow it away in the library of our recollection for future use. I know that I did!

It was with much surprise, therefore, that I have read Mr. John D. Sedding's attack upon Mr. Ashworth in the current week's issue. Mr. Ashworth is by no means a young man; he is, I believe, with one single exception, the senior practising architect in the West of England, whilst, of the world generally (I speak of the four quarters of the globe) Mr. Ashworth has probably seen more than the generality of men have seen, or are ever likely to see. And he still continues to be—what he has ever been—one of the hardest working men in England. I dare venture to say that Mr. Edward Ashworth measured and drew more towers in Devon and Cornwall, and read more papers thereon, before Mr. Sedding was born, than ever Mr. Sedding has done in all his life put together.

The same issue of the BUILDING NEWS publishes a report of a paper Mr. Sedding read recently at St. Paul's Chapter House, upon Perpendicular Gothic. Therein, amongst much interesting matter, the lecturer endeavoured to propound the problem that the Perpendicular style, so popular with many of our best architects, was a sort of Esau against whom everybody has set his hand. From Mr. Sedding's own particular point of view (see p. 651), there are not six men in the profession who are able to *think* in the Perpendicular, or, to express themselves sympathetically through its forms. The memorial relative to architectural competitions was signed the other day by 1,274 architects. Of all these, by Mr. Sedding's account, there are only five men, besides *himself* (for it is to be presumed, Mr. Sedding includes himself amongst the thinking six), who possess the necessary capacity for appreciating Perpendicular work. Now this sweeping and really startling assertion is very much on a par with the one he makes in his letter upon Probus Church Tower (p. 674), wherein he sums up the praises of the structure in question by saying that "it is in every way fit to be compared with the best towers of any date in any part of England." Boston to wit, we will say, just for the sake of argument.

Mr. Sedding has let his native Cornish enthusiasm carry him a little too far. True it is that pickled pilchards and parsley pasties are luxuries for which the West Countryman yearns, and sighs ofttimes in vain for, when far away in a London-made home. And true it may possibly be too that Cornish towers in general, and Probus tower in particular, may seem finer than all towers when seen through that magnifying glass—the mind's eye—from the same distant point of view; and no one would be disposed to quarrel with Mr. Sedding for showing his patriotism in that particular fashion. But when, in doing this, a fellow follower of the same profession, and an honoured one, is attacked in no choice language; told that he knows nothing, and is further accused of hostility to the very style of work Mr. Sedding knows perfectly well the architect in question is most partial to, it is going a little too far.

Mr. Ashworth is not only an architect, but he is a gentleman, and all who have had dealings with him have experienced many a kindly act, or thoughtful little attention, at his hands. I will conclude by recording one characteristic incident illustrative of this:—Not many years ago, the parish-church of St. Mary, at Rewe, not far from Exeter, was in a measure restored by Mr. Ashworth. The Vicar, however, having expressed a wish that a personal friend of his should do the chancel part, Mr. Ashworth, with his usual good feeling, at once acceded to the desire. So one day, down came the new architect to take the old roof's dimensions, and make other measurements. The elements were against him, however: it rained in torrents, and the thing was impossible. Mr. Ashworth, presuming that he would have the work to do, had, some time before, made measured drawings of what was required, and, with his usual good-nature, taking pity upon his brother-practitioner's ill-luck, he at once begged the new comer to accept the careful set of drawings he had made for his own especial use. The gentleman to whom Mr. Ashworth gave those drawings was named —— Sedding!

HARRY HEMS.

A memorial to the officers and men lost in the *Eurydice* is in course of erection in Shanklin cemetery, Isle of Wight. The monument will stand 8ft. high. It is carved in Portland stone, by Mr. Moynihan, of Shepherd's Bush, London.

TEMPLE CHURCH, MIDLOTHIAN.

ALTHOUGH situated comparatively near a great centre of education and architectural enterprise, the beautiful remains of the church or preceptory chapel of the Knights Templars, at Temple, in the county of Midlothian, are not so well known or appreciated as the excellence of its architecture deserves. Perhaps this may be chiefly attributable to its being placed at some little distance from any railway station, and in a thinly-populated district. The distance from Edinburgh is ten miles, and until the pedestrian is close to his destination, the scenery is not such as to repay him for his labour. The site of the church is in a beautifully wooded valley, traversed by a wide stream; it is very quiet, and reached by a narrow lane which leaves the main road just before it enters the village, near the top of the hill. A glance at the church and its surroundings carries the conviction that it is not one of the tourist's standing dishes; the healthy condition of the weeds, and the long grass growing beside the tombstones, at once impresses the beholder with a sense of neglect, and of the rare presence of strangers in its vicinity. The plan of the church is a simple oblong about 56ft. long by 17ft. 6in. broad; it does not lie exactly east and west, but nearly east-north-east by west-south-west, and the ground rises sharply a few paces from the east end. The chief beauty of the building is the east end, which is a perfect masterpiece of architectural design. The gable is surmounted by a simple bellcot, admirably adapted in proportion to the substructure. The east window is of three lights, the head being a good example of early tracery, but without cusping. The angles are strengthened with gableted buttresses at right angles, and the plinth mouldings give a firm base-line.

The harmonious simplicity of this excellent piece of early Gothic work is well worthy of the study and admiration which are more frequently bestowed upon the heavily-ornamented specimens of later periods. At the east end, on the north side, there appears to have been a small vestry; on the north side of church there is a small doorway, with a pointed cusped head wrought out of a single stone. There are no signs of stone vaulting; probably the roof was simply wood. The west end, and a small part of the side walls, starting from the west, are built of rubble both inside and out, and the details are of a coarser quality; all the rest of the church being of ashlar. In several places, square windows for sashes have been cut through the walls in modern times, and a three-light window on the north side has been walled up; a modern entrance has also been cut in the wall at the east end on the south side; and it would seem that, at one time, the idea of making it into the parish kirk had been entertained, but, fortunately, abandoned before irreparable damage had been done. There are two lancet windows opposite to each other, about 16ft. from the west wall; they differ slightly, excepting the scointion arch of that on the south side is deeply moulded, and the other is plain. The tracery in the two three-light windows on south wall is very remarkable, the head of the central light following the curve of the circle which pierces the space between the two lancet heads; the scointion arches of these windows are well moulded. The sedilia on the south side is a double one, and the seats are divided by a filleted roll with a hollow on either side which forms a simple cusped head to each, and runs down the jambs. The piscina, which is close to the east end on the south side, has a peculiar trefoil cusped head, the side cusps of which convey the impression of a horse-shoe arch, and which may have been thus designed to accommodate a crucifix. On the north side, there is, under the sill of the three-light window east of the small doorway, a low segmental arched recess about six and a half feet between the jambs, the arch of which is finely moulded, the jambs being splayed. There are no remains of any monument, which makes the supposition that it was an Easter sepulchre more probable. The interior of the church has been used as a burial-ground, and the dust of rude country boors has mingled with that of the once haughty knights of Temple. The gravestones stand against the side walls, and a path runs up the centre of the church, with grass growing on either side, thickly interspersed with weeds and nettles. The ground inside the church slopes from east to west. W. H. M.

COMPETITIONS.

DERBY.—The Committee for the erection of St. Chad's Church have received Mr. Ewan Christian's report on the drawings submitted in competition, and have accepted the design furnished by Mr. Turner, of London. The following seven designs were recommended as suitable by Mr. Christian:—G. Enticknap, Manchester; "Faith"; Austin, Johnson, and Hicks, Newcastle; G. H. Reid, London; G. Freeth Roper, Manchester; E. Turner, Leicester; and H. G. Turner, London. The whole of the designs sent in to the building committee were forwarded to Mr. Christian.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

ANTHROPOLOGICAL INSTITUTE. — At Tuesday night's meeting of the Anthropological Institute, Mr. F. G. Hilton-Price, F.G.S., read a paper on "Camps on the Malvern Hills." Last September, having obtained permission from Lord Somers, to excavate in any part of the camps on these hills, he set his labourers to work, first on the Hollybush-hill, on the south side of the Malvern range, and afterwards on Midsummer-hill, both of which were encircled by a deep ditch and a rampart, while in the glen between the two on the south side was the site of a British town about 1,100ft. in length. In the interior of the ancient camp on the Hollybush-hill were many hut hollows, some of which he opened, but without making any discovery. On the east face of Midsummer-hill were several lines of such hollows, which, like the rest, had been habitations, and no fewer than 214 had been counted. Along the ravine between the two hills were four tanks, having the ancient dams for holding back the water still in existence. The explorations of these camps were not very fruitful. More productive were the excavations on the Herefordshire Beacon Camp, one of the largest and strongest earthworks in the district. It had usually been looked upon as of British origin, and Mr. Price saw no special reason for doubting it. In one hut hollow much coarse black pottery was met with, and there were besides many bones of the ox, pig, horse, sheep, dog, some kind of gallinaceous fowl, and of the deer. A description was given of the huge block of syenite known as the "Divination Stone." It was mentioned that in 1650 a jewelled gold crown or bracelet was found in a ditch at the base of the Herefordshire Beacon. Camden had written of it, and in a MS. said to belong to Jesus College, Oxford, it was stated to have been sold to a Gloucester goldsmith for £37, who sold it to a jeweller in Lombard-street for £250, who sold the stones alone for £1,500. There were many traditions as to coins found there; but their dates were uncertain. Mr. Price thought this large camp, as well as those on Hollybush and Midsummer hills, were of late Cymric or Celtic origin, that the latter camp was of earlier date than that on the Herefordshire Beacon, and that in all likelihood they were occupied by the Romano-British, as many remains of those tribes existed in the district, and the pottery seemed to date from that period.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—The last ordinary meeting of the session was held on Tuesday evening at the rooms of the Association, Queen's College. The chairman, Mr. R. B. Morgan, presided. Mr. George Ingall was elected President of the Association for the ensuing session. The following members were elected to serve on the Committee, most being re-elected:—R. B. Morgan (chairman), A. Freeman Smith (treasurer), Fred. G. Hughes (hon. secretary and librarian), F. W. Cross, O. Essex, W. H. Kendrick, H. H. McConnal, J. P. Osborne, A. Reading, and E. Wood. Messrs. T. Jones and F. E. F. Bailey were appointed auditors. Mr. Thomas Brawn, art metal-worker, was elected an honorary member. Votes of thanks were passed to the retiring officers.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The concluding meeting of the session was held last Wednesday week, Mr. Syer Cuming, F.S.A. (Scot.) in the chair. It was announced that the Devizes congress would commence on the 16th of August, the Earl Nelson having been elected president for the congress and the following year. The death of Mr. Planché, vice-president, was referred to in fitting terms. Dr. Stevens announced the discovery of Roman remains at Carton, Wilts, in a position that appears to indicate the existence of buildings at no great distance. A seal, found at Barnes, was exhibited, with an inscription, "Johanna de Breneford." Dr. Kendrick exhibited a curious wooden spoon with the crowned heart of the Douglas family; Mr. Moore Hyde a silver goblet with portraits in relief. Dr. Woodhouse described the progress of the demolition of Old Fulham Church, and produced several early flooring tiles. The monumental slab of Bishop Hunchman has also been found. Mr. W. Money, F.S.A., exhibited photographs of the carved bosses of the roof of St. Nicholas Church, Newbury, which are boldly carved with the emblems of our Lord's passion. The Rev. S. M. Mayhew described several beautiful objects of antiquity, and also a portrait of the Duke of Cumberland painted on glass in China. Mr. C. Brent, F.S.A., exhibited a curious MS. relating to accounts paid by Cecil, Lord Burleigh, 1593. The first paper was by Mr. C. W. Dymond, F.S.A., on "Cup Marking on Burley Moor," and was read by Mr. W. de Gray Birch, F.R.S.L., in the author's absence. It was descriptive of a series of curious markings on a stone of large size which had hitherto escaped observation. The second paper was on the site of the village of Wrangholm, near Old Melrose, the birthplace of St. Cuthbert, by Mr. E. Frier, and was read by Mr. Loftus Brock, F.S.A. The third paper was by Mr. Thomas Morgan, F.S.A., on Roman inscriptions from Italy, and now built up into the walls of a mansion at Higham, Kent. They are all sepulchral in character, and are mostly surrounded with architectural borders of great beauty. They were brought to England in the last century, when the collection of Classical antiquities was so prevalent. The paper is the second of a series on similar collections in England, and it is to be hoped that others may follow, that a permanent record may be kept of these contributions to history which are, at present, difficult of access or comparison. Mr. George Wright, F.S.A., reported the arrangements for the congress, and named the places to be visited.

LINCOLN DIOCESAN ARCHITECTURAL SOCIETY.—The annual meeting of the Lincoln Diocesan Architectural Society took place on Tuesday and Wednesday at Retford. At half-past nine o'clock in the morning between 60 and 70 ladies and gentlemen assembled in the West Retford Church, when afterwards the architectural features of the fabric and of East Retford Church were described by the Bishop of Nottingham. The latter edifice had a most unfortunate history. In the years 1528 and 1582 the church suffered from fire, and in the following century the central tower was blown down. In the forenoon the members were driven to the churches at Sutton, Blyth, Mattersey, Everton, Clayworth, and Hayton. At Blyth the Rev. Precentor Venables gave a short description of the fabric, which is distinguished as being in the purely Norman style of architecture. On their return to Retford the members dined together. At eight o'clock a meeting was held in the Council Chamber of the Town Hall, where a number of objects of interest were on view. The Mayor of Retford (Ald. Wilkinson) gave an account of the history of the borough. The Rev. Precentor Venables subsequently read a paper on the Church of Blyth. On Wednesday the society made other excursions to churches of interest in the district, and several papers were read. Mr. C. Hodgson Fowler, F.S.A., of Durham, read an exceedingly interesting paper on the parish-churches of Nottinghamshire. After some introductory remarks, he compared the general architecture of the churches of the county with those of other counties, and said he would leave the great collegiate institutions and allude only to the parish churches. The Saxon remains were few, and specimens were in existence in Farndon, at Carburton, and elsewhere. The Norman work was extremely limited so far as his observations went. In the 13th-century came the Early English style, features of which were observable in Muskham, St. Peter's, Nottingham, Mansfield, Gedling, and many other parishes which he mentioned, including Upton, Farndon, Rodestan, and Radcliffe. In the 14th century the Decorated style prevailed, but there were few churches built of this character. He referred at some length to the peculiarities of the churches of Newark, Houghton, and Sibthorpe, much of which he ascribed to this

particular epoch. The principal feature was the tracery of the windows, which were divisible into two classes—the square-headed and arched—and he pointed out where specimens might be seen. Alluding to the Perpendicular style of the 15th and 16th centuries, he said the chief characteristics were observable in the towers and clerestories, and he pointed out the churches in the county where they might be seen, especially the familiar eight-pinnacled towers. He had seen one church that day with twelve pinnacles, the first he had yet seen. He pointed out the necessity and desirability of preserving the ancient local features of all parish-churches, and regretted certain novel changes which had been made during the recent restoration of the parish-church of Ordsall, Retford. He urged that the "mania" for pitch-pine in the modern benches should be stopped. He greatly admired the work done in the parish-church of Plumtree.

PARLIAMENTARY NOTES.

THE WATER SUPPLY OF LONDON.—Sir W. Harcourt, on Thursday week, moved the appointment of a Select Committee to inquire and report as to the expediency of acquiring on behalf of the inhabitants of London the undertakings of the existing Water Companies within the Metropolitan area, and also to examine and report whether certain agreements, or any of them, already entered into provisionally for the purchase of these Companies, would furnish a satisfactory basis for such an acquisition; and, further, to inquire and report as to the nature and extent of the powers of the Water Companies to levy water-rates and rents, and how far it may be desirable to modify the same. Sir R. Cross approved of the appointment of a committee, but expressed a hope that it would not be made use of to hang up the question. After some discussion the motion was agreed to.

MAINTENANCE OF HIGHWAYS.—Mr. Sotheron Estcourt proposes to make the owners of horses pay specially towards the maintanance of highways. The bill that he has introduced on this subject would compel every one who keeps a horse within the district of any highway authority to take out a licence from the authority. The sum to be paid for the licence is fixed at 10s. in respect of each horse. Among the exemptions included in the bill are horses kept solely for the purpose of husbandry or use in the business of a market gardener; also horses used solely in an underground mine. The bill is limited to England, and does not include the metropolis in its operation.

CHIPS.

The memorial-stone of a new Congregational church, at Holt, was laid on Wednesday week. The cost will be £1,500. The style is Early English, of the 14th century. There is a nave, transept, and west aisle, and provision is made for an east aisle at some future time. Mr. Ponton, of Warminster, and Mr. Brown, of Hilperton, are the builders.

New out-relief buildings for the Manchester guardians of the poor will very shortly be occupied. They front New Bridge-street, and comprise administrative buildings, male and female tramp-wards, and temporary lunatic-wards. Messrs. Mills and Murgatroyd are the architects.

St. Barnabas' Church, Ashton-old-road, Openshaw, was reopened by the Bishop of Manchester on Saturday, after alterations, including the removal of the old three-decker pulpit, and the erection in its stead of a lofty octagonal structure of Painswick stone, and Decorated Gothic in style, and the replacement of high pews by open benches of varnished pitch-pine. The restorations have been carried out from the designs of Mr. G. Enticknap, of Manchester, and the pulpit was erected by Messrs. Earp and Hobbs, of the same city.

A vestry meeting was recently called at Tolleshunt D'Arcy, near Maldon, to consider the plans of the architect, Mr. Hayward, of Colchester, for the restoration of the church. The plans were accepted, and Mr. Hayward was instructed to advertise for tenders. It is proposed to remove the present seats and put in benches; to remove the pulpit to the opposite side of church, and to reseat the chancel. There will also be a new reading-desk and lectern.

The Baptist chapel at Wilden, Beds, was re-opened on Sunday week, after renovation and repairs, carried out by Mr. W. Wootton, builder, of Shefford.

The School-board for Warley decided on Friday to erect new boys' schools at Tuel-lane, Sowerby-bridge. Messrs. Utley and Gray, of Halifax, were, by a subsequent resolution, appointed the architects for the work.

Building Intelligence.

BALLYMACARRETT.—A new Presbyterian church has been erected at Ballymacarrett. The main body of the church, completed, is approached through a spacious vestibule by two deeply recessed doorways, with two orders of moulded arches, supported on columns with moulded bases and carved caps. Above these doorways are placed two large traceried windows lighting the main body of the church. All the main walls are built of local stone, in random-coursed work, with dressings and strings of Scrabo sandstone. Mr. J. Russell was the builder. All the works have been designed and carried out under the superintendence of the architects, Messrs. Young and Mackenzie.

BRAMPTON, CUMBERLAND.—New banking premises have been erected here for the Carlisle City and District Banking Company. A manager's house has been provided above the bank. The new buildings are of stone, and occupy a central position in the market-square. They are designed in the Early Gothic style, and have been carried out from plans and under the superintendence of Messrs. Hetherington and Oliver, of Carlisle.

CAMDEN TOWN.—The corner-stone of the new Church of St. Michael, Camden-town, was laid on Saturday afternoon. The church, of which Messrs. Bodley and Garner, of Gray's Inn, are the architects, will be in the style of the earlier part of the 14th century. A view of the interior is at the Royal Academy. At present the nave only will be built; but it will, when completed, have nine bays, and will be of one continuous height. There will be a barrel vault, and the apex of the arch, internally, will be about 60ft. from the floor of the nave. The total internal width will be about 56ft. The church will be chiefly lighted by clerestory windows, the windows in the aisles being few and subordinate. The total length, when the choir is built, will be about 140ft. Brick will be used for the structure, the piers, arches, and windows being of stone. The site for the church cost £2,400.

DENHOLME.—The corner-stone of a Mechanics' Institute was laid in the Keighley-road, Denholme, on Saturday week. The building will be a plain Italian structure. The ground-floor will contain central entrance and corridor to a reading-room 20ft. by 15ft., smoking and play-room 30ft. by 15ft., class-rooms 36ft. by 20ft. and 20ft. by 15ft., and a library 15ft. by 10ft. Over these on the first-floor is a lecture and concert-hall, 60ft. by 36ft., and seating over 400 persons. The site was given, and the building, exclusive of fittings, will cost £1,800. Messrs. Milnes and France, of Bradford, Yorks., are the architects.

HANDSWORTH, NEAR BIRMINGHAM.—Memorial stones of the new Wesleyan Theological College were laid at Handsworth on Tuesday. The college, which is now one story high, will, with its grounds, occupy about seventeen acres. It is situated at the junction of Grove-lane and Friary-road. The chief frontage will face north-west, and will be relieved by a central tower and flanking projections of library and governor's house at either end. It will be treated in Collegiate Tudor style, the materials being red brick for the walling, and buff terra-cotta for all dressing, with red tiles for the roofs. Accommodation is provided for seventy resident students. The library, with a large seven-light bay window to the fore and three-light windows between the buttresses on the flank, will form a prominent feature from the road. The governor's house at the right is treated in a more domestic manner, with a double gable front. The studies range along the intermediate frontage, with two-light mullioned windows. Five classrooms, and a large lecture-hall will comprise the teaching department. The library will be 44ft. by 28ft. and the dimensions of the dining-hall are 48ft. by 30ft. This hall is entered by the students from an arcade in the west corridor, and by the servants from the serving-room at the other end. The wings are occupied by the studies on either hand of the main corridors. The governor's house communicates with the main corridor by a short passage. A detached sick-ward of five rooms, provided for infectious cases, will be placed at the extreme right of the college. The architects are Messrs. Ball and Goddard, of Waterloo-street, Birmingham, whose design selected in competition was illustrated in the BUILDING NEWS for July 25th, 1879. The contract, which amounts to £24,150, includes the erection of two detached residences for Professors. Mr. W. H. Parton, of Balsall Heath, is the builder. The college grounds are to be arranged under the direction of Mr. Vertegans.

HINTON AMPNER.—The church of All Saints' Hinton Ampner, was reopened for divine service on Thursday week. A new nave has now been rebuilt on the lines of the old, with the exception of a further extension of 10ft. westward, exclusive of a new tower. A new south porch is also added. A small vestry is placed at the north-west extremity of the nave. A west tower has been constructed, surmounted by an oak turret, containing the three bells, of 17th-century date. The walls are of flint, with dressings of Bath stone, the roof being constructed of red deal, and covered with local red tiles. The floor of the nave is on a level with the old, the chancel being raised a step above throughout its divisional length, and it is paved with glazed encaustic tiles from the works of Messrs. Craven, Dunnill, and Co. York-stone steps are introduced at the various levels, and a handsome polished brass altar-rail and standard supplied by Messrs. Hart, Son, Peard, and Co. The old pulpit has been placed on the north side of the nave, with new oak base and adaptations. The font is of Bath stone, with polished alabaster shafts, executed by Mr. John Roddis, of Birmingham. The lectern, which is of polished brass and iron, also the entrance-gates to the south porch, and the vane and finial to the tower, have been obtained from Messrs. T. Brawn and Co., of Birmingham. The total cost will be about £2,550. The works have been carried out by Messrs. J. H. and E. Dyer, of Alton, from the designs and under the personal superintendence of the architect, Mr. Capel Nankivell Tripp, A.R.I.B.A., of Eldon Chambers, Gloucester.

WALTON-LE-DALE.—The foundation-stone or new Local Board Offices, Walton-le-Dale, near Preston, was laid by Mr. Richard Calvert, Chairman of the Board, on Monday, June 7th. The site contains about 1797 superficial yards, and comprises several blocks of buildings. The main offices consist of, on the ground-floor, entrance and staircase hall, office 12ft. × 12ft., weighing office and waiting-room, divided by a panelled screen, 18ft. 3in. × 12ft. 6in., drawing office, 18ft. 3in. × 11ft. 0in., and in the rear kitchen, 16ft. × 12ft., scullery, pantry, and out-buildings. On the first floor is the board-room, 24ft. 3in. × 18ft. 3in., plan-room, lavatory, and three bed-rooms. The materials used will be brick with stone dressings, the board-room, staircase, and main rooms, of selected pitch pine. In the rear of the yard will be the stables for three stalls, harness-room, stone-breaking sheds, tool-house, disinfecting shed, and other conveniences. The whole site will be inclosed by a brick wall, &c. The work is being carried out by Mr. Henry Ward, of Preston, for £1,782 14s. 5d. The buildings are being carried out from designs by Mr. S. Harrison Myres, A.R.I.B.A., (Myres, Veevers, Myres), of Preston, and Westminster, and Blackpool.

WEST ANSTEY.—The church of West Anstey, near Southmolton, was reopened on June 2nd, after restoration, at a cost of £1,400. The church (St. Petrock's) is a neat structure, consisting of chancel, nave, north aisle, south porch, and western tower, and is built of local rubble stone, with dressings partly of local stone of very pleasant colour, and partly of Ham-hill stone and Bath stone. In order to preserve the original proportions of the chancel, a pillar with a side-arch has been built. A new open-timber roof has been constructed, and the door and windows have been removed. New roofs also have been put up to the remainder of the church, none of the old wood being available for the renewal. The porch roof has been replaced with new oak, the old design being followed as accurately as possible. It was found necessary to rebuild nearly the whole of the north aisle, and to insert new windows. New windows have also been inserted in the nave. The old entrance oak door has been preserved and repaired. The porch entrance has been rebuilt. The reredos consists of an oak canopied framing, with a cross in the centre pannel, and angels painted on the double panel on either side. The church

is paved with Maw's tiles, with diagonal coloured border. The architect for the work was Mr. W. White, F.S.A., of London, and the builder Mr. John Cock, jun., of Southmolton.

WINCHESTER.—A memorial chapel is about to be erected in memory of Bishop Utterton at the Training College, West Hill. It will be built from the design of Messrs. John Colson and Son, the former of whom designed the college. There will be accommodation for 100 persons, the length of the little sanctuary being 45ft., and the breadth 21½ft. There will be an organ chamber in the north side, and the chapel will be divided into four bays, the eastermost forming the chancel. The western gable will have a rose window, and on the sides will be eight tracery-headed windows, the roof division of the nave and chancel being marked by a bell-turret. The walls will be faced with Swanage stone with Bath stone dressings. The height will be 35ft., and the roof will be open-timbered and truss-raftered with tie beams, and tiles will cover the roof.

WORCESTER. — Extensive additions to St. George's Catholic Church have been going on for months, the principal feature being the building of a new chancel, which was opened on Sunday. The church was erected 50 years ago in the prevailing manner of that period, the plan being a simple parallelogram, 40ft. in width, in one span, with a shallow recess at either extremity. The columns, cornices, and other ornamental features, were all carefully copied from ancient Greek examples. The church has now been completed, by the erection of a sanctuary, transepts, two side-chapels, a baptistry, confessionals, and a sacristy, over which is a large room for use as a library—all designed in harmony with the original structure, but with the style more freely treated and with greater variety of detail. The original massive columns and pilasters now form a screen to the chancel, which is lofty and is lighted by a clerestory. The altar-piece is principally of marble-work, inclosing in the centre the copy of Raphael's "Transfiguration," which formed the old altar-piece; to this has been added triptych wings, painted with figures of SS. Oswald and Wulstan, and of SS. Ignatius and Francis Xavier. Immediately behind the high altar is a painting on a gold ground—Archangels and Angels adoring—by Mr. Joseph Bouvier, of London, who has also painted the large side figures. Both the side-chapels have altars decorated with marble, alabaster, and modelled work. The general contract has been carried out by Mr. J. Kendrick, and the three marble altars and pulpit have been executed by Mr. W. Forsyth, of Worcester, the whole from the designs of Mr. S. J. Nicholl, of 1, Caversham-road, London.

CHIPS.

The Sheffield board of guardians last week met with some personal feeling a proposal to rescind a resolution passed at the previous meeting, by which it had been decided to carve on the corbels of the men's dining-hall of the workhouse, the heads of ten of the oldest guardians. The absurdity of spending money on such decoration in paupers' dining-rooms was strongly urged, and the motion for rescinding was carried, it being decided to leave the stone on which the chairman's head is carved as it is, to place the Sheffield borough arms on another, and to leave the others plain.

The vicar of Kenwyn, by Truro, having recently given up his residence for the use of the bishop, a new vicarage is about to be built from the plans and specifications of Mr. J. P. St. Aubyn, at a cost of about £3,000.

The South Shields town council decided on Wednesday week to adopt the suggestion of the borough surveyor as to the remains of the Roman fort or station. They are to be cleared from earth and exposed to view; the site will be planted with trees, and a caretaker's cottage erected close by. The town council propose to borrow £750 for carrying out these arrangements.

New buildings are about to be added to the Grammar School at Oakham, in accordance with the new scheme, and will complete the quadrangle. Mr. Tait, of Leicester, is the architect, and the contractor is Mr. Hayes, of Melton Mowbray.

A memorial-tablet to the late Canon Woodrooffe has just been placed in the north aisle of Winchester Cathedral. It has been executed in white statuary marble, by Mr. W. Hibbins, of Kennington, S.E.

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PORTLAND CEMENT AT THE INSTITUTION OF CIVIL ENGINEERS.

To the Editor of the BUILDING NEWS.

SIR,—Is it likely that we shall ever get beyond the experimental stage of Portland-cement testing in this country, while so much difference of opinion prevails within the exclusive circle of the Institution of Civil Engineers? The three interesting and most useful papers, prepared, with much care, by four members or associates of that Institution, prove that no common or unanimous treatment of cement-testing prevails. Not only do the authors of these papers, to which your recent articles have directed public attention, differ in their views, but they import much that is unpractical, and complicate, by so doing, a very simple subject. All of the authors, with the exception of Mr. Bernays, enter into the manufacturing details of Portland-cement making, and thus import a needless element of discord into this discussion. The business of cement-making is a very simple one, and its general details can readily be understood by a visit to one of our large works on the Thames or Medway. The question for engineers is not one of making, but one of testing, and it is time enough for them to become cement-makers when they have settled the all-important one of how it must be proved before being used.

General Scott and Mr. Redgrave, in their joint paper, fully enter into the purely chemical division of Portland cement; but it does not appear to me that they have succeeded in disentangling it from the unsettled condition in which it has been left by the most eminent European chemists. Professor Hayter Lewis, in his few remarks on the night of the *discussion* at the Institution, threw much light on the peculiar behaviour of cement in contact with aggregates, and few, I think, will dispute the fact that the ultimate beneficial setting process is a somewhat vague and undefined crystallisation. The learned Professor had come to that conclusion from careful microscopic observation. The quality and character of such crystallisation must, of course, be dependent on the kind and quality of cement used.

The question of testing cement now becomes more and more important, and when further progress in the right direction is resolved upon, care should be taken that it is upon true and accurate lines. While we have been, in this country, squabbling and differing as to the nature of the tests, other countries have settled down to a sensible condition of unanimity. The German method of testing has only recently received much attention from civil engineers, although full particulars of its machinery and rules appeared in my last cement-book, published as long ago as 1877. I am glad that General Scott and Mr. Redgrave have the courage to speak out boldly on this subject, and hope that, through their agency, the Institution of Civil Engineers may be induced eventually to arrange a satisfactory and uniform test. It is quite time that Portland cement should be freed from the fetters of the misleading "Board of Works" test, with which it has been for so long prejudicially enthralled.

If the Metropolitan Board of Works consider it their duty to the London ratepayers to experiment on Portland cement, let them contribute to a fund, controlled by the Institution of Civil Engineers, at whose hands I have no doubt the subject would receive the best consideration. They might also dedicate the numerous moulds, machines, and tables of experiment, which Mr. Grant, by their means, has accumulated, to public use.

The test must, sooner or later, have some authoritative aid from one or other of our learned societies. The cement-makers will have to take care of themselves, and they are of sufficient importance and influence to exert some control on the quality and character of the test, whatever it may be. Any system, almost, would be better than that now prevailing, for it is a continual source of annoyance to the makers to feel that any hour they may be called upon to supply cement under some new and previously unheard-of, fancy test. This cement-testing has almost assumed, of late, an epidemic form, for much emulation is displayed by various engineers to propose something eccentric and novel in character.

Fineness of powder is no doubt the most trying member of the German test, and time must be allowed our makers (should that part of the test be adopted) to arrange the necessary machinery for meeting its requirements.

There will not be much difficulty encountered in this direction, even if the standard of 2,500-mesh sieve leaving a residuum of 5 per cent. should be adopted, when the proper means are provided for its accomplishment.

The mortar-test, involving a pause of twenty-eight days before using the cement, is creating a large amount of unnecessary alarm, and all sorts of vague predictions are offered as to its inconvenience, if not danger. There can be no question as to its desirability, for the truest test of a cement is its capability to bind together the aggregates with which its main purpose is to be associated. The difficulty of finding a proper quality of sand is mere nonsense, for there is plenty of suitable quality, both from river and

pit sources, in almost every district of England, Ireland, and Scotland. Delay in waiting upon cement might be obviated by inducing the maker to have sample briquettes ready, giving a guarantee that the quality of the cement would be as represented by the results of these pioneer breakings.

Waiting on cement until it becomes "mellowed," or "purged," is a tender point, and I am sorry that I cannot agree with the writer of the article in your last number, who says that "no Portland cement, however good it may be, ought to be used when less than from two to three months old," for I state fearlessly that no *true* Portland cement requires keeping, not even an hour. The cement that requires keeping to purge and purify is not Portland cement at all, but simply an imperfect concoction, which it is the bounden duty of the consumer to reject, unhesitatingly and without mercy.—I am, &c.,

HENRY REID.

21, Arundel-street, W.C., June 7th.

ST. MATTHIAS CHURCH, UPPER TULSE-HILL, BRIXTON, COMPETITION.

SIR,—As there were, up to Saturday last, *only* 200 competitors for this work, I fear this splendid chance of winning fame and emolument must be comparatively unknown to my professional brethren, and I fear many may have been deterred from entering the list by the rumour that competitors are *not* to be allowed to erect the church on approval at their own cost. The committee are so innocent and confiding as to require *only* working drawings, "detailed specifications," and "an estimate from a responsible builder," and as the church is to cost only £7,000, the services which the committee require from each competitor are thus worth *only* £315 (viz., 3 per cent. for the drawings, specifications, and obtaining tender, and 1½ per cent. for taking out the quantities to base such tender upon). It is true "no premium is offered," but "the committee undertake to employ the architect whose design is placed first." It is named by the bye, that "the committee do not pledge themselves to accept any design," but then they kindly "undertake to return all unsuccessful designs, but will not be answerable for any damage in transit." And what more can you desire than to have them back, smashed to pieces?

"The committee wish it to be understood that the church will probably be built in three sections." Supposing, therefore, they spend £3,000 at first, it will be seen at a glance that the prize is worth £150, and the value of each competitor's work is, as shown above *only* £315, so that it is quite lamentable to think that only 200 competitors, involving a gross value of work of *only* £63,000 (besides the builder's trouble, which is, of course, nothing) should enter for such a magnificent prize.

I think it would be far better if the committee were to ignore the rumour above alluded to, and allow each competitor to erect a church at his own cost on approval (of course finding his own site), and as it might involve the committee in some trouble and expense in going about to see them, they might stipulate that each member of the committee (whose time is no doubt valuable) should be allowed say five guineas a day, by each competitor, for his trouble in examining the buildings. They might further protect themselves by stipulating that they were not to be answerable for any damage that might result from their examination by breaking into walls, &c., to see if they were sound, and of course stipulate that they only pay the commission on the part they intend building at first; the rest might stand over, say the second third, for 50, and the last third for 100 years.

The only point in which they might *still* be taken in, would be that when the church they select is taken down, and a third part rebuilt at Upper Tulse-hill, they *might* be disappointed at its different appearance; but then they might protect themselves by stipulating that they should not be bound to pay for it if they did not like it, but that the "successful" competitor should in such case remove it, reinstate the site, and, *of course*, compensate the committee for their further trouble.

I should think that with the above *trifling* alterations in the conditions, the 200 competitors would immediately swell to 2,000, and all the unemployed architects and builders would then be busy for the next 18 months.—I am, &c.

"Wonderland," June 7. "SAM WELLER."

ST. PAUL'S, COVENT GARDEN.

SIR,—All men who attach value to the few remnants of architecture which exist in London (and by Inigo Jones) must, when passing through Covent-garden, feel shocked at the alteration made in the side-arches of the portico of St. Paul's; done, too, through the instrumentality of an eminent architect.

To anyone who remembers it a few years back, or who can refer to an old print, it must be evident that the proportion is entirely, and I venture to say, needlessly destroyed. It is, at least, radically altered, and it seems to me that some note of this, for the benefit of student, and others, may not be out of place in your columns.—I am, &c.,

R. C.

ST. MARK'S, VENICE.

SIR,—Your reports are usually so much more accurate than others, that I think I ought to correct an error in your last number as to my alleged "protest against the statements of Mr. Stannus," at the meeting of the Architectural Association. I did not in any way controvert his statements, either as to the engineering necessity which led to the rebuilding of the portion of the western façade, or as to the Venetians being the best judges of this necessity. I did not feel qualified to form a judgment on these points; but I protested that, granting all he said to be correct and true, he had made out no case of defence at all for what appeared to me the utterly unjustifiable alteration of the *building lines* in the reconstruction, and the wholesale destruction of the *surface treatment*, whether of wall or mosaic, which ought to have been most carefully preserved and reinstated with the greatest accuracy and precision possible.—I am, &c.,

WILLIAM WHITE, F.S.A.

Wimpole-street, June 8.

ANOTHER INSULT TO THE PROFESSION.

SIR,—Allow me to assure "A.R.I.B.A." that I was not aware the Tottenham School Board proposed building four schools simultaneously from one set of plans, or I should not have written as I did, nor have called in question the honesty of anyone who chose to accept the terms offered. I need say nothing of the artistic feeling of the board or of the architect who would agree to erect four schools "from one set of plans" in a small place like Tottenham.

Certainly the information now given was not *easily* to be ascertained from the conditions which state "the architect and surveyor will be paid 4 per cent. on the cost of the *first* block of buildings, and 2 per cent. on the cost of the *subsequent* buildings." I have also been informed that "quantities (for the use of the board)" simply means such as would be required for an approximate estimate. Such being the case, it is much to be regretted the board did not offer the usual commission, instead of attempting to make a paltry saving. I presume there is not one member who would think of asking a solicitor or medical man to work for four-fifths of his accustomed fees; why should they ask architects to do so? Surely we are not overpaid as it is. I cannot help thinking that the greatest enemies to our profession are those who are ready to undersell their brethren. If boards can get their work undertaken for 4 per cent. now, it will not be long before they endeavour to do so for 3 per cent. or less.—I am, &c.,

HUGH ROUMIEU GOUGH.

6, Queen Anne's Gate, St. James's Park, S.W.

June 8.

WALKER v. KIRK AND RANDALL—HAYMARKET STORES.

SIR,—May I ask you to find a space for a few words in reply to Mr. Walker's letter, in your last issue, to point out some other errors into which he has been inadvertently led?

As regards the summons to produce drawings, I am content to take his own version of the matter in his former letter, where he says "the magistrate intimated he should dismiss the summons," and thereupon Mr. Walker "proved the facts, and asked for a case." How, then, could Mr. Walker have fallen into the error of supposing he had withdrawn the summons.

But this is not the only one; the latter part of Mr. Walker's letter contains almost as many inaccuracies as there are statements; but as they are all beside the question, I shall not take up your space by replying to them beyond expressing my opinion that it is a pity Mr. Walker should attempt to bolster up his case by making statements which he knows do not represent facts in all their fulness.

I did not intend to bring this matter before the public in this way, but since Mr. Walker has chosen to do so, I will state one or two facts and leave you to draw your own inferences.

This building has been in course of erection since July, 1876. It is throughout constructed on the same system, and it is distinctly untrue that Mr. Walker on any occasion before March of this year, endeavoured, as he says, to get the construction amended.

The iron-work, which consists of about 140 girders and over 100 stancheons, was all but completed before Mr. Walker felt it his duty to object to it, after, as he says, some of the workmen had called his attention to what they considered the dangerous character of the iron construction.

It certainly seemed rather late in the day to make the discovery, seeing that the whole of the work had been executed by the same firm.

The matter was referred to the Metropolitan Board in the beginning of March, was finally disposed of by them on the 23rd of that month, and I believe Mr. Walker felt very much aggrieved with the result. This gentleman thereupon felt it his duty to take the unusual course of writing to the chairman of the Society, declining to meet *me*, but suggesting that it would still be possible to avoid further litigation if some other surveyor could be appointed.

This letter also contains the following remarkable paragraph:—

"I think that I have been, both as a public official and professional man, extremely badly treated by the Stores in being put to such a great amount of annoyance in compelling your builders to comply with the law, and, when I state that the fees I have received for supervising your buildings have amounted to only £30, and that the costs of prosecutions in connection with them have cost me a loss of £80, I think you will see the truth of this, more especially as, in consequence of the firm stand which I took in enforcing the law as regards the dangerous party-walls surrounding your property, the Stores have been considerably benefited."

While every one must regret that Mr. Walker should consider his official duties in connection with the Stores have met with such inadequate remuneration, it can hardly be considered fair that he should hold this a reproach against the Society, notwithstanding that they may have been considerably benefited by the course he took. The amount of his remuneration is fixed by Act of Parliament, and his position is, or should be, that of an impartial public officer.

But, reverting to the ostensible question at issue, viz., whether the district surveyor can compel the architect to submit drawings of structural ironwork for his inspection—until it be proved that he has that power, I shall certainly refuse to produce them, and, I believe I am quite justified in this course, more particularly as I have already laid them before the professional advisers of the Metropolitan Board of Works, who, I should have supposed, have as much *responsibility* in advising the Board as Mr. Walker himself.

In giving the extract from the joint report of Sir Joseph Bazalgette and Mr. Vulliamy, which gave him so much pain to publish, I regret that he had not the candour to add that I pointed out to them in my reply that the ties therein suggested were already provided for, and therefore, as I before said, "nothing was proposed beyond what was originally intended"; but of course this may be only another inadvertency.

I can only say that I have received no notice that such a minute as Mr. Walker mentions was ever passed.

I can quite understand that the Haymarket has many disagreeable associations in Mr. Walker's mind; but surely he must imagine that everyone has as bad a memory as himself when he alludes to a building three doors from the site in question as involving considerations similar to those at issue in this case.

This Haymarket catastrophe is his favourite bogey at the police-court; but it is ridiculous to allude to it for any purpose of comparison with this building.

With this reply to Mr. Walker's letter, I must decline any further correspondence.—I am, &c.,

THOMAS VERITY.

27, Regent-street, S.W., June 9.

Intercommunication.

QUESTIONS.

[6141.]—**Architect's Certificate.**—Will some reader kindly inform me if a proprietor is compelled by law to pay a builder the full amount of money the architect certifies for? In this case the proprietor objects because a certain portion of the work has not been done.—ARBITER.

[6142.]—**Belfry.**—A Congregational church is being erected in my neighbourhood with tower and spire, provision being made for a belfry, which will be provided with at least one bell to be tolled before service. But the vicar of the parish says it is not legal for a Dissenting chapel to toll a bell before service. I should be glad to know if there is any foundation for such a statement.—SQUARE AND LEVEL.

[6143.]—**Glazing Casts.**—I should be greatly obliged if any reader could name the ingredients, with particulars necessary for the making, of a transparent glaze into which objects might be dipped (say, plaster of Paris casts) to have their surfaces hardened and protected, and also made capable of being washed.—MODELLER.

[6144.]—**Pupils' Indentures.**—The following is written on my indenture:—That the said A. is not to set up business as architect and surveyor in opposition to the said B. within a distance of ten miles. Nothing more is mentioned with regard to this point. No premium was paid. Will some one kindly inform me whether proceedings could be taken by B. against A. if he was to set up business in the same town?—ARCHITECT.

[6145.]—**Cleaning Stone.**—Is there any method for cleaning and removing vegetable matter from a coarse sandstone? I shall be glad to hear of any composition for the purpose, or any way of attaining the object in view.—B. Z.

[6146.]—**Architects' Charges.**—In your issue for the 30th of April last (page 530) a correspondent on "Architectural and Builders' Charges" writes: "I remember a few years since that it was laid down from the county-court bench, that a builder was not entitled to charge a profit on his workmen's time. He could only legally charge the exact sum he paid his men, and I never heard this decision challenged." Could your correspondent "B." cite a case in which the builder has been disallowed this 5 per cent. on labour? Owing to C. C. cases not being reported, I have been unable to find a precedent, though it may be so.—W. H. WORSAM.

[6147.]—**Science and Art Examinations, South Kensington.**—I should be obliged if some of your readers (holders of certificates preferred) will inform me which are the best books to study for the examination in advanced architecture.—FORTUS.

REPLIES.

[6129.]—**Valuer's Licence.**—I understand the law to be as follows:—A building surveyor must have an appraiser's licence if he value either work or material and charge for the valuation. The cost of licence is £2. It is not transferable, and must be renewed annually on the 6th July. Appraisers may act as house agents without being licensed as such, and auctioneers who pay a £10 licence annually may act as appraisers and house agents without being licensed as such. These are the only exceptions.—THOS. BLASHILL.

STAINED GLASS.

ELY.—Messrs. Powell Brothers, of Park-square, Leeds, artists in stained-glass, &c., have been commissioned by the Bishop of Ely to design and paint three subjects from Church history, to be placed on the walls of his lordship's palace chapel. One canvas has already been fixed in position, and the second is in progress. The one now in its (central) place commemorates the reintroduction of Christianity into these realms by the missionary St. Augustine, as exemplified in his reception by Ethelbert, King of Kent, A.D. 596.

GIGGLESWICK CHURCH.—The three-light window at the east end of the north aisle has been filled with glass, illustrating the message being brought to St. John, "Blessed are the dead," &c. The window, which comes close to the eye, contains a very great number of figures, and is by Messrs. John Hardman and Co., of London and Birmingham.

INGLETON CHURCH.—A window of one light, rather large, and rectangular in form, has been filled with the subject of the Virgins round the Lamb. The window is low down, and is treated in a very minute manner, and crowded with figures and details. The figures are almost entirely in white and yellow. The window is by Messrs. John Hardman and Co., of London and Birmingham.

NEWCASTLE-ON-TYNE.—Another stained-glass window has just been added to the Scriptural illustrations of the fine Church of St. Nicholas, in this town, the prospective cathedral of the new bishopric. The subject, which runs through all the lights, is The Transfiguration, the record of St. Mark being mainly followed. Circling the Apostles' heads is the legend of the words of the Voice from the over-shadowing cloud, "This is my beloved Son, hear ye Him." The subject paintings are further enriched by suitable ornamental accessories; the whole design and execution being by Powell Brothers, Park-square, Leeds.

LEGAL INTELLIGENCE.

ARUNDEL CHURCH AND THE DUKE OF NORFOLK.—THE DUKE OF NORFOLK *v.* ARBUTHNOT.—The appeal of the vicar of Arundel against the recent decision of Lord Coleridge with regard to the ownership of the chancel of Arundel Church, came on for hearing in the Court of Appeal last week, and on Monday judgment was given. It will be remembered the case arose out of the foundation of a collegiate church at Arundel, at the commencement of the reign of Richard II., by the then Earl of Arundel. In the "Collegiate church" there was a chancel at the east end, and at the side a "Lady-chapel"—each with its altar. The body of the church was built also with a nave and two transepts, and various altars elsewhere in the church. A vicar was appointed to serve the parish, and he, it appeared, used an altar in the south transept, which, therefore, as appeared from an award in 1511, came to be "commonly called the parish chancel." It did not appear, however, that the vicar ever officiated, either at the high altar in the chancel or in the "Lady-chapel," and these are the places claimed by the duke as belonging to his ancestors and himself, though in this action only the chancel chapel is in question. In the reign of Henry VIII., under the Act for giving all chantries to the Crown, the whole church was in terms surrendered to the Crown as the church, not of a parish, but of a chantry, and by the Crown it was regranted to the earl and his heirs; and in the reign of Charles I. it was included in a private Act settling the earl's estates. In this Act it is referred to as "a chapel adjoining the church of Arundel," and it was settled with the other property of the family on the earls and their descendants, the Dukes of Norfolk. From that time until the present the right of the duke to the chancel or chapel in question had never been disputed, and the chapel had ever since been in the possession of the duke's ancestors, and since 1691 as many as 16 of them were buried there, most of them with Catholic rites. The present duke desired to separate it by a stone wall with a view to its restoration, when the vicar claimed it as the chancel of his church; and hence this action. The case was tried before Lord Coleridge, who gave judgment for the duke. The vicar had appealed from that judgment, and the case has been argued on his behalf for four days, when the Lords Justices took time to consider whether they should call on the duke's counsel to address them or should give judgment in his favour without hearing them. On Monday The Lords Justices now delivered their judgment in favour of the duke.

A BUILDERS' PARTNERSHIP DISPUTE.—ROGERS v. MANLEY.—This was an action before Sir R. Malins, by the plaintiff, who formerly carried on an extensive business with the defendant as builders and contractors, under the firm of "Manley and Rogers," claiming to have the deed of dissolution of their partnership, dated the 20th August, 1878, set aside, on the ground that when he (the plaintiff) entered into it he was, to the knowledge of the defendant, utterly incapacitated from attending to, or properly understanding, business of any kind. The Vice-Chancellor, on Tuesday, briefly referred to the main facts of the case, and pointed out that the plaintiff and defendant, who had started life as journeymen carpenters and joiners, had for twenty years, or thereabouts, carried on the business of builders and contractors, in partnership, with great success, so much so that, in 1866, when they came to divide the profits made up to that time, it was found that after discharging all liabilities they amounted to no less than £66,000. During all this period they had acted with the greatest good faith, both towards their customers and between themselves, and no differences had arisen between them until the date of the dissolution. He should therefore give them the opportunity of settling this dispute between themselves, and he recommended Mr. Manley to make some concession to Mr. Rogers, on the ground that, considering the health of the latter at the date of the deed of dissolution, he ought not to have allowed him to conclude so important a transaction in a few hours. He would not look at the papers for a fortnight, during which time he sincerely hoped the parties would come to terms. If, however, they had not done so, he should then ascertain on which side the truth lay, and should have no difficulty, after that, in deciding this case.

The Board of Classical Studies at Cambridge University have recommended that steps be taken for giving systematic instruction in classical archæology. Professor Colvin will give a course in the next Lent term on a branch of this study, and, in the mean time, Mr. Charles Waldstein, Ph.D., of Heidelberg, who recently gave a course of lectures on "Greek Sculpture" at the Fitzwilliam Museum, will deliver a course on another branch during the ensuing year, a member of the senate having anonymously offered £200 for Dr. Waldstein's remuneration.

Our Office Table.

ON Saturday the members of the Association of Engineers took their annual excursion and picnic, the destination being Northwich, and the principal object the hydraulic lift at Anderton, by which vessels are raised and lowered simultaneously the difference of 50ft. 4in. between the respective levels of the River Weaver and the Trent and Mersey Canal. Mr. E. Leader Williams, C.E., the designer of the lift, accompanied the party in the two canal boats, which were elevated above 50ft. in one of the water troughs which was raised by one central hydraulic ram 36in. diameter. There are two of these cylinders and rams, and two water troughs 75ft. in length and 15ft. 6in. wide. The weight of each trough is 240 tons, including water, and the two are in equlibrium when the water in the troughs are at the same level. Pipes and valves connect the two cylinders together, and the mode of working is by using six inches extra depth of water in the descending trough and opening the communication between the two presses, when the upper trough descends, causing the lower and lighter one to ascend. A small accumulator is used to lift the ascending trough during the last few feet of its rise, as the lower trough is then in flotation in the river below, and descends by its own weight, the connection between the two presses being then closed. The ironwork and machinery were executed by Messrs. Emmerson, Murgatroyd, and Co. (Limited), of Stockport, from the designs and under the direction of Mr. Leader Williams. They were completed in 1875, and the lift has worked satisfactorily in every way since. The cost of the whole was £48,428.

THE members of St. Paul's Ecclesiological Society visited Westminster Abbey on Saturday evening. They were met at the Chapter-house at 5.50 by Dean Stanley, who gave an introductory historical lecture on the foundation and progress of the Abbey. Mr. J. T. Micklethwaite, F.S.A., followed with an address on the architectural foundations and difficulties, and of the successive steps by which it was built up to its present unrivalled grandeur and beauty, and Mr. G. H. Birch gave a description of the Chapter-house itself, tracing its history, its desecration, and defacement in post-Reformation time, and the works carried out by the late Sir Gilbert Scott in its restoration, and then alluded to the original paintings on the walls and to those now to be seen thereon. It was announced that Mr. J. L. Pearson, A.R.A., the architect in charge of the Abbey, was unable to attend, so the party was divided under Messrs. Micklethwaite and Birch, who, each accompanied by about 60 members, gave peripatetic lectures in various parts of the building. It may be interesting to some readers to be reminded that during the past few years we have given the following illustrations of the Abbey: ground plans: (conventual buildings) March 3, 1876, (abbey) May 31, 1872, (St. Katharine's infirmary chapel, &c.) June 28, 1872, (apse) May 30, 1879; exterior north transept, Feb. 4, 1870; restored north transept portals, May 3, 1878; bay, north side, choir, Jan. 5, 1877; arcade, south transept, Jan. 14, 1870; north walk of cloister, April 12, 1872; St. Edward's Shrine, as it appeared in the fourteenth century, Sept. 1875; the Valence tombs in choir (measured drawings by H. W. Drinkwater), Aug. 22, 1873; (measured drawings by F. Miller), Feb. 6, 1880; iron grille, Queen Eleanor's tomb, Aug. 8, 1879; and Mr. G. E. Street's design for memorial brass in nave to Sir Gilbert Scott, Sept, 12, 1879. This brass, we may mention, will be laid within the next few weeks.

THE Court of Appeal have confirmed Lord Coleridge's judgment with regard to the right of ownership claimed by the Duke of Norfolk with regard to the chancel of Arundel Church. If the architectural evidence offered by the building itself is to be brought into harmony with the legal decision arrived at, it can only be by agreeing with the view taken by Mr. Justice Brett, that the building was never really the parish-church at all, but that the parish have by use acquired rights over all the building except the chancel. This view of the case, which makes out the parish to be the encroaching party, and not the Duke, is a novel one, but it really seems at present the only one which can be entertained by any architect or archæologist.

A PARLIAMENTARY paper, issued on Saturday, in reference to the British Museum, states that during the past year progress has been made in arrangements for removal of the natural history collections, and in preparations for their reception in the new building designed for them at South Kensington. The transference of the departments of botany, mineralogy, and geology to the new museum will probably be effected in the course of the present year. The galleries so vacated will be at once made use of for the exhibition of objects of archæological interest, which have been accumulating for many years, and from want of space have been stored away in imperfectly-lighted rooms in the basement. In consequence of coming into possession of a considerable sum of money, the trustees have considered plans for adding to the Museum building. These will include a substantial addition to the south-eastern side of the Museum, and an extension of the gallery for exhibition of Greek sculpture. The latter work will at once be proceeded with. Two buildings for the reception of the sculpture hitherto placed in sheds under the Museum portico have been already erected. The whole of the zoological and geological portions of the India Museum at South Kensington, together with the friezes from the Amravati Tope and other remains of ancient sculpture, have been made over by the Secretary of State and Council of India to the trustees of the British Museum. The sculpture will be exhibited in the Museum; the Zoological and other collections have been removed to the new Natural History Museum at South Kensington.

A PARTY of the directors and officers of the South-Eastern Railway Company visited Boulogne-sur-Mer on Saturday, in order to inspect works now being proceeded with in the south-west of Boulogne for the new deep-sea harbour, which is intended ultimately to expedite and further facilitate the passenger and goods traffic between Great Britain and the Continent. The survey began at Chatillon under the guidance of the resident engineers and M. Caville, a member of the firm of contractors. The works were only started in July last, but some considerable progress has already been made. In order to provide room for the future workshops a roadway 850 metres long has been made at the foot of the cliff, faced on the seaward side with solid masonry. Lines of railway connect the works with the old harbour. Further westwards, a small creek intended for harbouring the boats required for the works has been prepared under the lee of the walls of the western breakwater. This begins about 1,900 yards west of the present west pier-head, at the foot of the Semaphore Station; 280 metres are almost complete even to the breastwork, 170 metres are about half-finished, and the foundations have been laid along an important fraction of the 550 remaining metres of its straight portion. Out of a total sum of 4,456,000f. (£178,240) expended by the French Government upon the improvement of harbours during the first quarter of the current year, £25,000 have been applied to the new port of Boulogne.

A REPORT was made to the Metropolitan Board of Works on Friday, by their engineer, Sir J. W. Bazalgette, C.B., on the recent arbitration, as to the Main Drainage Outfalls, between the Board and the Thames Conservators. It consists of a brief summary of the occurrences which led up to the inquiry, from the opening of the outfalls at Barking and Crosness, in 1864-5, to the repeated charges made by Captain Calver. As might be expected, the subjects are treated in a controversial spirit, and extreme satisfaction is expressed with the award, the author declaring that "it has been demonstrated that the Conservators have themselves, by their unequal dredging, formed the banks of which they complained." Another quotation, and that from the closing words of the report, will serve to show its spirit and tenour. Regret is expressed that the inquiry was limited by the Conservators to the mere formation of banks in the Thames, whereas the kindred questions of the amount of impurities cast into the river, the extent of its pollution by tidal water, and the general condition of the river, were inseparably involved in the investigation; but Sir Joseph suggests that the issues were thus narrowed "doubtless under the advice of the Conservators' counsel, because they saw that sufficient evidence could not be produced to justify the smallest hope of a decision in favour of the wild and groundless statements that the banks above and below the outfalls were formed by sewage deposits from them, or that the water in the river is polluted by them to such an extent that it can be called a nuisance, or is even perceptible to the senses."

AN international exhibition of industrial and art productions, to be held at the Pomona Palace, Manchester, in August and September next, is being organised by the Industrial Exhibition Company, Limited. The exhibition is to be conducted upon the principle of giving no prizes, but allowing the exhibitors to sell their goods upon the spot. Although no prizes will be offered, established Societies, such as the Society of Arts, the Manchester and Salford Sanitary Association, the Manchester Academy of Fine Arts, the Manchester Society of Architects, the Manchester Scientific and Mechanical Society, &c., will be invited to report upon the various departments with a view to granting certificates of merit. The exhibition will include the following departments:—(*a*) Machinery, including machinery in motion and motive power; (*b*) textile and other fabrics, clothing, &c.; (*c*) mineral products and manufactures; (*d*) carriages, saddlery, firearms, &c.; (*e*) appliances for saving life and property; (*f*) domestic appliances, furniture and accessories; (*g*) food; (*h*) sanitary appliances; (*i*) education; (*k*) art. The manager is Mr. Fred Scott, of King-street, Manchester.

CHIPS.

The tower at the Rhyl Town-hall is a standing difficulty with the commissioners of the town, although there is at least some probability of a solution being attained by pulling down the unsatisfactory structure. Major Tulloch, the Government inspector, has condemned the tower, and the Town-hall Committee are about to make a last effort to save it, by sending a deputation to the Local Government Board.

The Cumberland and Westmoreland Archæological Society have arranged to hold their annual meeting and excursions at Maryport and Workington on the 16th and 17th inst. The programme provides for visits to the excavation at the Roman camp at Maryport and to Netherhall on the former day, and on the latter for excursions to Burrow Walls, Camerton Church, Ribton Hall, St. Lawrence Kirk, and Dearham Church, and papers will be read by the Rev. H. Whitehead, Sir G. Duckett, and Messrs. Jos. Robinson, R. S. Ferguson, and E. T. Tyson.

A reredos was unveiled on Trinity Sunday in Holy Trinity Church, Watermoor, near Cirencester. It has been executed under the superintendence of Mr. John Oldrid Scott, from a design by the late Sir Gilbert Scott. In the centre is a group of "Our Lord in Glory," flanked by "The Entombment" and the "Visit of the Holy Women to the Sepulchre." Belgian marble columns divide the panels. Mr. E. Geflowski, of Burton-street, London, carved the figures, and his brother, Mr. Maurice Geflowski, the foliage.

New schools have just been completed for the School Board for Loughborough, Leicestershire, from the plans and designs of Messrs. Hodson, Price, and Co., and will be opened after the summer holidays.

The new Midland line from Nottingham to Kettering, by which the former town is placed upon the main line of that system, was opened on the 1st inst. The work is in two sections, the intervening portion from Melton to Manton being part of an old branch line. In the first section, that from Nottingham to Melton (18¼ miles), the work has been very heavy, there being 30 bridges and viaducts and 4 heavy tunnels. A viaduct a mile in length and containing 16,000,000 bricks, crosses the valley of the Welland. Between Manton and Kettering there are 30 bridges and tunnels, the cost of the work having been £650,000. Over 3,000 men have been employed on the works.

A new highway bridge is being built at Hackford Vale, near Reepham, Norfolk. Mr. Blyth, of Foulsham, is the contractor, and Mr. S. W. Leeds the surveyor.

Mr. George Haydock Dodgson, for many years a member of the Society of Painters in Water-Colours, died at his residence, Clifton Hill, St. John's Wood, on Friday, aged 69 years.

A new dock is in course of excavation at Maryport, Cumberland, for the harbour trustees. Mr. Doherty is the contractor.

An organ-chamber is about to be added to St. Michael's Church, Shelf, near Halifax. The contract was let last week to Messrs. Booth and Sons, of Clayton, Yorkshire.

The Stockton-on-Tees School-Board invited the architects of the town to compete for new schools proposed to be erected in Bowesfield-lane, and, at their meeting on Tuesday, selected the plans of Messrs. Weatherhill and Moses. The accommodation is for 700 children.

On Monday the town council of Dublin re-elected Mr. Freeman as city architect, on condition that he performs all duties under the building clauses of the new Public Health Act.

Mr. Mallinson, of Keighley, has been elected surveyor to the Local Board of Colne and Nelson, Lancashire. There were 66 applications, and the salary offered was £120 per annum.

The Unitarian Schools in Trafalgar-street, Burnley, were reopened on Saturday, after enlargement and heightening. Mr. Wigg was the mason, and Mr. Cunliffe, also of Burnley, the joiner.

The Carlisle Scientific Society visited Holme Cultram Abbey, and Roxby Cote, on Wednesday week, under the guidance of Messrs. R. S. Ferguson, Cory, and Sheppard.

New premises have just been erected for the Commercial Bank, at Halifax. The architects are Messrs. W. and R. Mawson, of Halifax.

A conference was held at Milton-next-Gravesend, between Major Hector Tulloch, inspector of the Local Government Board, and the local board, on Wednesday week, with reference to the water-supply. The inspector having stated that a supply of water was indispensable on sanitary grounds, it was unanimously resolved to apply to the Local Government Board for a loan of £4,500 for a water-supply, and Mr. H. Robinson, C.E., the local board's engineer, was instructed to prepare fresh plans and estimates. The inspector promised an answer from the superior board within a week.

At a meeting held at Halifax last week it was decided to apply the balance in hand from the Musgrave effigy fund to the placing in the parish church of a stained-glass window, representing "Ancient Simeon." Messrs. Hardman will be asked to furnish the design. The east window in the Rokeby Chapel is about to be filled with stained glass from the works of Messrs. Clayton and Bell, London, in memory of the late Mr. J. Waterhouse.

The "Otto" silent gas-engine has been awarded a "special 1st prize" at the Sydney Exhibition.

Among other works which have been recently executed in the Cathedral at Manchester by Mr. Joshua W. Graham, the font, which stands near the north-west entrance, has this week been thoroughly cleansed and restored. The font is of Gothic design, in Caen stone.

A Church mission chapel at Carnbrea, Illogan, Cornwall, was opened on Wednesday week. Mr. Basset, of Tedridy, was the builder.

An iron pier is in course of construction at Skegness-on-Sea, opposite Scarborough Avenue, projecting 600 yards into the sea. It is being erected by Messrs. Head, Wrightson, and Co., at a cost of £16,859 2s.

A large new Wesleyan church was opened on 8th inst. at Barnet. Mr. James Weir, of London, was the architect, and Messrs. Dove Bros. the contractors.

On Monday, the 7th inst., the town council for the borough of Oswestry accepted the tender of Messrs. W. and G. Thomas, at the sum of £1,194 19s., for alterations and extension to their Cross Market Hall, from plans and specifications prepared by Mr. W. J. Hodgson, their surveyor.

In our advertising columns to-day an announcement appears of a sale by Messrs. Protheroe and Morris, of the first portion of The Cedars estate, comprising 107 plots of freehold building land, to take place on Monday evening next, at the Working Men's Hall, Stratford. The estate is within easy access of London, and abuts upon the most interesting portion of Epping Forest, close to the renowned avenues formerly the approach to Wanstead Park. The combined attractions of the estate will, no doubt, recommend it very forcibly to builders and others interested in securing sites for building purposes.

At a meeting held at Andover last week it was resolved to form a local archæological society. The first meeting will be held at Bury Hill, a Romen encampment three miles from the town, when the President elect, the Rev. C. Collier, will deliver a lecture on earthworks.

At a meeting of the Salisbury town council, held on Thursday week, it was resolved to adopt the same system as that at Taunton, with modifications, for the disposal of the sewage of that city, and a committee was appointed to cary out the scheme. The sewage, under the adopted plan, will flow into tanks, and will then be dealt with by a chemical process.

A new Primitive Methodist Sunday-school is just being commenced at Dennyson-place, Bradford, Yorks. The building will contain a large schoolroom 44ft. × 36ft., 13 class-rooms, infant school, lecture-room, and offices. The cost will be about £2,000. Mr. Thomas Howdill, 40, Park-lane, Leeds, is the architect.

On the 28th ult., a special service was held in St. John's Church, Hedgeend, Hants, to celebrate the opening of a new organ, and the erection of three stained-glass windows in the chancel. The organ has been built by Messrs. Norton and Taylor, of Redhill-street, Regent's-park, London, under the direction of Dr. Arnold, of Winchester Cathedral. The case is of oak, and the pipes are decorated. The windowshave been supplied by Messrs. Clayton and Bell, of Regent-street, London. The subjects are, in the first window, "The Baptism of our Lord," and "The Transfiguration;" in the second, "The Crucifixion" and "The Resurrection," and in the third "The Ascension" and "Pentecost."

The local board of St. Helen's, Lancashire, on Friday, authorised their surveyor, Mr. Hart, to prepare plans and estimates for a scheme of sewerage for the borough. The estimated cost, exclusive of purchase of land, is £60,000.

The annual dinner was given on Saturday evening by Sir J. M. Hogg, the Chairman of the Metropolitan Board of Works. Sir W. V. Harcourt, in responding for "Her Majesty's Ministers," suggested that the board would not have been created in vain, if, in conjunction with the Corporation of London and other great bodies, it should bring into the metropolis, by an aqueduct equally magnificent with the Thames Embankment, a plentiful supply of pure water. Sir James Hogg said the board were quite ready to undertake the great work thus shadowed forth by the Home Secretary.

The corner-stone of the new chuch of St. Michael's, Camden Town, was laid on Saturday afternoon by the youthful Marquis Camden. The church is a memorial of St. Michael's, Queenhithe, part of the funds having been derived from the sale of the materials of the building. Messrs. Bodley and Garner are the architects.

Joseph Kehren, an esteemed painter of the Düsseldorf school, died in that city on May 21, aged 63 years. He was engaged with Stilke and Andreas Müller in several large decorative works, and completed the frescoes begun by Rethel in the Rathaus at Aix-la-Chapelle. He painted many religious pictures for churches. When the Düsseldorf Academy was burnt down in 1872, Kehren lost his studio, a number of pictures in various stages of progress, and all his collection of studies.

At a meeting of the Court of Common Council of the City of London, held at Guildhall last week, a select committee of twelve members of the Court was appointed to consider the question of the metropolis water supply, and the preliminary agreements relating thereto, with power to take such part as they may think expedient in the inquiry before the Select Committee of the House of Commons.

The town council of the borough of Stratford-upon-Avon have called in Mr. Bailey Denton, C.E., to advise them on the best means to be adopted for the disposal of the sewage of their borough.

The Local Government Board has refused to sanction the scheme propounded by the Lower Thames Valley Main Sewerage Board for the disposal of the sewage of their district by a system of irrigation at Molesey. A provisional order has, however, been issued, extending for three years—the time allowed to the board for the diversion of the sewage from the Thames. The inquiry before the Local Government Board inspectors extended over seven weeks, and is reported to have cost £30,000.

An award has just been given in the arbitration case of the Wishaw Gas Co. v. the Commissioners of the burgh of Wishaw. The commissioners wished to take over the gasworks as the urban authority, and offered £6,340; the company asked £15,629, and that a debt of £1,100 be taken over. The arbitrators decided that £11,000 be paid by the commissioners, and that the aforesaid debt be taken over. These terms have been agreed upon.

At New Eddystone lighthouse it is reported that rapid progress is being made, the work of building the solid base of the light-tower was resumed for the season on April 12th, and now the pediment has attained imposing proportions. Already the amount of building done has considerably exceeded that accomplished last year. During May six hundred tons of granite were set. The original rock has, during this week, been entirely covered with the stepped courses of masonry, chiefly above high-water mark. By the end of the season several courses of the tower itself will have been completed. The work will then be far less dependent on tides and weather. Work on Sundays is no longer considered necessary.

A new Primitive Methodist chapel was opened on the 27th ult., in Holdforth-street, New Wortley, Leeds. The building has been erected at a cost of £2,800, from the designs, and under the superintendence of, Mr. T. Howdill, architect, 40, Park-lane, Leeds. Sitting accommodation is provided for about 850 persons.

The new church of St. Mary, Kippington, Kent, was consecrated on Monday. The edifice is in the Early English style, built of Kentish rag quarried near the site. Mr. J. M. Hooker, of Duke-street, Adelphi, is the architect. The cost (exclusive of land) has been about £11,000.

At the meeting of the Metropolitan Board of Works, on Friday last, the Works Committee reported against the prayer of the Kyrle Society, which urged the opening to the general public of Lincoln's-inn-fields. After a somewhat protracted discussion, the report was adopted.

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MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Public discussion on House Drainage in London, at Society of Arts' room. 3 p.m.

THURSDAY.—Society for the Fine Arts. Morning meeting at Lambeth Palace.

SATURDAY.—St. Paul's Ecclesiological Society. Visit to churches of St. Mary, Stone, and SS. Peter and Paul, Swancombe, and to Romano-British Camp near latter place. Assemble at Cannon-street station 2.10 p.m. for Greenhithe.

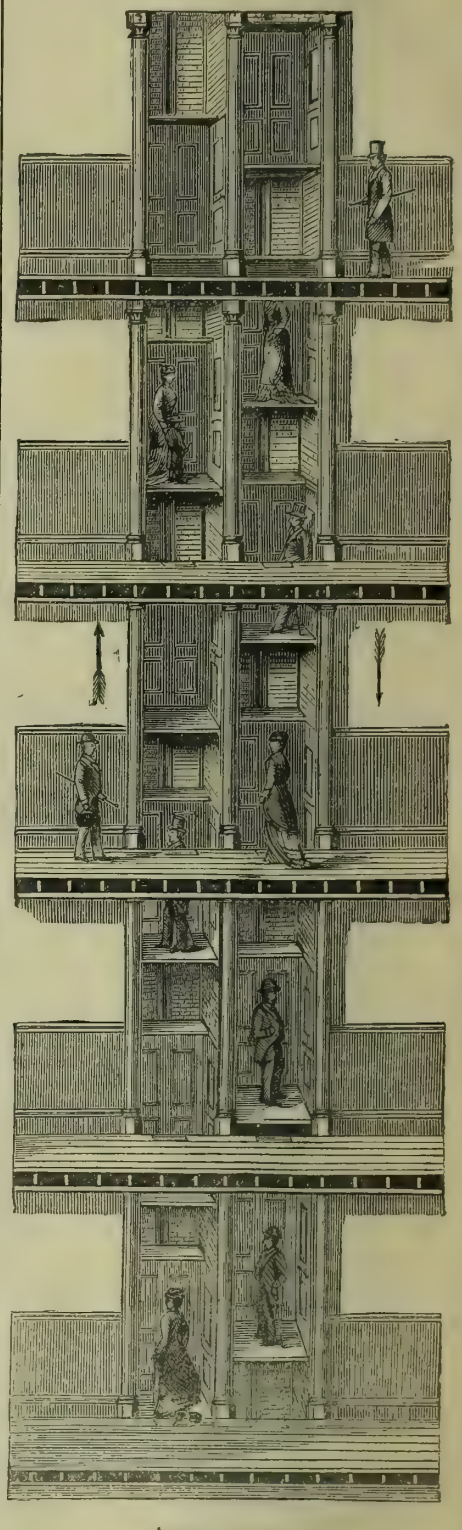
Trade News.

WAGES MOVEMENTS.

CORRIS SLATE QUARRIES.—The men employed at the Corris Slate Quarries, Merionethshire, were on Tuesday locked out, owing to their refusal to accept a lower rate of wages. The slate trade of North Wales still continues almost stagnant, many of the smaller quarries being entirely closed, and the output in larger ones limited to four days weekly.

THE LABOUR MARKET IN SYDNEY.—In a Sydney paper of the 3rd April is published an article on the Sydney labour market, based upon a special investigation by a staff correspondent. The report is of a gloomy character, and calculated to deter artisans in the building trades from emigrating to New South Wales at present. The writer says that as a consequence of the general depression there is great slackness in the building trades, in fact, there is practically nothing doing. Every branch of the building trade is said to be largely overstocked. The cause is that, some four or five years ago, when there was a great rush of building, a number of artisans came from the adjoining colonies and settled in Sydney. Since that time, however, business has fallen off steadily. The leading contractors are pestered with applications for employment from stonemasons, bricklayers, carpenters, and labourers. About one half of the stonemasons in Sydney are out of employment. The bricklayers are not quite so bad, but many are working in the suburbs as labourers. The sole hopes of improvement rest upon the chance of Government work. There does not appear to be any prospect of private work on a scale sufficiently extensive to perceptibly affect the supply of labour. In the carpenters' and joiners' shops trade is also extremely dull, and these industries are suffering from the growing practice of importing ready-made joinery from Melbourne, where it is more cheaply put together. As a natural sequence of the slackness in the building trades, business at the quarries has fallen off, none but first-class men being able to hold on, and here things promise to get worse. In a few of the best painters' and paperhangers' shops trade has improved, and during the Exhibition a good deal of renovation went on, but since then employment has fallen off. Cabinet-making has been crushed out by importations and Chinese competition, but the Chinese shops are busily employed and do a brisk trade. Trade in the plumbing line is pretty brisk. In gas-fitting also things are lively. The extension of water and gas mains keeps up a constant demand for workmen in these trades.

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THE BUILDING NEWS.

LONDON, FRIDAY, JUNE 18, 1880.

EMPLOYERS' LIABILITY.

THE Government Bill "to extend and regulate the liability of employers to make compensation for personal injuries suffered by workmen in their service," has now been issued in its amended form. As originally drawn, it was wholly on the side of the men; though even then the trades-unions were discontented, and still clamoured for the complete repeal of the doctrine of a common employment as proposed by Mr. Macdonald. But the deputation of employers from all parts of the country that recently waited on the Prime Minister have met with the consideration they deserved. Some attempt has now been made to hit the golden mean of compromise in this measure, and to deal fairly with employers and employed. The Bill will probably be referred to a Select Committee, in accordance with the present custom where there is any doubt or difficulty to be encountered. But as the matter has really become a political question, and the Government are pledged to pass some Bill during this Session, it is probable that the proposals as they now stand will become law without much material modification. It will be well, therefore, briefly to consider the main points of principle and practice in this measure.

An employer will be liable for injury resulting to a workman in his service, by reason of any defect in the works, machinery, plant, or stock, connected with the business. Originally, this clause stood without any qualification, and it would alone have been enough to ruin many masters. But now it is provided that there shall be no right to compensation in such a case, unless the defect arose from the negligence of the employer, or of some person in his service, and intrusted by him with the duty of seeing that the works, machinery, &c., were in proper condition. Under the present law a master is liable for injuries caused by a defect in his plant, if it be proved that it had come to his knowledge. The Bill would extend this liability to all cases in which the defect can be traced to the employer's negligence, or that of one specially in charge of the stock. But this would have to be shown by the workman claiming compensation, and the mere fact of a defect in machinery causing an accident would give him no right of action. It is proposed that an employer shall be responsible for the negligence of any person in his service "who has superintendence intrusted to him": which would include foremen and overlookers generally. In order to limit the application of these words within reasonable bounds, they are now defined as meaning one whose principal duty is superintendence, and who is not ordinarily engaged in manual labour.

But the next clause extends an employer's liability to the negligence of any person in his service, to whose orders or directions the workman, at the time of the injury, was bound to, and did, conform. This is, perhaps, the most doubtful and dangerous part of the Bill from its vagueness and want of certainty, and is sure to lead to much litigation before its meaning is fully construed. It comes nearest of all to Mr. Macdonald's proposal, as it would make an employer liable for the negligence of one workman causing injury to another who was but little beneath him in the service. An important branch of liability is that which would arise by reason of the act or omission of any person in the employer's service done or made in obedience to his rules or by-laws, or to particular instructions given by any person delegated with the authority of the employer in that behalf. But this responsibility is now made subject to the condition that the injury resulted from some impropriety or defect in such rules, by-laws, or instructions; which is a very important proviso, and one that throws the full burden of proof upon the shoulders of the workman claiming compensation.

Wherever a man has, by his own negligence, contributed to the cause of his injury, he will have no right to recover damages against his employer. This would be the law without being so specially stated, and is now applied to all cases of accident and actions thereupon. But the Bill contains another condition, which has been added in the course of amendment, and is one of great moment to all large employers. Under this clause no workman would be entitled to compensation where he knew of the defect or negligence that caused his injury, and failed within a reasonable time to give information thereof to his employer, or some person higher in the service; he himself having no reasonable cause to believe that either his employer or his superior was aware of such defect or negligence. This condition is somewhat clumsy and cumbrous in its wording, but the principle of it is plain and practical. One strong argument in favour of upholding the present state of the law is, that it makes men watchful of each other's way of working, because they have a common interest in putting down negligence; and the same point applies to cases of defective machinery. But if the Bill become law, the main reason for this watchfulness would be withdrawn, and it is quite probable that careless conduct would be actually encouraged amongst workmen when they knew that their common employer was liable to pay compensation. It is to prevent this kind of plotting together that the condition has been inserted, though its effect will mainly be found, we fear, in bringing about endless litigation and much conflicting evidence.

Other clauses provide that the amount of compensation recoverable for personal injuries shall not exceed such a sum as would be equal to the earnings during the three years preceding of a workman in the same grade and district at the time of the injury. This is, doubtless, intended to put a stop to those verdicts of vindictive and exemplary damages which many juries would delight in giving against employers in bad cases of accident, and which are as unfair as they are illogical; the real aim of the jury being, not to compensate the man injured, which is their only duty, but to punish the negligent employer—a matter that is entirely beyond their proper province. It is further proposed that notice of action shall be given within six weeks, and the action itself commenced within six months, of the occurrence causing injury. These are, curiously enough, copied from the Bill brought in by Mr. Macdonald, and are, therefore, hardly likely to be opposed by either side; while experience has proved in other cases that rules of this kind are of great practical value in preventing imposition. Every action is to be commenced in a County-court, but may be removed to a superior court in the manner now allowed by law. The expression "employer" includes a body of persons corporate or unincorporate; and "workman" is to mean a person to whom the Employers and Workmen Act, 1875, applies: so that the whole class of domestic servants, and many other employés, would not be affected by the new statute.

THE BLACK AND WHITE EXHIBITION.

THE artists who contribute to the Black and White Exhibition are men who stand high in their profession, as such names as Léon Lhermitte, J. Tissot, Ernest George, Goodall, Walter Crane, G. Du Maurier, H. S. Marks, R.A., Herkomer Luxmoore, J. O. Connor, Slocombe, Britten, A. Evershed, Adrien Marie, W. Cave Thomas, Anna L. Merritt, Glindoni, &c., will show. The contributions of that master of light and shade, Léon Lhermitte, are studies of an order which place him high among delineators of busy market-places. We may mention his "La Boucherie de Village" (82), and "Les Glaneuses" (14), No. 160, "The Choir of Notre Dame" (345), and his "Vieilles Boutiques à Morlaix" (605), as Rembrandt-like and masterly in drawing and chiaroscuro. They are all executed in charcoal, with a power of interpretation which shows the artist to be no mere passive observer, but one who can impart a meaning, and describe with a true poetic instinct, the commonest scenes. The architectural detail of the old overhanging houses in the view at Morlaix is also a truthful reflex of life in the old French seaport. Mr. W. E. T. Britten's "Studies for Picture of Dancing" in red chalk, on white or grey paper (83 and 109), are vigorous models, displaying animated movement in the limbs and drapery, though the head of the girl in No. 83 looks out of balance, and does not appear to be skilfully joined to the shoulders. The other is more graceful and better posed. Mr. Marks, R.A., has cleverly united humour with good taste in his "Design for a Meeting Card" (121). The figures, representing the various schools of sentiment, such as Mediæval, Modern, Realism, Intensity, Humour, &c., are characteristically sketched, and avoid the exaggerated or comical; but we are less disposed to praise the more ambitious attempt of the same artist in his charcoal studies, "Hearing" (341), and "Feeling" (358), which occupy conspicuous places on the other side of the room. The countenances are certainly expressive of the attributes; one, a maiden in a wood listening to the notes of a bird; and the other, a figure of a girl with her eyes bent downwards towards the brink of a brook; but the drawing of drapery is singularly hard and stiff, and there is a meagreness in the liny-looking figures which destroy the meaning intended to be conveyed. As a decorative treatment we admire Mr. E. Matthew Hale's oil-sketch, "Design for the Front of a Piano" (346), The subject chosen is Music, and the painter has introduced his figures seated in a semicircular form, denoting various kinds of music. As a composition for filling in a long panel, the work has undoubted merit, and the figures are drawn with grace, and are in Classical keeping. We notice two portraits of the late Sir Gilbert Scott; the engraving by J. D. Miller is a fair likeness, but we rather prefer the etching after G. Richard, R.A., by Anna Lea Merritt (601). Illustrations for works of fiction form as usual a well-recognised class. Those illustrating "The Clever Woman of the Family," and "The Three Brides," by Charlotte M. Yonge (350 and 454), are worthy of Mr. Adrian Stoke's pencil. They are in pen-and-ink, sharp and clever in definition and character. Several original sketches for "Punch" are hung. Mr. G. du Maurier's pen-and-ink drawings are as fresh and spirited as ever, full of point and humour, as, for instance, Nos. 72 and 284. Another contributor, Mr. A. Chantry Corbould, sends Nos. 138, 374, 501, and 587, all displaying skill in the same direction. "Seaside," by J. Tissot (141), is a charming etching, displaying much feeling; the chiaroscaro is clever. Mr. Walter Crane sends a series of original designs in pen-and-ink, illus-

trating fairy-tales. "The Heart of Princess Joan," and the "Wanderings of Faramon" (203 and 204), are characteristic and exhibit true sentiment. Nos. 114 and 234 are also clever in conception and spirited in drawing. No. 312 is a pair of allegories illustrating the "Pedlar's Pack" and "The Princess," both clever. Mr. Arthur Evershed's etching of "Old Cottages at Hampstead" (146), his "Street in Rye" (196), and his "Dry Points" (520) are admirable works. At the end of room Mr. J. W. Waterhouse is represented by "A Greek Play," in sepia and white, a composition of considerable power, evincing also expression in the face of the dark damsel with fan who is attentively bending forwards witnessing the performance. Mr. John O'Connor's "River from Waterloo Bridge," just above it, is a conscientious charcoal drawing of early sunrise effect upon the Thames, though we might find fault with the detail of bridge; the drawing is rather a bold study of chiaroscuro, and an instance of the really pictorial and poetical effects which the river scenery affords, and which Miss Clara Montalba has rendered so charming by the power of her pencil. "Through the Trees" is another charcoal drawing of some power by Mr. A. Parsons. We may point to "Summer Shade," by J. Howard, as another striking charcoal sketch, and to Mr. Frank Dodd's "Too Late," a study in neutral tint of a touching incident (226). In architectural work we must especially mark Mr. E. H. Haig's delightful etching in brown (287), "The Quiet Hour," where a church-spire rises amidst a grouping of houses. A true poetic feeling, such as that suggested by Longfellow in the "quaint old Flemish city," has inspired the artist: next to which we must name Mr. H. W. Brewer's exceedingly clever and imaginary pen-and-ink drawing of "A Dead City" (385), in which the artist has brought together some of the fragments of architecture which helped to make up a Mediæval city. We may somewhat question, despite the beauty of the detail, whether the broken bridge with its side chapel, the gabled and timbered fronts which fringe the river, and the majestic octagon tower of Late Gothic, could ever have been combined, as Mr. Brewer has imagined them here; they look a little crowded and confused, and there is a lack of repose, indicating an unreal assemblage, rather than the quiet harmony of an old town. But we must assign the work a high position as a composition drawing, of great merit in execution. Mr. J. Mc Neil Whistler gives a spirited etching of Old Battersea Bridge. We must award praise to Miss Alice Donkin's "Violin Concerto—'Tutti,'" in crayon, a clever expression of of upturned face, thoroughly professional; Mr. Arthur Severn's fine lampblack scene, "A Lee Shore" (324); J. M. Donne's "Theatre of Marcellus" (338); M. Aranda's "La Mandolinato," and E. Rougeron's etching, No. 396. Mr. A. C. H. Luxmoore, who contributes several drawings on wood, has two very clever and humorous studies, Nos. 430 and 431. One is called "A Stimulant for the Mind," an old man intently reading a large volume in a study; while in another, called "Stimulant for the Body," we see him enjoying wine. Mr. T. R. Macquoid has a pleasing lampblack sketch (No. 444), well drawn in the corbelling and archway, which make up the scene of his Spanish muleteers. We cannot pass by the fine dry-paint by Mr. C. P. Slocombe (No. 446), showing the young Prince William of Orange (after Rembrandt) a work of extreme delicacy; Mr. J. C. Dollman's spirited outlines of popular fables (455); H. G. Glindoni's chalk sketch (Nos. 462, 471); and G. Bischopp's "Samson Agonistes" (478). Mr. W. Cave Thomas's "Imprisoned Soul," in red chalk, is commendable for its high finish, if not for its conception. "Twilight" (534); and "Views of Paris," by Adolfe Geraldon; "A Song without Words," by E. Hanley; "Un Petit Avase" (200), by Adrien Marie; Mr. H. C. Brandling's "Hotel de Ville, Brussels" (256); and two exceedingly well-toned etchings by Mr. David Law (Nos. 25 and 26), must be noticed also. On the screen we mark etchings of Bruges, by Mr. L. B. Phillips; "Winchester Cathedral," by Mr. H. Sumner; "A Cover of Catalogue," etched by Mr. H. G. Glindoni; and several charming eaufortes by M. Maxime Lalanne; and, turning from the serious to the humorous, Mr. Linley Sambourne's clever skit for *Punch* on Mr. Orchardson's picture of the "Bellerophon" in the Royal Academy, in which the late Premier figures for Napoleon. The artist has ironically called it "On Board H.M.S. Opposition." The terra-cotta models Nos. 637 and 641 are clever; the oak case of No. 639 irretrievably bad in design.

THE HEALTH CONFERENCE AT THE SOCIETY OF ARTS.

IN our last issue we indicated the leading points of the programme of this conference, which was pretty closely adhered to. The proceedings dealt chiefly with the question of establishing county boards, with the view of strengthening Local Government administration—a proposition which has been under consideration for some years, and was made the subject of a resolution in May, 1878. The resolution passed last Thursday week disposes of the question so conclusively that it only needs legislative sanction to complete it. It confirms the former proposal, and urges the immediate institution of county boards, having enlarged powers, with the object of elevating the principle of local self-government. We refer all readers interested to the report of the discussion on another page, which deals with some of the contemplated difficulties raised by a few members at the Conference, and we think Dr. Bond's remarks worth consideration.

Mr. Stansfeld very justly maintained that the first step towards success in local self-government was the enlargement of the areas of local authorities, so as to obtain a higher class of men, and diminish correspondence. The practical working of local authorities, as at present constituted, has been found beset with difficulties. If a local defect in sanitary arrangement is discovered, a very cumbrous machinery has to be put into motion, the Local Government Board is appealed to, but is often powerless to act, or its suggestions are set aside as impracticable. If, instead, a staff of inspectors acquainted with the local peculiarities of the district were appointed to inquire into defects, and to consult with authorities in cases of difficulty, a large amount of correspondence would be saved, and the work of rectification and reform would proceed without interruption. Mr. Chadwick's remark that the Local Government Board was a "stupendous sham" has been borne out by the difficulty of obtaining satisfactory solutions of local questions submitted to that body. Local Government Board inspection was the first subject of discussion on Friday, and a resolution was proposed by Mr. Alcock, and carried without opposition, in pretty nearly the words of the programme. The chief recommendations were—first, the mapping out England and Wales into a few large areas, each to be under the administration of a staff of inspectors, and the whole under the head of the department, properly assisted and relieved of secretarial work; and secondly, the institution of an inquiry department charged with the collection of statistical data, the official record of sanitary experiments, and the publication of periodical reports upon the results obtained. As we have urged before, such a measure, if adopted by the Government years ago, would have saved tens of thousand of pounds wasted upon profitless schemes of drainage and water supply. We trust there may be no more hesitation in passing a proposition which commends itself at once to science and common-sense, and which received the support of the leading speakers at the Conference. The Amendment of the Public Health Act is another matter upon which all sanitary officials, engineers, inspectors, and medical officers are alike agreed, and the speakers, as will be seen from our report, were tolerably unanimous about the need of a reform in the present law, which unnecessarily retards, and often defeats, the interests of the large number of inhabitants. Mr. Cresswell's amended resolution, which to a certain extent agrees with the practical suggestions of Dr. Bond, Capt. Galton, Mr. Alcock, and Mr. Wright, meets this defective condition, "by conferring powers and corresponding duties upon local authorities with regard to the construction of sewers, and the connection of house drains therewith, as extensive as those conferred upon the Commissioners of Sewers." The object of this amendment is to confer powers upon sanitary authorities to prevent the "continuance in old, and the construction in new houses" of drains within the building, until an outfall approved by the authority has been provided. At present, as many of our readers know, it is allowable, under Section 23, for drains to be constructed without a proper outfall, or for drains to enter into lakes, ponds, and water-courses in rural districts—in fact, for no connection to be made. It will further confer a power to enable local authorities in these districts "to construct new sewers and water-supply works for the special service of outlying dwellings, charging the cost of the same upon the owners and occupiers thereof, payment to be made within a period not exceeding 21 years." The most important suggestion was Mr. Cresswell's motion for the sanitary inspection and classification of houses, the discussion and resolution on which will be found in our report. The suggestion, indeed, is not altogether new. In Scotland there is an association for ascertaining the sanitary condition of dwellings, and in many large towns there are facilities for ascertaining the facts of drainage, &c., but they are fragmentary, and generally inoperative. Mr. Cresswell's resolution proposes an organised inspection of every house, and the granting of certificates of sanitary efficiency to the owners or tenants upon application. The self-interests of owner, builder, and tenant would to a certain extent be coincident. An honest builder would gladly court inquiry; the conscientious proprietor would, of course, like to know that he was paying for sound and sanitary construction, and the tenant would also especially take care to ascertain the sanitary equipment and healthworthiness of the dwelling he was about to occupy. The objections raised to the proposal were those which might have been anticipated; but we think the difficulties are not so formidable as some of the speakers thought. The objections raised by Dr. Tripe, of Hackney, and Mr. Alcock were the leading ones that would occur to any practical mind. But the granting a certificate of sanitary perfection for a term of years, of course might be made subject to periodical inspection, and under certain conditions only, and as regards alterations by dishonest and crotchetty tenants, the simple renewal of the sanitary efficiency of the house from time to time would meet any difficulty. A more reasonable objection was that as regards workmanship, and the difficulty of the inspector giving a certain certificate without

knowing the details of every drain, its connection, and the honesty of the workmen who had been employed. It is very true, as Dr. Tripe says—district surveyors and other officers, at present are powerless to cope with these hidden parts of building; but we take it that the proposal of increasing the number of inspectors, as would be necessary if Mr. Cresswell's resolution became law, would lessen, if not entirely remove, any force in the objection, for every house would be subject to constant supervision while building, and be under control afterwards; that is to say, its sanitary good character would be subject to constant renewal. Mr. H. Collins, as a professional architect and district surveyor, expressed some reluctance to fall in with the proposed measure, and what he said is worth perusal. As regards the application of the measure to the registration of old houses, we are not inclined to think there would be such a difficulty as was suggested, as an old house would be skilfully and scientifically examined, the drains, their velocity of flow, and their water-tight condition might be tested as they are at present, and a certificate granted accordingly, having in view all recent appliances for ventilation, &c. Of course a standard of perfection would be agreed upon, and the suggestion to accompany a certificate with the plans of drains, gullies, &c., of the premises, would diminish the chances of error in the certificate, and a miscarriage of justice.

Last week we noticed a few of the sanitary appliances exhibited at the Conference; we may now refer to a few others. Field's self-acting annular siphon is an ingenious arrangement for flushing house-drains, and for regulating the flow of sewage on land. Its working parts consist merely of a tank and a tube, which form an annular siphon, and is extremely simple. The tank is sunk into the ground, and can be readily applied to public buildings and detached groups of houses; its value in flat districts is undoubted. Galvanised iron tanks, holding 100 gallons each, are supplied by Messrs, Bowes, Scott, and Read, of Broadway Chambers. The Sanitary Engineering and Ventilation Company, of Victoria-street, exhibited some simple aërating cistern filters; other excellent cistern filters we mentioned in alluding to the London and General Water Purifying Company exhibits last week. A good lift and force-pump, in action, was shown by Mr. G. W. Hobbs, of Market-Harborough, capable of serviceable work in estates, and for emptying cess-pits. We may also mention approvingly the machine-made "lap-folded tubes" of the Patent Tube Company, Euston-road, who showed several good fittings, and Bean's patent flushing-valve and waste-preventer. Messrs. Verity's patent air-propeller, or ventilator, was shown in action, and elicited various opinions, and those interested in ventilation had the opportunity of comparing the excellent "deflecting" or vacuum-creating cowls and tubes of Messrs. Boyle, Kite, and others. We may mention the ingenious water-waste preventer and valveless closet called the "Shrewsbury," which does away with all valves, and consists of a balanced vessel to hold the charge. Weaver's ventilating sewer air-trap, a very simple and effective combination of trap and air inlet for disconnection, and the effective warming apparatus shown by Mr. G. G. Pritchett, of Bishop Stortford, who also had on view his appliances for cellular wall-construction, and other inventions for warming and ventilation. Fielding's "Indispensable" double-acting high-pressure rapid water filter is a simple addition to an ordinary water-tap, and Silvertown's electrical indicator, manufactured by the Indiarubber and Guttapercha Company, of Cannon-street, will be welcomed by all managers of waterworks. We may add to our remarks of last week that an examination of the model shown by Mr. W. Batten of his manhole cover and ventilator has corroborated our opinion of the merits of his invention; the form of the manhole cover is hexagonal, and the openings for ventilation and road refuse are simply contrived, the latter being easily removed by a scoop. The details have been well studied, and those who are seeking for a combination of manhole and ventilator without the defects of many of the old plans, will do well to try this improved cover.

THE MANUFACTURE OF PORTLAND CEMENT.

EXAMINING AND TESTING THE CEMENT.

IT is only during comparatively recent times that much attention has been given to the examination and testing of Portland cement in this country. This neglect was due, in some measure, to the keen competition and antagonism of the well-known Roman cement, which was, until the last twenty years, the favoured cement, not so much from its intrinsic worth, but because it had secured for itself a position of acknowledged value amongst engineers and architects. Important works, notably the Thames tunnel, had been executed through its agency, and, indeed, all the great engineering structures up to that time were, more or less, indebted to it for much of their excellence and stability. Government works especially continued to be executed in Roman cement mortar long after the more valuable properties of Portland cement had been generally acknowledged in other quarters. The struggles of the new rival were, indeed, at first, somewhat spasmodic in character, and, owing to the more complex nature of its method of manufacture, had more than ordinary difficulties to contend with. However, through good repute and bad repute, and under, sometimes, the most depressing influences, it finally overcame the prejudices and interested opposition, reaching, at last, a position of indisputable superiority over its natural enemy, the Roman.

During the premiership of the great Sir Robert Peel, and at the time when Portland cement was beginning to receive serious attention from engineers, an outcry was raised against the French for dredging our shores for the septaria from which Roman cement was made. The Prime Minister was asked to levy a duty on all stone so raised, and the matter was receiving his most serious attention, when it was pointed out to him that a cement was being made from materials inexhaustible in their extent, much superior in quality to that made from septaria. These representations had due influence on the mind of the Minister, and the idea was abandoned of instituting the new tax.

As there is, even at the present time, in outside places, a certain amount of misconception as to the relative properties of the new and the old cement, we will shortly describe the great difference between the two.

Roman cement (the old) was manufactured by a simple and inexpensive calcination of the "septaria" found in the London and other clays. The principal cost was incurred in dredging it from the sea, or collecting it on the shores of Kent, Essex, and Yorkshire, where it abounds, owing to the constant degradation of the clay cliffs, in which it lies embedded. Roman cement, however, was more recently, and is still, made from stratified deposits of argillaceous limestones found in some districts of England, Wales, and Scotland. There was no expensive machinery or plant required in the manufacture of Roman cement, and, after judicious calcination, it was easily ground to an exceedingly fine powder. A few days sufficed to convert the dredged stone into a marketable powder, which, however, required to be used fresh; otherwise, the cementitious properties became depreciated, and, ultimately, in a comparatively short time, unless carefully packed in well-papered casks, became worthless. Roman cement, when freshly burnt, has a quick, energetic, initial set, but does not reach any high indurative value. It cannot be used for concrete purposes with profit, and, indeed, its use for such a purpose is almost impossible. Its specific gravity is much lower than that of Portland cement, and the colour is brown. In every respect, it differs from Portland cement, as our readers will fully understand after a careful perusal of these articles.

After the description we have given of the various details of manufacture, and the risks attending the production of a good Portland cement, it will be apparent that an article with such dangerous surroundings must be challenged before being accepted by the consumer. Cements differ very much from other building materials, inasmuch as they are received in a crude and incomplete state from the manufacturers. They are not like iron, wood, stones, or bricks, which are placed in the constructor's hands ready for adaptation, and, generally speaking, exert their influence passively in the structures in which they may be placed.

Portland cement, however, must be accepted under different circumstances, for, in a powdered state, it is practically incomplete, and must undergo another process in the hands of the builder before any beneficial influence can be realised. Hence, the imperative necessity of submitting so valuable a constructive material to such tests as will prove its fitness for the work for which it may be destined. Long experience and scientific examination has laid down reliable rules to guide us in applying these tests, which it is our duty to describe.

Owing to the absence of a uniform standard whereby a good cement can be valued, great irregularity exists, not only regarding the fineness of the powdered cement, but also as to its setting capacity. The consumer, therefore, is under the necessity of determining the exact quality suitable for his particular purpose, and should arrange his tests accordingly. We merely remark on these well-known and, unfortunately, very general obstacles to the acquirement of a uniform quality of cement, for the following observations will have reference only to what—from our point of view—we consider the essential properties of a good and true Portland cement.

(1) *Weight.* — In the English system of testing, this is regarded as an important member of the compound test, and receives its importance from being considered a reliable check on the admission of an inferior light cement, which would be competent to pass the water and tensile tests successfully, and yet be unsuitable for good concrete or mortar. The weight or bushel test had its origin long before mechanical means were resorted to, and was, indeed, the measure by which Portland cement was generally sold. It became, gradually, the fashion to value the cement according to its weight per bushel, for, as it increased in weight, its colour, as well as its strength, improved. Consequently, when testing by machine became the fashion, the weight (bushel) element was included as one of the most important. The reason is not always clear to the uninitiated, and should be made intelligible by the following explanations:—The test, as first instituted, was a seven-days test (one day in the air, and six in water), the briquettes being made with neat cement; it was quite possible, therefore, with a light quality of cement, to pass the water and tensile tests. To provide, therefore, against the use of an imperfect cement, without the property of extended

induration, its weight was secured. Otherwise, cements of quick initial set would have been used, that were incapable of becoming, after a length of time, much, if any, harder than at the end of seven days. Experience, and lengthened careful observation have proved that a cement not less in weight than 112lb. per imperial straked bushel continues to harden for years after being set. No cement, therefore, should be tolerated of less weight, provided all the other conditions of the tests can be complied with.

(2) *Fineness.*—This subject has, of late, received a good deal of attention, and is, indeed, a most important one, requiring the gravest consideration at the hands of consumers. The objections hitherto raised, and with much reason, by cement makers, was, if a heavy cement was insisted upon, a sacrifice of fineness was inevitable. Better, they said, to have an average cement, not exceeding 110lb. per bushel, which might be ground, with care, to a fineness of 1,600 meshes per square inch, than a cement of 120lb. per bushel which, except under most extraordinarily expansive conditions, could not be ground down lower than a fineness of 900 meshes per square inch. It has to be borne in mind that weight means cost. A heavy cement has consumed more fuel when being burnt, and its reduction, owing to its greater hardness, involves a larger outlay in steam and grinding power.

The English test did not specify the exact quality of fineness required, but somewhat vaguely described the cement to be fine only. Under such conditions, the question of fineness was not so irksome to the manufacturer, unless the high specific gravity or bushel-weight test was insisted upon. However, owing to the enlightened action of foreign engineers and cement-makers, a test fineness of something like 2,500 mesh, with a residue of not more than 5 per cent., has been agreed upon. The weight, or bushel, test has been disregarded, because the test is not a neat cement test, limited to seven days' probation, but a mortar test, spread over 28 days. This is intended to meet a commonly-received opinion that the very heavy cements, while displaying high tensile value in their neat condition, do not always, when mixed with sand, maintain their superiority. The test is, therefore, now a mortar one, and spreads over a period of four weeks instead of one. The details of this test are given at length in Reid's work on Portland Cement, and are too detailed and exact to introduce here in an essay which can only, at best, be general in character. Of course, the sand to be mixed with the cement must be of some normal standard; otherwise, with the varieties of sand in use, conflicting results could only be reached.

With a fineness of 2,500 meshes per square inch in a specification, the weight per bushel should not exceed 112lb., and at that density a residuum of 5 per cent. may be regarded as the margin of coarseness which would be permitted for ordinary purposes. Should a test of fineness be imposed, it will be imperative upon the manufacturers to set their houses in order, and provide for the improved means by which alone such a quality as 2,500 gauge can be reached without straining the machinery of their works.

(3) *Setting.* — The process by which this member of the test is known must not be confused with the ultimate setting or induration. They are distinct in character, and it is necessary that a clear understanding should be arrived at on this much-misunderstood point. Setting means simply the initial action of the cement-powder when water has been applied to it, and its defined duration is limited to the time when the mixed cement or mortar loses its plasticity. A great deal of ingenuity has been of late displayed in providing means by which the estimation of this stage can be determined with exactness. Vicat's needle has been disentombed, and a great parade attempted of its valuable properties for proving the time of setting of cements and mortars. We prefer, however to disconnect this simple test from such refined surroundings, and trust to the ordinary intelligence for its determination. Of course, the action of this initial setting is affected by the quantity of water used, and the character of the cement under examination. A good Portland cement is generally slow in its initial set, and, in a temperature of 60° Fah., should occupy about thirty minutes in parting with or losing its plasticity. Cement which sets either faster or slower may be regarded as unsound in character, and should be looked upon with suspicion. Although the raw materials of chalk and clay are alike in character, it is often found that cements made in manufactories alongside of each other differ greatly in quality. The weight, fineness, and other tests being even equal, and one cement is found to be quick-setting and the other slow. This difference cannot be due to the raw materials, for they are dug from the same sources, but rather to the different systems adopted for their conversion into cements, and probably, also, in a great measure to imported impurities in the fuel.

(4) *Hydraulicity.* — The most important ingredient of the test, for unless this division of the ordeal can be passed, all other estimation is worthless. Setting in water means the capacity of the cement to withstand the action of disintegration, which would speedily follow if it contained any portion of lime uncombined with the silica and alumina. Any portion of free lime would become hydrated, and by expansion exert a mechanical influence on the immersed mass, and thus cause its degradation. Generally speaking, the evidence of imperfect hydraulicity is speedily shown, although in some cases, when it is due to combination of sulphur, the result is very protracted, and extends beyond the period of seven days or even seven weeks. Indeed, this kind or quality of defect—a most dangerous one—is happily of rare occurrence, and is only found when the cement is made from unsuitable materials. Good cement, when placed in clean water twenty-four hours after being made, will continue to harden, and owing to the perfect silicasation of its component parts, produces little if any disturbing influence to the water in which it may be immersed. Whereas, a doubtful or imperfect cement produces a thin white scum on the surface of the water, although the briquette itself might not become disintegrated. These are the indications which generally arise during this stage of the test, and experience will soon indicate how and by what signs this very important part of the test is recognisable.

(5) *Tensile strength.* — In testing cement by mechanical means, the measure of direct or tensile strain has been selected from the facility with which it can be applied at an early period of the briquette's age. The form of the briquette has been in a state of transition owing to the ambitious desire of advanced engieeers to associate their names with some fantastic form, regardless in many cases of the accuracy of its lines or its fitness for general purposes. The original form first introduced into this country from France was simply a parallelogram, 7½in. long and 3in. wide, being narrowed in the middle of its length to 1½in. to an extent of 1½in. So that practically the point at which fracture took place when the strain was applied was at this neck, which represented a square surface of 2·25in., the briquette being 1½in. thick.

A variety of testing machines have been designed and used for tensile testing, and unfortunately, as with the form of the briquette, a great deal of ingenuity has been displayed on the machine. Adie's single lever testing-machine, which is used by a weight travelling along a graduated beam; Bailey's double-lever machine, used by the flowing of water into a receiver, on which are indicated the pounds per inch at which the fracture takes place. Both of these machines are self-recording, and have been in use for many years both by manufacturers and consumers of cement. Although these testers have given considerable satisfaction, a growing desire has arisen for a more accurate machine on the double-lever principle, and to break briquettes having one inch of section only. The practice in Germany is to adopt a common standard of estimation, and the machine adopted is a double-lever one, much less expensive than those now generally in use, and singularly accurate in its results. The test is also different from ours, being a mortar one, the briquettes being tested when twenty-eight days old. The weight is applied by the agency of shot running out gradually from a can or cistern, and the weight of fracture has to be multiplied by fifty to give the actual strain. A weighing-machine at hand having its dial divided so that each pound represents fifty, readily furnishes without the necessity of calculation, the exact breaking weight of the briquette. An advantage which such a machine secures is that of maintaining an accurate vertical strain, which is not always possible at high breakings with a long lever.

It is to be hoped that some combined action will be taken amongst engineers and cement-makers in this country, so as to secure some uniformity of test, and prevent, or at all events, reduce, the confusion which now prevails. A testing-machine should not be an expensive affair, and while maintaining its accuracy, we should readily obtain an instrument at less than half the cost of those now in use.

THE HEALTH CONFERENCE AT THE SOCIETY OF ARTS.

THIS conference, the opening day of which we reported in our last issue, was concluded on Friday. The Right Hon. J. Stansfeld, who again occupied the chair, in an opening address, strongly insisted on the necessity for decentralisation, and for local self-government in sanitary work, objects which he thought could be best obtained first by enlarging the areas of local authorities, so that a higher class of men should be attracted to serve on the boards, and next, by diminishing the correspondence of the Local Government Board, and instead thereof, to have a small staff of inspectors, to confer with local authorities on any points of difficulty. By increasing the size of district over which inspectors travelled, they would obtain broader views of sanitary questions, and would be less likely to irritate local authorities by dictation as to unimportant details. He also proposed to institute an inquiry department, which should issue periodical reports containing the latest information on sanitary matters. A very full explanation was given of the present working of the Local Government Board, which he strongly condemned for its defective organisation, and the perfunctory character of its supervision.

Mr. E. Chadwick, C.B., asserted that in talking of a "Local Government Board" they were referring to a stupendous sham. There was no board; there never had been one, in the sense of an assembly of persons meeting to consider a question, and taking united action thereon, after deliberation. This work devolved on a secretary, who was overburdened, and had to devolve it upon the assistants, and they in turn devolved the labour upon other clerks. Instead of a Local Government Board, it was a Local Government Block. For the expenditure of £27,000 a year he challenged the "Board" to produce any evidence of good result upon the health of the people.

The proposition that England be mapped out into a few large areas was then discussed. Dr. Bond, of Gloucester, Mr. R. N. Cresswell, Captain Douglas Galton, and Mr. Alcock, of Sunderland, strongly advocated its desirability,

while Mr. Owen, of Exeter, feared it would increase rather than diminish centralisation. Dr. Bartlett, and Messrs. Domville and Adolphe Smith, urged the benefits that would accrue were the suggested inquiry department to issue reports as to the latest conclusions in sanitary science gratuitously to the authority of everylarge area, although the first of these speakers feared the reports might become mere official and unmeaning documents. At the close of the discussion the following resolution was unanimously adopted:—"That this Conference considers it advisable to strengthen the administrative organisation of the Local Government Board, while diminishing centralisation and correspondence, by mapping out England and Wales into a few large areas, each area to be under the administration of a staff of inspectors, the whole under the superintendence of a permanent head of the department, properly assisted, and relieved of secretarial work; and this Conference is also of opinion that there should be instituted without delay an Inquiry Department, for the assistance of local authorities wanting information and applying for it, charged with the investigation of scientific processes, the collection of statistical data, the official record of sanitary experiments here and in foreign countries, and the publication of periodical reports upon the results obtained."

AMENDMENT OF THE PUBLIC HEALTH ACT.

Mr. R. N. Cresswell moved a resolution, urging the necessity of the amendment of the Public Health Act in four particulars: (*a*) in simplifying section 299, and amending construction so as to enable the Local Government Board to interfere in cases of default by local authorities where complaint is made by persons other than those actually aggrieved; (*b*) by conferring powers on local authorities to provide the entire connections between house-drains and sewers; (*c*) by substituting one hundred *yards* for *feet* in limits of sewer-extension powers; (*d*) by enabling rural authorities to construct sewers and water-supply works for outlying dwellings, to be repaid by the owners within 21 years. While the sanitary laws needed to be codified into a new decalogue, it was desirable to point out to the legislature the lines upon which detailed amendments should go. He explained in detail the nature of the proposed alterations.

Dr. Bond opposed the motion, on the ground that the Public Health Act bristles with mistakes, and that no mere amendment of three or four clauses would afford any substantial improvement. A general resolution that the Act required amendment would be more useful, and in this opinion Captain Galton, Mr. Wright (of Cheltenham), and others concurred.

Mr. Mellor objected to alteration *a*, as giving too much arbitrary power to the inspectors of the Local Government Board; and Mr. Alcock and other representatives of urban authorities coincided in this view. Mr. Cresswell showed that under this section, as it now stands, the Government can intervene only when complaint by some person aggrieved is formally made, and not upon the report of their own inspectors, however flagrant the dereliction of duty. This amounts in the majority of cases, especially where the interests of the poorer inhabitants are concerned, to a defeat of the intentions of the Legislature altogether.

An amendment for omitting clause *a* was put to the meeting, and carried by a majority of one.

Clause *b* was then introduced by Mr. Cresswell, who explained that the City Commissioners of Sewers have for many years possessed powers for performing, by authorised contractors, the entire work of connections from the house to the main sewer, after the same manner as gas and water companies. He argued that powers which had worked well in the hands of the City Commissioners for many years ought to be conferred on all local authorities. He further explained that the amendment was intended to apply to old as well as new houses.

Dr. Wright, of Cheltenham, supported the clause in a vigorous speech, in which he condemned the jerry-work now put into underground work, and urged that these connections should be undertaken by local authorities under close supervision, while Mr. Adolphe Smith did not think the work would be energetically carried out by authorities. Eventually this clause and that lettered *c* were agreed to, as was also *d* after a short discussion. The entire resolution was then put as follows, and also carried:—"That, in the opinion of this conference, it is desirable that the Public Health Act should be amended in the following particulars:—*a*. By conferring powers, and corresponding duties, upon local authorities with regard to the construction of sewers, and connection of house-drains therewith, not less extensive than those conferred upon the Commissioners of Sewers by the 11 and 12 Vic., c. 112, ss. 37, 38, and 46. *b*. By amending section 23, and substituting one hundred *yards* for one hundred *feet*, and empowering the sanitary authority to prevent the continuance in old, and the construction in new, houses, of any drain, sewer, or conduit within the building until an outfall for emptying the same has been provided and constructed to the satisfaction of the authority, other than into any lake, pond, river, canal, or watercourse. And *c*. By enabling local authorities in rural districts to construct new sewers and water-supply works for the special service of outlying dwellings, and necessary for their healthful occupation, and charging the cost of the same upon the owners or occupiers thereof, payment to be made within a period not exceeding twenty-one years, the intent of such provision being that rates for sanitary purposes in rural districts, including water-supply, should, as far as practicable, fall on those only who are benefited by the improvements." And, by a subsequent resolution, the Executive Committee of the Conference were requested to urge these points on the Government, should any Bill be brought in for amending the Act.

POLLUTION OF RIVERS ACT.

Mr. Cresswell moved similar resolutions with reference to suggested amendments of the Act of 1876, viz., (*a*) By striking out of sections two and three the word "knowingly," as superfluous and embarrassing. (*b*) By striking out of sections three and four the words "solid" and "liquid" respectively, and by substituting, whenever necessary, the word "matter." These were agreed to after some discussion.

SANITARY INSPECTION AND CLASSIFICATION OF DWELLINGS.

Mr. Cresswell then brought forward his proposition for enabling the Metropolitan Board of Works and the proposed county boards to inspect and classify houses, and to grant certificates of healthworthiness in different categories for terms of years, on a plan analogous to that adopted for mercantile ships by Lloyd's Association. The scheme would, he said, afford a stimulus to builders and house-owners to do their duty by making the lines of sanitation and sound construction coincident with those of self-interest. The idea was not altogether a novel one. In regard to shipping, the plan was universally adopted, and a certificate of registration as A 1 at Lloyd's for sixteen years was indisputable evidence of seaworthiness in every port in the world, enabling the owner to secure freights at high rates. Farther than that, an almost identical scheme was in operation in Edinburgh by an association founded on a co-operative basis, for enabling members to obtain facts as to the drainage, &c., of houses, and was, he believed, a success. Similar associations had been founded at Manchester, and other large towns, but he proposed to give the plan an official recognition. If it was objected to as novel, that argument was put by Sidney Smith into the mouth of a noodle; if it was thought it might give much trouble, he admitted that all improvements caused a vast amount of trouble, but he believed in this case the labour and cost would be repaid. It might be thought to create an invidious distinction between healthy and unhealthy houses: but that distinction was sharply drawn in the moral world, in every department of life, and especially between the honest builder and the "jerry." Having enlarged upon the difficulty of obtaining information as to the drainage of dwellings, Mr. Cresswell asserted that his scheme would be supported by every contractor who put good substantial work into his buildings, by conscientious owners, and by all tenants. He did not ask for a subsidy, but would make the certificates self-supporting by the payment of fees; and estimated that if the system were generally adopted the outlay for examination, &c., of an ordinary house ought not to exceed ten guineas. At first he had thought of delegating this duty to the Society of Arts; but Mr. Stansfeld had, in a correspondence on the subject, shown him that it was "too big an undertaking" for that body, and besides, somewhat beyond its scope. He now thought a certificate would carry most weight if issued by the largest governing body having charge of any sanitary area.

Mr. Wright, of Cheltenham, having spoken of the value such certificates would possess in watering-places and other health resorts, proposed a formal resolution in the following terms, drawn up by Mr. Cresswell:—"That it is expedient that the Metropolitan Board of Works within the metropolis, and the County Board within each county, should be empowered by the Legislature to make provision for the inspection and sanitary classification of dwellings, upon application being made by the owners thereof; and to grant certificates of healthworthiness in different categories, for terms of years, according to the perfection of sanitary equipment and fitness for habitation of such dwellings; and to determine the scale of fees to be paid for such inspection during construction and repair, and also upon delivery to the applicant of the certificate of classification awarded to such dwelling."

Dr. Tripe (M. O. H. for Hackney) saw grave difficulties in the way of granting these certificates, largely arising from the differences between ships and dwellings. To grant a certificate for a term of years would, in his opinion, be ill-advised, for who could tell what a dishonest or crotchetty tenant or new owner might not do to a house? Then again, how were the authority issuing the certificates to insure good workmanship, and that a house really belonged to the first, second, or third class. Notwithstanding the district surveyors, and the surveyors of district boards and vestries, and other checks, medical officers of health knew the great difficulties there were in the way of securing honest construction, the connection of drains, and the use of mortar that was what it pretended to be. Such certificates might be safely granted, but only by an immense increase to the inspectors, the maintenance of constant supervision over each step in construction, and all this involved a serious addition to the cost of new buildings. He especially objected to putting the power of granting certificates into the hands of the Metropolitan Board of Works.

Mr. Alcock asked what value a certificate would have if, after obtaining it, the owner, a builder, made alterations to the premises?

Mr. Yeld inquired if, after a house had been inspected and certified as healthworthy, typhoid fever broke out in it, what remedy would the occupier have against the authority issuing such certificate?

Mr. Cresswell explained that just as vessels were re-inspected periodically, and after every voyage, so houses should be re-examined at intervals, and after any alteration. He would, if the Conference were against him, give up the issue of certificates for a term of years. As to Mr. Yeld's suggestion, of course, by the common law, a man could recover damages from the certifying body *if* he could prove that the infection were caught in the house, and was not imported; but in the present state of sanitary science, and the differences amongst doctors, this would appear to involve but little risk. Undoubtedly an action would lie if it could be shown there was wilful negligence in issuing the certificate, or that the surveyor was gloriously incompetent.

Dr. B. W. Richardson corroborated Mr. Cresswell, and dwelt upon the practical difficulty of demonstrating where a case of typhoid fever originated.

Lord Alfred Churchill spoke in terms of high approval of the feasibility and utility of Mr. Cresswell's suggestions.

Mr. H. H. Collins, as one of the district surveyors for the City, replied to some of Dr. Tripe's observations, and asked if Mr. Cresswell and others who advocated these suggestions at all considered the army of inspectors which would be necessary for carrying them out. He did not believe the system of registration would be self-supporting, nor would the cost be so light as had been assumed. If people wished for certificates of healthworthiness, there was nothing to prevent them from obtaining them if they were willing to pay for qualified persons' advice; but he believed voluntary registration would be a dead letter, except under the stimulus

of occasional epidemics. At the Brighton meeting of the Social Science Association this question was ventilated, but only twenty or thirty replies were received by a committee, to some 400 to 500 inquiries sent out. Associations had been started for this object in Glasgow, Edinburgh, and Manchester, but seemed only successful for one or two years. If issued by local authorities, he feared there would always be a certain suspicion as to the certificates.

Mr. Vacher, of Birkenhead, considered that houses should not be classified, but simply certified as sanitary or insanitary—a suggestion received with general expressions of dissent.

Mr. Wakefield feared the task would be too arduous and too invidious to impose upon a local authority, on account of the pressure which might be brought to bear by house-owners, and suggested that the registration should be intrusted to the Board of Trade.

Mr. Lovegrove, surveyor to Hackney vestry, held that only trained and educated artisans should be employed for work of such importance as the laying of sewers and house-drains, and thought that certificated workmen rather than certificated houses was the proper mode of securing healthy dwellings.

Captain Douglas Galton entirely sympathised with Mr. Cresswell in his aims at securing greater healthiness of houses, but foresaw very grave difficulties as to how far they would be furthered by the plan proposed, and whether so extensive an inspection would be practicable on a large scale. Such a scheme must be made permissive, for they could not compel a nation to pay greater attention to sanitary law than it was educated up to.

Mr. Rogers Field thought that for many reasons the plan of registration was not practicable, and in the first place, it could not be carried out, at least in old houses, for anything like the sum named. In new houses there would be needed a standard of healthiness to found data upon, so that different bodies should agree as to what houses should be classed in each division. As to all sanitary matters great difference of opinion existed, and even on such primary matters as the disconnection of house and sewer-pipes, it was constantly demonstrated that there might be great diversity of opinion.

Dr. Bond heartily supported the proposition, and thought the self-interest of houseowners would, after a short time, make the issue of certificates self-supporting.

Mr. Pearce thought that what was required was, not so much registration as improved inspection and surveying, and gave instances showing how easy builders found it to deceive district surveyors.

General Cotton thought nothing could be more inexpensive and satisfactory than the proposed plan of registration.

The Chairman expressed his hearty approval of Mr. Cresswell's suggestions, and said that he proposed a clause throwing the work of forming connections between house-drains and sewers on the local sanitary authority, in the Public Health Bill, when President of the Local Government Board, but was obliged to sacrifice it to get the other part of the Bill through. He considered the supervision of house-drains one of the first duties of a local authority, for in their laying the private individual was at the mercy of the several tradesmen employed in the work. He put to the meeting, as a substantial resolution, Mr. Cresswell's resolution amended to the following form:—"That in the opinion of this conference it is expedient that the local authorities should be empowered by the Legislature to make provision for the inspection and sanitary classification of dwellings, upon application being made by the owners thereof; and to grant certificates, according to the perfection of sanitary equipment and fitness for habitation of such dwellings, accompanied by plans of drains, gullies, &c., and to determine the scale of fees to be paid for each inspection during construction and repairs, or otherwise, and also upon delivery to the applicant of the certificate awarded to such dwelling." It was carried unanimously.

FUTURE CONFERENCES.

The Chairman said this brought the fifth annual conference to a close, and in reviewing them it became a question whether they should be continued, and if so, should they be annual or occasional. He thought if they were to continue to meet year by year to suggest alterations in sanitary legislation, their deliberations would become too desultory, and if the law were not amended for some time under the pressure of other legislation, the influence of their resolutions would be weakened by repetition. Upon the question of local government he thought their expressions of opinion, broadened as they had been year by year, would make their mark. He suggested that it would be best that the Conference should be again convened when there was an immediate probability of new legislation on these subjects.

These views having met with general approval, the following resolution was put by the Chairman and adopted without dissent:—"That the Council of the Society of Arts be requested to call together this Conference again when it shall deem it desirable, and especially to consider as to such desirability when the Government measure shall be brought in to create county boards or otherwise to deal with the question of local government."

A vote of thanks to the Chairman, proposed by Lord Alfred Churchill, and seconded simultaneously by several members of the Conference, brought the proceedings to a close.

Another meeting was held on Monday, in the rooms of the Society of Arts, to discuss the evidence of house drainage in London, given before the Sanitary Committee of the Society by Messrs. W. Eassie, Field, and E. F. Griffith. The chair was occupied by Mr. E. Chadwick, C.B., in the absence of Lord A. Churchill. After a few introductory remarks from the chairman, Mr. W. Eassie, C.E., repeated a considerable portion of the evidence which he had given before the Sanitary Section of the Society, and said that about 60 per cent. of the older-built houses which he had examined in London were furnished with old brick drains averaging 18in. in diameter, which had been put in before jointed pipes were in use. They were in a very defective state. Very frequently, in the older houses, he had come across a large cesspool full of soil, and sometimes more than one had been found. In a house situated in one of the West-end squares he last month found a cesspool in a kitchen 10ft. deep and 4ft. in diameter full of the foulest matter, and which had not been interfered with or discovered by the builder who had lately put down some new stoneware pipes. The drawbacks to the construction of new houses upon sound sanitary principles, and the impediments to putting old houses in proper repair were mainly due to the want of technical education on the part of persons employed in equipping houses. A discussion, in which Mr. Alcock (Sunderland), Mr. Melliss, Mr. Pearce, Mr. Hales, Mr. Weaver, Dr. Dudfield, and others joined, having taken place, Mr. R. Field, C.E., recapitulated some of the evidence which he had given before the Sanitary Section. He pointed out the necessity for the erection of a separate cistern for the use of the closet from that used for drinking and domestic purposes, and contended that the employment of one water-tank for flushing the closet and for drinking purposes was likely to produce injurious results. He regretted to see at Hampstead and elsewhere that new houses were being erected with one cistern to supply water for the use of the family for drinking purposes, and also for use in the closet. If the work was commenced at the outset, the cost of building a house with proper drainage and a good water-supply was but a few pounds more than was incurred in carrying out the present defective system. At the conclusion of Mr. Field's remarks, Mr. E. F. Griffith, C.E., who had likewise been previously examined by the Sanitary Section, gave his experience of the house-drainage of the metropolis, and in the main corroborated the views expressed as to the defective sanitary arrangements of a large number of the houses in London. After some further discussion had taken place, General Cotton pointing out the necessity for a Government inspection, in order that an adequate drainage system should be carried out before building operations commenced, the proceedings were brought to a close with the passing of a vote of thanks to the chairman.

ARCHITECTURAL ASSOCIATION.

THE closing meeting for the present session was held on Friday evening, the retiring President, Mr. S. Flint Clarkson, in the chair. The proposed alterations of rules were discussed at considerable length, but the only emendation adopted was that providing for the appointment of an assistant treasurer. A vote of thanks was passed to Mr. Chart, clerk of works at Hampton Court Palace, for conducting the members over that building on the previous Saturday. The President announced that a special meeting will be convened for Friday, the 25th inst., when Mr. Hugh H. Stannus will give particulars of an excursion which he proposes to organise in the autumn to Northern Italy.

ELECTION OF OFFICERS FOR 1880-81.

The scrutineers (Messrs. Jamieson and Leverton) announced that the following gentlemen had been duly elected to fill the several offices during the ensuing session:—President, Ernest C. Lea; vice-presidents, E. B. I'Anson and T. E. Collcutt; members of committee, R. L. Cox, J. Neale, Cole A. Adams, G. R. Redgrave, W. Hilton Nash, H. H. Stannus, A. Conder, E. G. Hayes, R. E. Pownall, and S. Flint Clarkson; treasurer, J. Douglass Mathews; assistant treasurer, T. Williams; librarian, H. W. Pratt; secretaries, R. C. Page and F. E. Eales; solicitor, Francis Truefitt; assistant librarians, R. L. Cox and J. Bilson; auditors, W. Crisp and J. Smith; registrar, Thomas H. Watson. Mr. J. D. Mathews proposed, and Mr. Conder seconded, a vote of thanks to the retiring president. The motion was carried with hearty applause, and was suitably acknowledged.

THE PLANNING AND ARRANGEMENT OF SUNDAY-SCHOOLS.

Mr. C. G. MAYLARD then read the following paper on this subject. It is just one hundred years since the first important movement was made in connection with the establishment of Sunday-schools, but while there has been a progressive and enormous increase in the number of scholars, the buildings in which the instruction is given are very little better than they were at the commencement by Raikes and Stock. Indeed, the buildings at present largely used for Sunday schools, such as the elementary schools built under grants from the Education Department, and in connection with school-boards, are, except in rare instances, ill-adapted for this work, and altogether unfitted for the purpose. I intend treating the subject of my paper more in connection with Church Sunday-schools (in which I am a practical teacher), than with Nonconformist schools. The Church has only been too thankful to use the buildings at her disposal, but, owing to their unfitness, and to the passing of the Education Act, the fact is daily becoming apparent that special buildings must be erected adapted not only for the purpose of Sunday-school work, but in addition for other Church work, such as mission-services and parochial meetings. The question may be asked, Why are the day-school buildings unfitted for Sunday-school work? If we turn to the regulations issued by the Education Department for the planning of schools, we shall see. The children in a day-school are arranged in classes averaging thirty to a teacher. The room and accommodation are apportioned to meet the requirements, and the arrangement of desks, and the desks themselves, are considered in the planning of such schools. These two reasons necessitate rooms of a shape unsuitable for the system of instruction adopted in Sunday-schools, where more numerous classes are required with a less number of children (seven or eight) given to each teacher, and the classes so arranged as to be all under the eye of the superintendent. Desks are thus in the way, and if not used they take up the space necessary for rightly apportioning the various classes. The best shape for a day-school room is not the best for a Sunday-school room. The former requires the shape to be such that groups of desks running the length of the room can be so arranged that there are not too many in the width, thus necessitating to some extent a room much longer than it is wide. The latter requires such a room that the classes may be arranged in front of the superintendent's desk and under his command, so that every child can be under his eye without having to look from one side to the other. Both day and Sunday-schools require as much as possible the isolation of the various classes, whatever the number of scholars may be, and both also require efficient superintendence. In the day-schools, however, desks are required for writing and other lessons, but in the Sunday-schools they are absolutely useless, and a great drawback to the efficiency and

well-working of the school, for it is almost impossible to teach a class well with the use of these desks. The Sunday-school requires that a class shall be so seated round the teacher that every scholar shall be concentric round him, and that every class again shall be so disposed round the superintendent as to be also concentric round him. Such an arrangement as this, which is essential, could only be efficiently carried out by chairs, which can be more easily arranged round the teacher than either desks or forms. The first consideration, therefore, in a Sunday-school is the planning of the schoolroom, and the shape of this is of necessity governed by the arrangenent of the classes, which must be the same in all, whether for a large or a small school; that is, that every scholar and every teacher shall be so placed as to be under the eye of the superintendent. It is evident that, to gain this result, a room must be planned in shape more approaching to a square than the present day-school buildings will allow, or, what is still better, as a room of a semicircular shape. This, then, is the first requirement in a Sunday-school—a good room for what would be called general class instruction for scholars. For the instruction of the infants the system is the same in both day and Sunday-schools, and consequently the room that will suit the one will equally suit the other, all that is required being a gallery for the seating, and ample space at the foot of the gallery for their assembly, and for a teacher's black board and easel, and table and chair. It is as easy for an efficient teacher to teach 100 as 20 infants, and as a rule, the class of infants will only require to be accommodated in one room. By far the most important rooms are those for the senior scholars. These ought to be as numerous as possible, and of varying size, to suit the wants of scholars, which will range from 10 to perhaps 80 in a class. This room ought to be so placed in connection with the general schools that, while forming a part of the school, they should be capable of being made decidedly distinct. Separate entrances are required to each from the outside, and they ought to be so arranged as to be capable of being thrown into the general room by means of folding or sliding doors or partitions, a portion of which to be used as an entrance for the general room. A Sunday-school building ought, therefore, to consist of a large general room for the scholars from seven years old to twelve or thirteen; one or two infants' rooms, and rooms for senior scholars in number according to the size of the parish, and all capable of being thrown into one large room for the purpose of church-service and parochial meetings. Such schools as this are common in America, and they have long recognised there the importance of special buildings with numerous class-rooms. For example, the Bethany School in Philadelphia has the large number of twenty-eight class-rooms, all radiating to a common centre. The superintendent's desk, with two large infant school-rooms, one at each side of the general school-room, and a large lecture-hall with gallery over at the back of the superintendent's platform. The whole of these rooms are capable of being thrown into the large general room by the removal of partitions and sliding-sashes, when the entire number of scholars, 2,500, are at once brought under the eye of any speaker addressing them from the platform. The American school has adopted an arrangement of class-rooms that will allow of a greater number being thrown into the general room, and this radiating system is no doubt capable of allowing addition to buildings as well as increased area of accommodation. By the kindness of Mr. James Weir, I am allowed to use a plan he has procured that gained the first prize offered in America for the best Sunday-school building. It will be seen that this is entirely a disc radiating system, and would answer for a Church Sunday-school better than the Bethany plan, if adopted for church-services and meetings in addition. The Nonconformists have given much attention to their school buildings, and though they have not had to contend with such difficulties as we have in the use of national schools, they have not been without their difficulties also, and have had to use rooms in many instances under their chapels, better, perhaps, than ours in the shape, and unencumbered with desks, but equally bad, if not worse, with regard to warming and ventilation. Various improved school buildings have been erected in London. As far as I know, the first one erected on the American radiating principle was that of St. John's Hill, Wandsworth, in connection with the Wesleyans, and designed by Mr. James Weir. It is partially on the radiating system, and its general arrangements, with some slight alteration, would entirely meet the requirements of a Church Sunday-school. The recess would require to be deeper to serve as a chancel, and the addition of a small class-room at the side to act as vestry would be needed. Each class-room is shut off by folding-doors, and the seating of the classes is admirably arranged by chairs formed in the segment of a circle round the teacher, who sits in an arm-chair, with a small folding table in front. I have alluded to the fact that we require a building that can be adapted also for services and parochial meetings. It will be at once evident that if all the rooms are capable of being thrown into one, the building will then answer these purposes. For parochial and other meetings, when prizes are given to the children, a gallery would be requisite to seat the parents of the scholars. Such buildings as these, and planned on the principles I have laid down, would make efficient Sunday-schools; and I will draw your attention to a plan which embodies my suggestions, and would answer for a small parish where only a few class-rooms were required. The boys' and girls' rooms are distinct, but yet capable of being made one by the removal of a partition. If used for church or mission purposes, the platform would form a chancel, and the small class-room at the side a vestry. Two of the class-rooms are available for use by either school, and the whole of them have separate entrances. Each class-room is available for use also in connection with the whole when used for church or mission services. A gallery could be arranged over the two end class-rooms, approached by a staircase at the side, which could also be used either for additional classes or for church purposes. The total number of scholars accommodated would be 500, and for church purposes, using the gallery, over 600 could be well seated. The girls' school could be arranged to have two additional class-rooms, one at each end, capable of being thrown into it, which would be further additional accommodation. For the purpose of having more separate rooms, this addition would, no doubt, be advantageous, but for church or mission services, and the assemblage of the whole school, the disadvantages in comparison with such a school as that of St. John's-hill, or with a school inclosed entirely on the radiating system, would be great, for although the school would be efficient for a Sunday-school building as to class arrangement, and be well adapted for such, it would not be so when the whole was thrown into one large room, as many of the children in the class-room could not be seen by the superintendent. An arrangement that would meet every objection, and answer all the requirements of a Church Sunday-school, could be best planned on the radiating system; and, as an example, I have drawn the plans of such building: a general class-room for both boys and girls, with a radius of 30ft. from the superintendent's desk, and seating 180 children. The class-rooms are arranged around outside this radius, each 22ft. by 18ft., to accommodate a further number of 360 scholars, and, with the addition of two Bible-class rooms for adults, the total number accommodated would be nearly 600, and if the two committee-rooms were also used for classes, 50 more could be seated. One or two of these radiating class-rooms would be available for infants. The committee-rooms would also be used for vestry and library. Every class-room has its separate entrance, and every scholar in the radiating room could see the superintendent. It will be apparent that such a building is well adapted for parochial meetings and church services, and would accommodate nearly 1,000 people. Whether from the unfitness of the present school buildings, or from the desire to make our Sunday-schools as efficient as possible, there will be a growing demand for more convenient premises to carry on this important work; and the architects of the present and of the future will be called upon to design and plan such buildings to a much greater extent than hitherto. There is an important matter, in which the architect can not only aid the Sunday-school teacher as to the future buildings, but can also aid him at the present. The architect is not only called in to advise on the matter of designing and building, but is often called in to advise as to fitting and furnishing, and he may well offer his opinion to his clients, and endeavour to get school-rooms made more comfortable. Why should they be as they now too often are, little better than whitewashed barns, with a few glazed windows, and by their cold and cheerless aspect rendering the scholars uncomfortable? They ought to be made as attractive as possible. Painted dados,—stained-glass windows,—glazed or coloured bricks, texts and scenes from Bible history, arranged in a manner to give that cheery aspect to a room that only an architect can give to it. We may well follow the Americans, and have not only carpets for senior scholars' rooms, but matting for the large general room, and in addition it might even be desirable to follow the Americans still more closely and decorate our schools with evergreens and flowers in pots, in the centre of each general school-room.

Mr. JOHN SULMAN proposed a vote of thanks to Mr. Maylard for his paper, and the proposition having been seconded by Mr. Mathews and spoken to by Messrs. Weir and Pratt, was adopted by acclamation.

MR. NEWTON ON GREEK ART.

MR. NEWTON'S fifth lecture on Greek Art was given at University College last week. It treated of the art of Scopas, the contemporary of Praxiteles. The period during which these two great artists flourished extended, said the lecturer, from the downfall of the Athenian Empire, B.C. 404, to the accession of Alexander the Great, B.C. 336. Great changes took place in the Hellenic world during this period. There came first the struggle for Hellenic supremacy between Sparta and Thebes, and afterwards the gradual ascendency of Philip of Macedon. In this period Princes such as the two Dionysii of Syracuse, Euagoris of Cyprus, and Mausolos of Caria, gained for a while supremacy over many free Greek cities. This period, full as it was of stirring historical events, was even more interesting to us in reference to the progress of thought, for it was in this age that Plato taught philosophy, and although no great tragic poet succeeded the illustrious rival dramatists of the age of Pericles, yet the poetry of Euripides exercised a marked influence on art by bringing the gods and heroes more within the pale of human sympathy and associating them with the accidents of human passions. Hence there was manifest in the art of the period a tendency to exhibit gods like Dionysos in dramatic situations in which certain subordinate mythical beings played a part. The artists of this age had before them a standard of perfect beauty in the works of Phidias and the great masters of the Periclean age; but this was a questionable advantage, because the sculptors were tempted to sacrifice the higher qualities in their desire to produce something new and attractive. Scopas was a native of Paros, an island famed in antiquity for the beauty of its statuary marble. He was rather older in date than Praxiteles, and probably influenced his art not a little, for Pliny says that in his own day the Roman critics could not decide to which of these two artists the celebrated group of Niobe and her children should be attributed. Scopas worked not only at Athens, but in the Peloponnesus, in Bœotia, in Samothrace, in Bithynia, and the Troad, at Ephesus, and in Caria. He was the architect of the Temple of Athene Alea, at Tegea, in Arcadia, and designed the sculptures in the pediments, in one of which was represented the hunt of the Calydonian boar, in the other the battle between Achilles and Telephos. Search had recently been made *in situ* for those sculptures, but hitherto without success. At Megara were statues of Eros, Pothos, and Himeros, by Scopas. These three figures were personifications of love in three distinct phases—Eros being the equivalent of Cupid, Pothos the regretful longing for absent love, and Himeros the attractive charm leading to Eros. In Bithynia, Scopas made a great group of Poseidon, Thetis, Achilles, Nereids, Tritons, and sea monsters. This probably represented Achilles after death conducted to the island of Leuce by his mother Thetis. The Nereids were impersonations of the varied respects of the sea. A Bacchante at Athens, which was described in pompous language by the rhetor Callistratos, was one of the most celebrated works of Scopas, representing the orgiastic frenzy which possessed the followers of Bacchus, and which was the subject of the *Bacchæ* of Euripides. There was a strong family likeness between this Bacchante

and a number of similar figures preserved to us on gems or in the reliefs of marble vases of the Roman period. In the Troad, Scopas executed the statue of Apollo Sminthius, whose temple has been recently explored by the Society of Dilettanti; in Ephesus he sculptured one of the columns of the Temple of Diana, and in Cara he was one of the four artists employed in decorating the famous Mausoleum with sculpture. On this important monument, which is virtually his own discovery, Mr. Newton spoke less, as he had treated it on the previous Friday before most of his audience, in view of its remains in the British Museum. The lecturer exhibited a number of drawings of the sculptures, explaining their relative position on the Mausoleum. The mutilated equestrian statue, which represents probably a Persian satrap, and the pieces of frieze found on the eastern side of the Mausoleum, might have been from the hand of Scopas, as we knew that he worked on this side of the building, the three other sides having been decorated by his colleagues, Leochares, Bryaxis, and Timotheus. The lecturer concluded by exhibiting drawings of the frieze of the choragic monument of Lysicrates, a work of which we have the exact date, and which was dedicated a few years after the Mausoleum. It represented the punishment of the Læstrigonian pirates by Dionysos, and their transformation into dolphins.

OUR COMMONPLACE COLUMN.

METAL-WORK.

IN addition to articles and papers found in the BUILDING NEWS on this subject, we refer the student to "Wyatt's Metal-work and its Artistic Design," 1852; and to Viollet-le-Duc's *Dictionnaire*, "*Serrurerie*"; also to Hefner's work on the forged iron-work of the Middle Age and Renaissance, by Ramée, Paris, 1869. Beautiful examples of wrought and hammered work are to be seen in the South Kensington Museum. A useful handbook on "Gold and Silver" has recently been published by John Hungerford Pollen, M.A., by authority of the Committee of Council, reviewed in these pages last year.

METOPE.

FROM Greek *μετα*, between, and *οπη*, a hole, or the square space left between the triglyphs of the Doric order. The width of the metope, according to Stuart and Revett's examples, was always greater than the height. Vitruvius IV., 3, states it should be square; a half-metope at the end of frieze is prescribed, caused by placing the triglypth over the centre of column. At an early period, the space occupied by the metope was left open in imitation of timber structures; the triglyph representing the end of beam. The metope was sometimes sculptured. (See Angell and Evans's "Sculptured Metopes," discovered at Selinus in 1823. See also Chambers's "Civil Architecture," and "Arct. Dict.")

MEWS.

"A TERM originally given to a court, or yard, where hawks were kept while changing their feathers, and thence, in a more excluded use, to a place for 'mewing,' or moulting, that is, changing of feathers, hair, &c. The king's mews, at Westminster, is noticed several times in the accounts entered in the Chanceller's role, 5 Edw. I., now in Brit. Museum, and was used for the same purpose as the Mewe at Charing-cross, where King Henry VIII. kept his hawks whilst moulting."—"Arch. Dict." The name is now applied to a yard or thoroughfare, composed of stables and coach-houses. In planning mews, the following points should be kept in view:—A sufficient distance from neighbouring houses, so as to avoid the nuisance of effluvium from stables; good drains and supply of water; hard, impervious paving, laid on concrete, and with proper falls of surface to the drains.

MEXICAN ARCHITECTURE.

FOR an account of this early architecture we refer the reader to Mr. Fergusson's "Handbook," "Penny Cyclopædia," and Prescott's "Hist. of the Conquest of Mexico." The principal buildings consist of *teocallis*, or temples. These are of pyramidal step-like form, with flat tops, and surmounted by a cell where the ceremonies are performed. Illustrations of them are to be found in Fergusson's History.

MILITARY ARCHITECTURE.

THOSE desirous of studying the military architecture of the Middle Ages are referred to the able work of Daly, *Revue Générale*, and Viollet-le-Duc's *Dictionnaire*, and his *Essai Sur l'Architecture Militaire*; also the translation by Bucknall of "History of a Fortress," by the same author. For detailed histories of fortresses, &c., see the *Vetusta Monumenta*, and Hartshorne's "Military Architecture of Great Britain," &c.

MILLSTONE GRIT.

A GROUP of strata belonging to the Carboniferous system. It affords a good building stone, and in Derbyshire it reaches considerable thickness. It is a coarse-grained quartzose sandstone, with layers of pebbles defining the upper or under surfaces.

MISERERE.

THIS is a word signifying a small shelf, or bracket, on the under side of the seats of stalls in churches. Parker says:—"These, where perfect, are fixed with hinges, so that they may be turned up, and, when this is done, the projection of the miserere is sufficient, without actually forming a seat, to afford very considerable rest to anyone leaning upon it." They were intended as a relief to a Canon during a long service required to be performed in a standing posture. They are generally ornamented with carving of foliage, figures, and often grotesque animals. In Henry VII.'s Chapel, Westminster, an interesting example of the thirteenth century is to be seen; it is engraved in Parker's Glossary. If the ecclesiastic fell asleep, he would naturally fall forward, and the miserere, or rest, would shut down with a noise, and awaken attention to the delinquent. At Winchester Cathedral may be seen interesting specimens of misereres, with ludicrous carving; but the Cathedral at Exeter is rich in early examples, many dating before 1244. See example illustrated in the BUILDING NEWS, 1871, p. 68, showing an elephant. Gloucester Cathedral has a few examples. Other instances (casts) are to be seen in the Architectural Museum. We refer the reader to Jewitt's "Art under the Seats," and Hewett's "Twenty Examples from Exeter Cathedral, 1849."

MONOPTERAL.

IS a species of temple of a circular form, having neither walls nor cella, but only a cupola resting on columns upon a basement. See Vitruvius IV.

MONSTRANCE.

FROM Latin *monstro*, to show. A receptacle, or glass case, used in the Roman Catholic Church, in which the consecrated wafer is deposited upon the altar, or carried in processions. It consists of a foot, or stand, and repository; the latter has a small holder called the *lunula*, or crescent, in which the host is fixed. They are often of elaborate design and costly materials, and Pugin, in his Glossary, thinks it not probable they were introduced before the end of the fourteenth century. Their forms were various. They often resemble crosses, shrines, towers, radiated suns, &c. Monstrances are often decorated with translucent and painted enamel. Its use dates from the festival of Corpus Christi, in the thirteenth century.—*Chambers's Encyc.*

MOSAIC.

ROMAN mosaic work is divided by Ciampini into four classes. (1) Tesselatum; (2) Sectile; (3) Figlinum; (4) Vermiculatum. The two former are applied to pavements, and the latter to walls. The first is the most ancient, and consisted of small cubes of marble, about $\frac{3}{4}$in. square, arranged in geometrical forms, and examples have been found at Pompeii, as well as in this country. The second class consisted of crusta, or slices of marble placed together, so as to produce contrast in the vein and colour; a fine specimen of it is the pavement of the Pantheon at Rome. The third variety is a modification of the first kind, and is now called *lavoro di smalti*. The fourth kind is a combination of the last, with small fragments of marble and gems, and is used decoratively in the representation of figures, pictures, &c. In the Mediæval period, three varieties of mosaic were introduced. 1. The glass mosaic used for walls and vaults; 2. Glass tesselation (Opus Grecanicum) used in inlays of church furniture; and 3, marble tesselation (Alexandrinum) conventional, used in pavements. Among the revived processes, we may mention Minton's, Blashfield's, Maw and Co.'s, Salviati's, Messrs. Powell's, Minton Campbell's, &c. In the South Kensington Museum, the figures of painters, &c., in the arcades, are executed with Salviati's Venetian mosaic. Enamel tesseræ are, of course, richer in colour than terra-cotta, and they are also more transparent and durable. The manufacture of marble mosaics (opus incertum) is largely carried on, and there are several varieties of coloured glass mosaics, and coloured cements and clays. For further particulars, we refer the reader to Wyatt's "Specimens of the Geometrical Mosaic of the Middle Ages." Gruner's "Ornamental Art," Thomas's "Mural Decoration," "The Architectural Dict.," "Notes on Building, Construction: Materials." Sir Digby Wyatt divides the history of pictorial mosaic into seven periods. 1. Classical, 2. Latln, 3. Byzantine, 4. Greco-Italian, 5. Italian Monumental, 6. Italian portable, 7. Mosaic in *pietre dure*. The art of inclosing gold leaf between layers of glass gave a great impetus to Italian mosaic. St. Mark's is the richest example of mosaic decoration in the world, and we refer the reader to Mr. Cave Thomas's remarks on it, in "Mural Decoration." As Mr. Layard aptly says, "A great deal depends on the judicious combination of tesseræ of different sizes for different parts, and by the mixture of tints in large masses of one colour, such as a gold ground, and by the dexterity with which the arrangement of the tesseræ is made to follow leading lines, and the undulation of flesh or drapery."

MOULDINGS.

(Lat., *Modulus*; Ital., *Modinatura*; French, *Moulure*.)

IN the present brief notice we shall confine our remarks to the leading characteristics of mouldings, as indications of style, and we may begin with the mouldings of Classical architecture. The simplest is the *fillet*, or list—a plain, rectangular or flat band, used to separate and combine congeries of mouldings, and to give a finish; the *astragal*, or bead, a small, semicircular moulding; *torus*, applied to a similar but larger moulding; the *cyma recta*, or ogee, a wave-like moulding that generally crowns the cornice; the *cyma reversa*, a like form or profile, but reversed, the convexity being above, and the concavity below, on the right-hand; *cavetto*, a hollow; the *ovolo* (echinus), an egg-shaped member, the crowning moulding of the Doric column below the abacus; the *scotia* or *trochilus*, a concave moulding used in the bases of columns to give deep shadow, and to separate the other members. In the Greek Architecture the curves were drawn by the hand, and are obviously founded on conic sections; all attempts to strike them are useless. The graceful *cyma* is really the Hogarthian line of beauty. In Roman architecture the *cyma recta* is projected more, and has a deeper flexure, and the mouldings are generally struck as arcs of circles. The reader is referred to Tarn's "Geometry for Architects," and other elementary treatises. The mouldings of Mediæval architecture are more numerous and diversified. In the Norman style the plain mouldings consist of rounds and hollows. The bowtell was a common finish to the arris; the *billet* was both round and square, and was a very common enrichment; so were the lozenge, the nail-head, the pellet, the beak-head, the chain-and-cable, and the indented ornaments. The zig-zag, or *chevron*, a moulding broken into zig-zag lines, occurs as a late ornament in the style, and was commonly introduced. For examples, see Parker's "Glossary. *Early English.*" During the distinctive phase of this period the mouldings were deeply undercut, the congeries of members were grouped so as to be circumscribed by rectangular lines forming a series of recesses, in the manner of the piers and arch-moulds of the preceding Norman. Rounds and hollows alternate, some very deeply cut, with a few separating fillets. Sometimes the rounds and hollows meet at an angle, which, in good work, is never acute; the scroll is a common moulding. The most characteristic ornament is the dog-tooth, consisting of four small leaves, united in a pyramidal profile. Leaves and flowers in running patterns are also common. *Decorated.*—In the well-marked varieties the hollows were still prominent, but gradually became shallower as the style advanced. Ogees and ovolos occur frequently, and the roll or scroll moulding is common; fillets are plentiful. The

ball-flower is the characteristic ornament of the style, though foliage is met with. In the *Perpendicular* period the mouldings assumed a flatter appearance; they were less grouped, and the use of larger shallow hollows is frequent. The ogee is common, also double ogees and the wave moulding. The foliage and flowers in the ornament are often detached, four-leaved flowers at intervals, and vine and oak leaves, as the Tudor leaf, are to be noticed, and shields and heraldic devices are frequently introduced. Throughout these styles there was, in fact, a development of mouldings, like other features, and it is hardly correct to speak of the peculiarities of different styles as if they were set and distinct forms, independent of preceding types. In France and other Continental countries, mouldings partook of the same general character, but the leaf ornaments were more varied. Mouldings may be regarded as the finishing touches of a building, and, by the refinement and study observable in their design, we may fairly estimate the architect's ability as an artist. To be perfect, a profile, or combination of mouldings should possess unity in variety, the members should be grouped together, vary in size and form, and yet be perfectly adapted to their several uses; the convex and concave members should alternate, or be intermixed, so as not to produce monotony, and the object of the arrangement should be to give prominence to one marked shadow and member. It requires considerable art and skill to design perfect mouldings, and the student should therefore study carefully the mouldings of the best Greek, Italian, and Mediæval examples. The subject has been discussed in the BUILDING NEWS in several articles; we may particularly refer the reader to Willis's "Architectural Nomenclature," Sharpe's "Discriminative Characteristics of the Mouldings of the Seven Periods," Paley's "Manual of Gothic Mouldings." There is probably no better test of the taste and artistic skill of the architect than the design of mouldings to suit different purposes and positions, but few things which are more neglected. Every moulding should be designed in reference (1) to its position, whether for use or ornament; with regard to its expression as a crowning member, or as an architectural relief and separation; and (2) with regard to light and shadow, elevation from the eye, &c.

G. H. G.

COMPOSITIONS FOR PRESERVING IRON, STONE, &c.

AN improved paint or composition, specially adapted for coating ships and submerged surfaces generally, but also applicable to stone and other building materials, has been patented by Mr. G. S. F. Edwards, of South Shields.

Paints used for colouring and preserving ships' bottoms have often been found to have objectionable qualities: they are either injurious to the material to which they are applied to preserve it from the ravages of animalcula and the growth of vegetable life, or the paint, under the repeated changes of climate to which most ships are exposed, scales off and becomes useless for its original purpose. To remedy these and other evils is the purpose of the paint or composition under notice. For the first coat the paint consists of the following ingredients:—(1), boiled and refined linseed oil; (2), amber resin; (3), oxide of zinc (pure); (4), oxide of iron; (5), American spirits of turpentine; (6), heptane and its homologens; (7), mineral naphtha; (8), tar (Archangel or Stockholm, the latter preferred for ships trading to ports in the torrid zone); (9), slacked lime; (10), shellac; and (11), pine oil. The ingredients numbered 1 and 3 are mixed thoroughly together, and ground through a pair of heavy stones. Number 4 ingredient is also mixed and ground in a like manner with number 1 and 5 ingredients, the proportions being about two and a half gallons of number 1 ingredient to the hundredweight of No. 3 and 4 ingredients, and about half to one gallon of No. 5 ingredient to the hundredweight. The patentee then takes 15lb. of No. 1 and 3 ingredients, and places them in a separate vessel, together with 15lb. of No. 1, 4, and 5 ingredients, after treatment as above. Six gallons of No. 6 ingredient are then added, together with about a gallon of No. 11 ingredient, and the whole very carefully mixed together and allowed to stand for a short time, say from five to ten minutes, to allow of a proper chemical action and combination of the ingredients. Twenty pounds of No. 2 ingredient, and 8lb. of No. 10 ingredient, are now placed in a suitable vessel, and heated over a slack fire to thoroughly melt or liquefy, when it is poured into a separate vessel, and the ingredients in the vessel before referred to quickly added, and thoroughly stirred and incorporated. One gallon of No. 8 ingredient is now mixed with a pint of No. 7 ingredient, and about 2lb. of No. 9 ingredient is added to it; the whole mixed and added to the ingredients above mentioned, and thoroughly incorporated therewith, when the paint is ready for use.

The surface treated with the above composition quickly dries, and is ready without further preparation to receive the second coat, or composition number 2, which is composed of the following ingredients, viz.:—(1), boiled and refined linseed oil; (2), amber resin; (3), pure oxide of zinc; (4), oxide of iron; (5), American spirits of turpentine; (6), heptane and its homologens; (7), mineral naphtha; (8), tar; (9), slacked lime; (10), shellac; (11), pine oil; (12), varnish (foots); (13), refined red-lead; (14), pulverised with arsenic; (15), carbonic acid; and (16), corrosive sublimate. These ingredients are combined together in the following way. Number 1 and 3 ingredients are treated as before described for No. 1 coating, also No. 1, 4, and 5 ingredients, the proportions being the same as in No. 1 coating. The patentee then takes 15lb. of No. 1 and 3 ingredients, also 15lb. of No. 1, 4, and 5 ingredients, after being treated as described for coating No. 1, and add 6 gallons of No. 6 ingredient, and also from half to one gallon of No. 11 ingredient, and about half gallon of No. 12 ingredient, and these are thoroughly mixed and allowed to stand for a short time. No. 2 and 10 ingredients are treated as in No. 1 coating, and the whole mixed as before. No. 14 ingredient is mixed together with No. 1 ingredient, and thoroughly ground through heavy stones, the proportions being about 3 gallons to the hundredweight of No. 14 ingredient. About 7lb. of No. 1 and 14 ingredients after being thus treated are added to all the before-named ingredients, when 1lb. of No. 13 ingredient is added. Nos. 7, 8, and 9 ingredients are treated as in No. 1 coating, and added together with half to one gallon of No. 15 ingredient, and the whole thoroughly mixed and incorporated, after which from 1 to 2 per cent of No. 16 ingredient is added.

Paints or compositions made up as above described, and applied for experimental purposes to a proper surface, have been found to dry very quickly, and to present an exterior equal in appearance to enamel, consequently, according to the patentee, exercising, when the ship is in motion, less surface friction, the result being an increase in speed; the exterior is also tougher and more durable than ordinary paint, and less liable to suffer from friction. The two mixtures or compositions are of different colours; it can therefore be readily ascertained whether the surface treated has been once or twice coated with the composition, thus preventing frauds, mistakes, or omissions.

WOOD PAVING v. MACADAM.

A REPORT on wood paving has been made to the vestry of Kensington by their surveyor, Mr. Wm. Weaver, A.I.C.E. Amongst the advantages of wood pavement—appearance, cleanliness, comfort, and quietness, &c.—stress is especially laid on scavengering. While the use of wood involves a greater outlay for labour than a macadamised road, Mr. Weaver remarks that the refuse swept off is very much less, and is easier disposed of. Indeed, at the present time while the Kensington vestry obtains £5 per barge-load (equal to a net profit of £3 per barge) for the sweepings from wood paving, £5 per freight is paid to get rid of the sweepings from macadamised surfaces. At present, 28,459⅓ square yards of wood paving have been laid in the parish on four different systems and by five different contractors, the original cost price per yard, exclusive of excavation, ranging from 12s. 6d. for deal blocks, grouted in lime, laid on 6in. Portland cement concrete; to 14s. for blocks. laid on ½in. plank on 6in. Portland cement concrete, with felt or asphalte laid between and under blocks. He reports, from a supervision and comparison of all modes of laying the paving, that the best system is that of deal blocks with a ⅜in. joint laid on a 6in. bed of Portland cement concrete; the joints between blocks to be grouted either with Portland cement or partly with that material and partly with asphalte. In order to render the surface impervious to wet, the blocks should be laid in straight, even rows, with a uniform width of joint. Mr. Weaver mentions that he has designed an iron stud which will keep each block in its place, and unite the whole firmly together, even before running in the grout. This stud (which is ⅜in. wide, fitting the space between blocks, and has on two sides a sharp spike running into the block) he places at the disposal of the vestry, but intends registering it against outside use. Passing on to consider the extended use of the material, Mr. Weaver recommends the adoption of wood paving in the principal thoroughfares over an area of 76,608 square yards. He estimates the cost of laying at 11s. per yard, and maintenance for first three years free of cost, and at 10d. per yard per annum for five other years. At this rate, the cost for fifteen years of the roads proposed to be dealt with will be £80,438, as against £85,590 for macadam, but the maintenance cost will be £5,866 12s. 8d., as against the present expenditure of £5,785 19s. 10d. for macadam. This loss in maintenance, just exceeding £160 a year, will be, he thinks, more than counterbalanced by the saving in slopping, and without reckoning the private gain in diminished wear and tear to horses and vehicles. In conclusion, he states that the proposed outlay for wood paving in the main roads will, in his opinion, be an economical step, and makes the following recommendations to the vestry should it be entered upon:—1. That in carrying out the work the vestry should either execute the whole of the work themselves, or contract for the entire work of excavating for and laying down wood paving. 2. If the latter alternative is adopted, the contractor should be allowed to use the clean sifted granite for concrete, and cart away as his own property the rest of the excavated material, except channel stones and crossings. 3. That a number of selected contractors be invited to tender for the work, on a carefully drawn specification. 4. That prior to any portion of the work being commenced, arrangements should be made with the gas and water companies, as to altering mains and services, and also as to the charges to be made for repairing trenches opened for such alterations.

CHRIST CHURCH CATHEDRAL, DUBLIN.

MR. STREET'S restoration of the cathedral of the Holy Trinity, commonly called Christ Church, Dublin, is, it may be said, almost drawn to a close. A bishop's throne and a reredos not yet erected will, it is understood, crown and complete a very magnificent and satisfactory work. The local outcry against the costly screen, arising from a small and uninfluential party, ignorant of all cathedral history and order, and of the fact that a screen in a cathedral was not a startling novelty, has died away. It is, of course, impossible that a great work like this, and by an architect so strong-minded as Mr. Street, should escape all criticism in points of detail. It is, for instance, a prevalent criticism that this beautiful screen in the right place is not the right screen; the authenticity of the ugly clerestory windows of the nave, for which Mr. Street believed he had undoubted authority, is questioned by competent judges; but there appears to be a general *consensus* of intelligent opinion in Dublin that Mr. Street has acquitted himself in a difficult work with decision, great erudition, and conservative spirit on the whole, which is above all praise. In those features which called for something more than restoration the pavements, ironwork, fittings, &c., Mr. Street has probably never designed more striking, original, and beautiful work. No building in Ireland has ever marked so important an epoch in the progress of church architecture in Ireland than this, and none so calculated to influence and impress its future.

The dean and chapter have appointed Mr. Thomas Drew, R.H.A., to the permanent office of honorary surveyor to the cathedral.

The plans for rebuilding the Tay-bridge have been published. Instead of the thirteen long girders, it is intended to erect twenty-six smaller ones, and to construct twelve new piers. The girders will be 57ft. above high water, or about 31ft. lower than the original bridge.

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ILLUSTRATIONS.

CLUB DESIGNS—SCREEN FOR VILLAGE CHURCH.—PLASTER CEILING, OLD WOOLPACK INN, BOLTON.—ST. GEORGE'S CHURCH, GLASCOTE.—NEW COFFEE TAVERN, TODMORDEN.—A COUNTRY HOUSE.—TECHNICAL SCHOOL, BRADFORD.

OUR LITHOGRAPHIC ILLUSTRATIONS.

"BUILDING NEWS" DESIGNING CLUB—SCREEN FOR A VILLAGE CHURCH.

We publish to-day the two best designs submitted by members of our Designing Club for a screen in wood suitable for a village church, the selected design being that contributed by "Alfred," whose work bears evidence of study, the simple treatment employed being admirably adapted for the purpose for which the screen is intended. A rood might, however, have been introduced with advantage, as we think such a feature gives character to erections of this kind. Chancel screens have been of late years, in new churches especially, singularly neglected, and although, doubtless, we are thus saved in consequence from many ugly and purposeless structures, yet so important a feature in church architecture cannot be neglected without regret, and we are glad to observe a return is now being made to their more frequent erection. Our designs, therefore, to-day, have a special interest.

PLASTER CEILING—OLD WOOLPACK INN, BOLTON.

The Old Woolpack Inn, Bolton, now in process of demolition, was built in the year 1672 by the Rev. Richard Goodwin, formerly vicar of Bolton, ejected on account of his Nonconformity in 1662. The front apartment, in which is the plaster ceiling now illustrated, is said to have been his private town dwelling; his country residence being in the township of Harwood, near Bolton. The rest of the premises were used as a Nonconformist chapel. The Rev. Oliver Heywood, the celebrated Nonconformist, often preached here. In June, 1696, when the congregation were about to remove to the new chapel which they had built in Bank-street, he preached here for the last time, and administered the Lord's Supper, at noon, to about 500 people. Since that time the premises have had a varied history, and have for many years past been used as a public-house, under the name of the "Old Woolpack Inn." Excepting the plaster ceiling illustrated, there are no details remaining of interest to an architectural student. The inside has been entirely remodelled to suit its different requirements, and the outside walls replaced with stuccoed fronts of ugly and commonplace design. Some of the back wall still stands however, and is of a light red sandstone, much decayed, with mullioned square-headed windows, indicating the character of the original design.

J. W. W.

GLASCOTE CHURCH.

Glascote is a suburb of Tamworth; its rapid growth has made the erection of this district church necessary. It is built to accommodate 200 persons, with ample passages. The materials are local red brick and Bath stone. The cost of the church was about £2,800. Messrs. Charles Clarkson and Sons were the builders, and Mr. Basil Champneys, of 39, Great Marlborough-street, was the architect. The church is dedicated in honour of St. George; a figure of him is intended eventually to occupy the niche over the porch.

COFFEE TAVERN AND TEMPERANCE HOTEL, TODMORDEN.

These premises are now erecting in the central part of the town by John Fielden Esq., Dobroyd Castle. The walls to the two fronts will be of pitch-faced parpoints, with tooled York dressings. The windows above transoms will be filled with lead lights (omitted in the drawings), the roofs covered with red tiles. The works are being executed by local contractors. Mr. William Henry Atkinson, mason; Mr. James Booth, joiner; Messrs. Samuel Barnes and Sons, slaters and tilers; Messrs. Whitaker, plumber and glazier; and Mr. James Blacka, plasterer. The architect is Mr. Jesse Horsfall, of Todmorden.

A COUNTRY HOUSE.

The design we illustrate, for a country house, is explained by the plan as far as arrangement goes. The principal rooms are grouped round a large hall, which is supposed to be used for any balls or receptions. This hall is of the height of two stories of the other rooms, and is surrounded at the level of the first floor by a gallery to give access to the bedrooms. The walls are intended to be hollow stone walls. The drawing from which our photo-lithograph is taken is by Mr. Philip J. Marvin, and is in the Academy.

TECHNICAL SCHOOL, BRADFORD.

The memorial-stone of this building was laid on Wednesday by the Master of the Clothworkers' Company of the City of London. Three years since, the Council of the Bradford Mechanics' Institute took into consideration the advisability of establishing a weaving school, for the purpose of supplying technical instruction to those engaged in the various branches of textile industry of which Bradford is the centre. A guarantee fund, which amounted to nearly £2,000, was subscribed to insure the undertaking against financial disaster; and Mr. J. Ashenhurst (who had for some time been the teacher at Calverley) having been chosen as instructor, the school was formally opened on the 6th March, 1878. The success of the movement was greater than had been anticipated, there being at the beginning such a rush of students (339) as to render much good work impossible with the limited accommodation. A meeting was next called by the Mayor on the 3rd of October, 1878, at which subscriptions to the amount of £11,000 were promised. This sum being afterwards considerably increased, the council proceeded to take the necessary measures for the erection of a building in which adequate provision will be made for imparting technical instruction in every branch of the principal industry of the town. The site of the new school covers nearly an acre of ground. The building, which will have frontages to Horton-road and Carlton-place, is to be in the Italian style of architecture, after a design prepared by Messrs. Hope and Jardine, Cheapside, Bradford. About 16 architects were concerned in the public competition which took place in response to the invitation of the council of the Technical School. The choice of the council was almost unanimously in favour of the design sent in by Messrs. Hope and Jardine, that of Messrs. F. and T. Healey taking second place, and that of Messrs. Hargreaves and Bailey third. The cost of the building, as originally fixed for the guidance of the competing architects, was to be £12,000; but since the adoption of a design several additions have been made involving further outlay, and the aggregate amount of the contracts is a little more than £13,000. One of the principal features of the building as approached from Horton-road will be a tower rising in the centre of the principal front to a height of 120ft. The general elevation to Horton-road will be very imposing, the front being relieved by fourteen Corinthian columns; and in the centre there will be the principal entrance hall, dividing the building into two portions. The building will extend along Carlton-place to a distance of 217ft., and its frontage in Horton-road will be 152ft. in length and 50ft. in height. The left side of the entrance hall, on the ground floor, will be occupied by the subscribers' reading-room and library (38ft. by 9ft.), council chamber (19ft. by 19ft.), secretary's room, curator's room, and by cloak-rooms for the use of persons assembling in the public hall. The whole of the right-hand side of the entrance hall will be taken up by the public hall, which will be a fine room (68ft. long, 46ft. wide, and about 32ft. high). It will have a gallery round three sides, and will seat about 800 persons. As the art classes will be over the public hall, and the floor beams will have a span of 46ft., it will necessitate the erection of two rows of pillars in the public hall for their support. The ceiling of the room will be panelled, and surrounded with a cornice. Adjoining the platform there will be two anterooms on the ground-floor, and a large well-lighted one underneath. Above the public hall (as already mentioned), and forming what may be called the second floor, there will be a suite of rooms lighted from the roof, which are intended for use as art classes. On the first floor, over the library and Council chamber, will be the Industrial Museum, a large room (58ft. by 46ft.) with galleries round all sides, and it will be lighted both from the sides and the roof. To this room there will be separate entrances on its area and gallery floors. That portion of the building fronting to Carlton-place will be devoted to the strictly educational work of the school, and a separate entrance will be provided for the students. The accommodation to be provided on the ground-floor of this department will be apportioned as follows:—A room for hand-loom weaving, 45ft. by 32ft. 6in.; one for power-loom weaving, 45ft. by 44ft. 6in.; one for drawing and twisting, 45ft. by 20ft.; one for spinning frames, 30ft. by 20ft.; a large workshop, 46ft. by 40ft.; four class-rooms, each 30ft. by 23ft. 6in.; and a large lavatory. A corridor, 8ft. in width, will separate those rooms in which machinery will be used from the class-rooms, so that students in the latter will not be much disturbed by the noise of mechanism. The first floor of the Carlton-place front of the building may be reached either by the principal staircase or by one which will be provided near the students' entrance. On this floor there will be a small lecture-theatre, with seats in raised stages; a large chemical laboratory (47ft. 6in. by 30ft.), separated from the lecture-theatre by a demonstrators' room; and an elevated well-lighted room (46ft. by 40ft.) in which practical dyeing will be taught. The Horton-road front of the building, the tower, and the end of the lecture-hall fronting Carlton-place, will be constructed with cleansed ashlar, and the remainder of cut wall stone. Mr. Abner Rhodes is clerk of the works. The contractors for the various works are as follows:—Mason, Mr. E. Atkinson; joiners, Messrs. Deacon and Whittaker (Shipley); plumber, Mr. S. Ryder; plasterers, Messrs. C. Howroyd and Sons; slaters, Mr. James Smithies (Great Horton); ironfounders, Messrs. Taylor and Parsons.

CHIPS.

New Board-schools at Even Swindon were opened on Wednesday week. The building is of red brick, with coloured brick dressings; the style is Gothic. The sanitary arrangements are by Macfarlane, of Glasgow; and the school fittings by Colman and Glendenning, of Norwich. The contract sum was £1,956, including boundary-walls, yard-making, and the fittings. The total cost, including site, was £2,450—or an average of £7 per head of the number accommodated. Mr. G. Wiltshire was the contractor; and the Board appointed Mr. Drew and Mr. W. H. Read as architects to jointly carry out the work.

In the chapel of Felstead Grammar-schools, Essex, one of a series of subjects has been fixed, being painted on linoleum. The figures are drawn from life, and painted by J. R. Thomson, of 29, Gladstone-street, St. George's-road, Southwark, London. The above has been done under the superintendence of the architect, Mr. F. Chancellor.

The new Catholic Church of SS. Catherine and Barbara, at Forton, near Lancaster, was opened on Sunday week. The building is connected with Brockholes Hall by a covered way, and is a substantial stone fabric. All the fittings, including chancel, roof, altar-rail, gallery-front, and the benches, are of pitch-pine varnished. Mr. J. Tomlinson, of Great Eccleston, was the contractor for the church and presbytery adjoining, and Mr. Hall, of Scorton, executed the joinery.

Technical School, Bradford.

Hope & Jardine, Architects, Bradford.
1880.

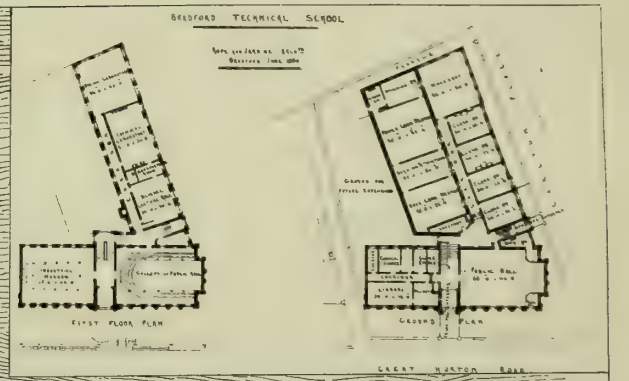


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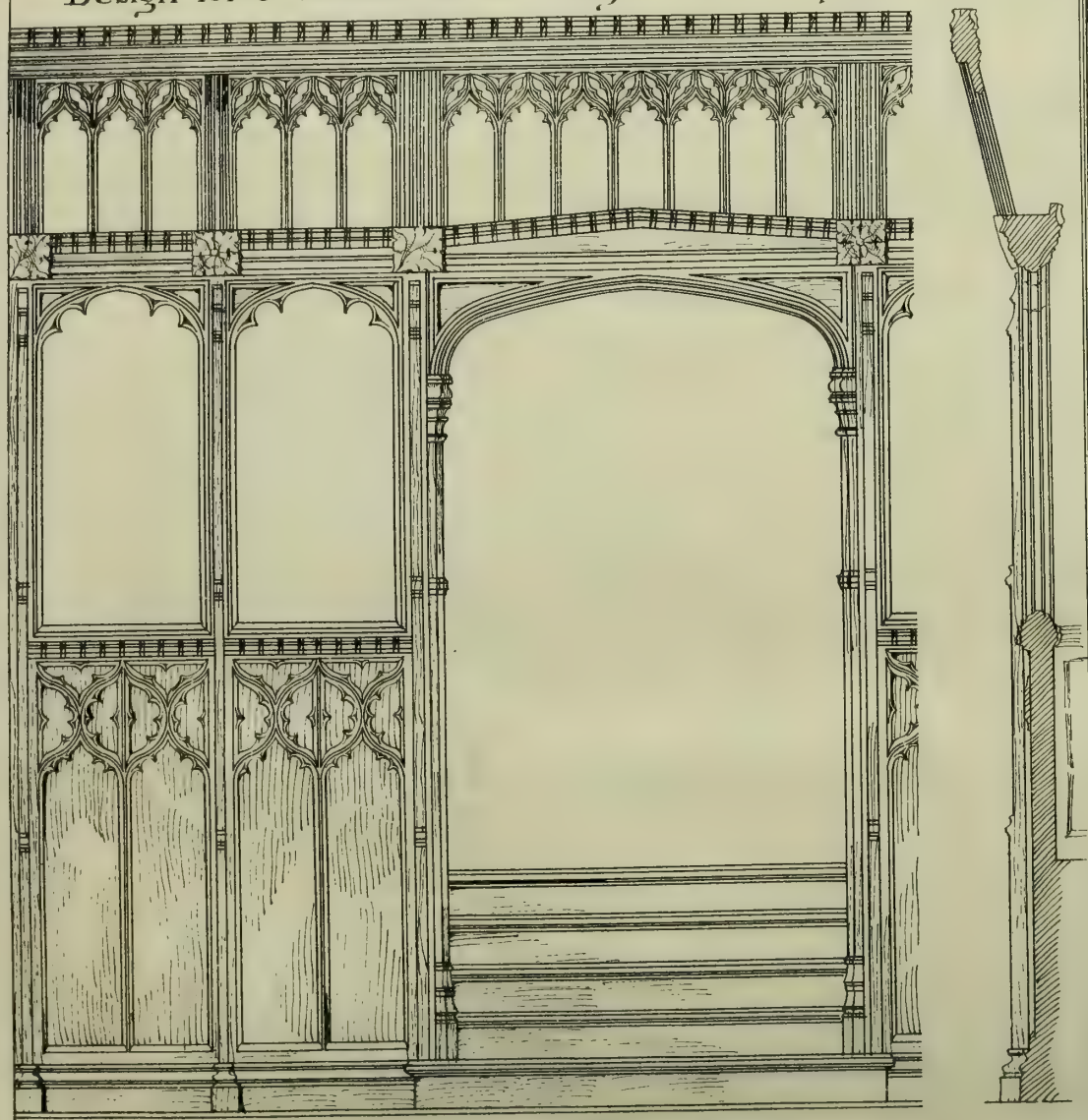


NEW · COFFEE · TAVERN · TODMORDEN · *NOW · IN · COURSE · OF · ERECTION* · JESSE · HORSFALL · ARCHT ·

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Building News Designing Club:

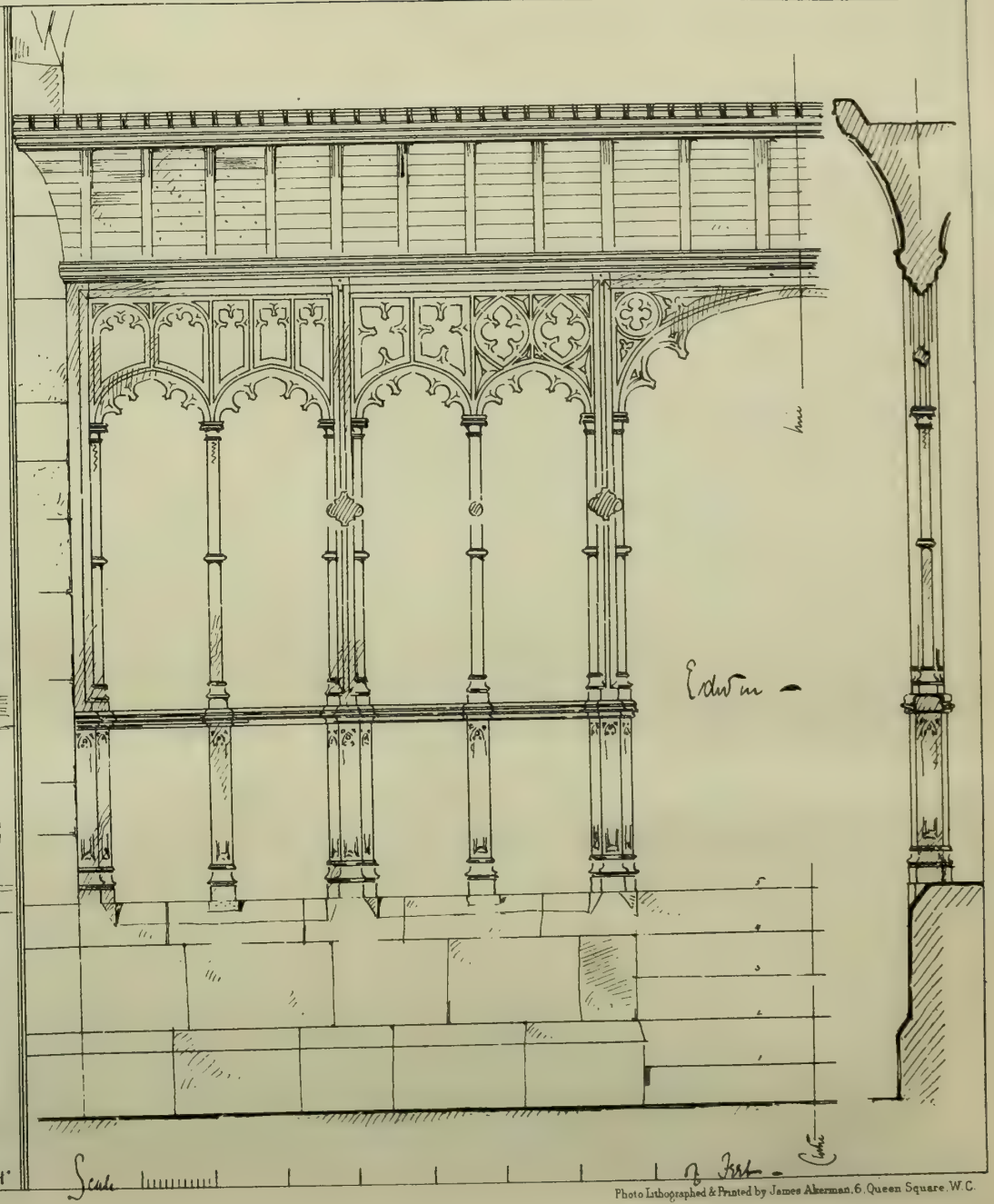
Design for a screen for a village church: "Alfred"



Elevation

Scale of Feet

Section



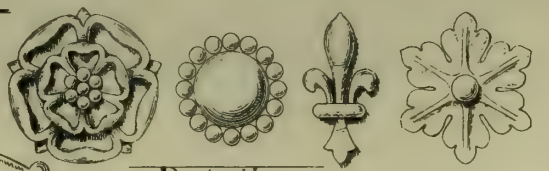
Scale

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PLASTER CEILING Old Woolpack Inn Bolton

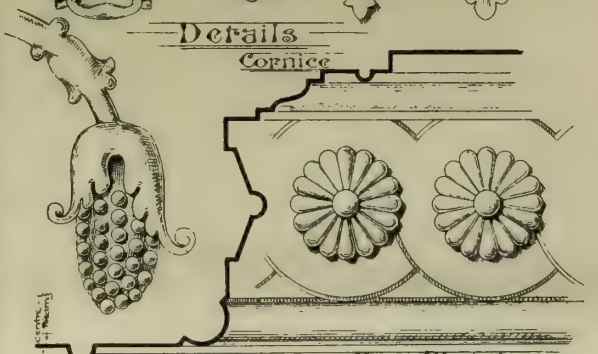
Scales Plan Inches 0 1 2 3 Feet
Details Inches 0 1 2 3 4 5 6 Inches

Rib Mould



Details

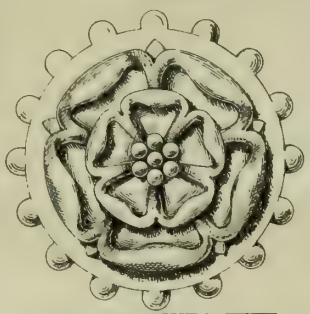
Cornice



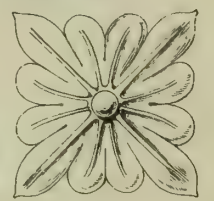
Half Section and Part Elevation of Beam



Part Soffit of Beam

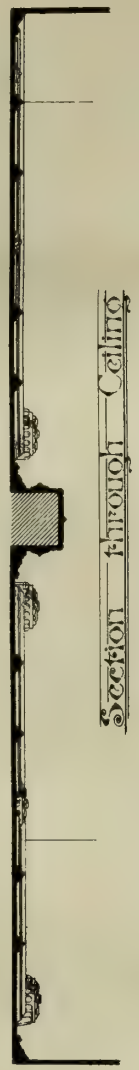


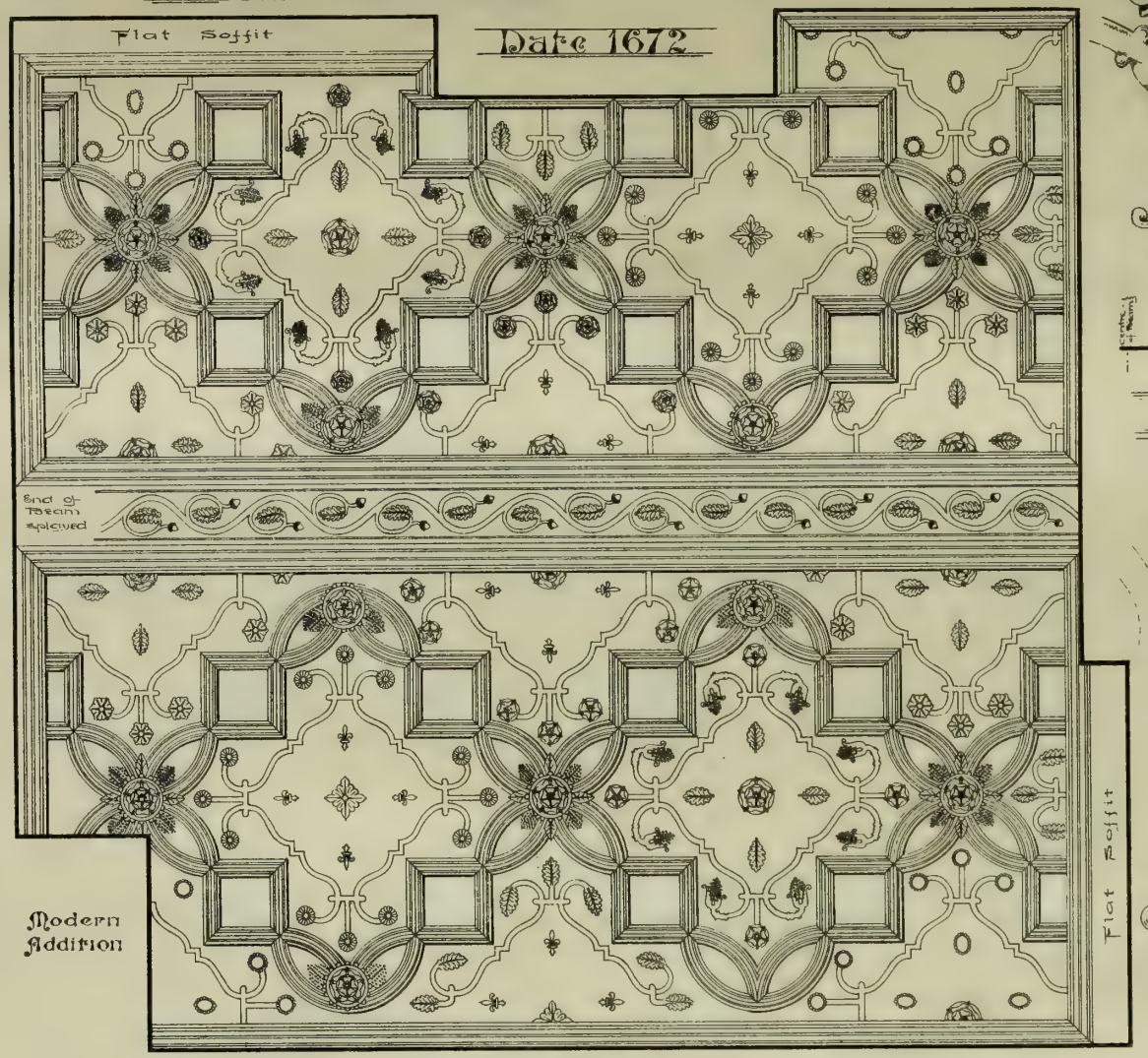
Centre of Boss.



Patera

Section through Ceiling





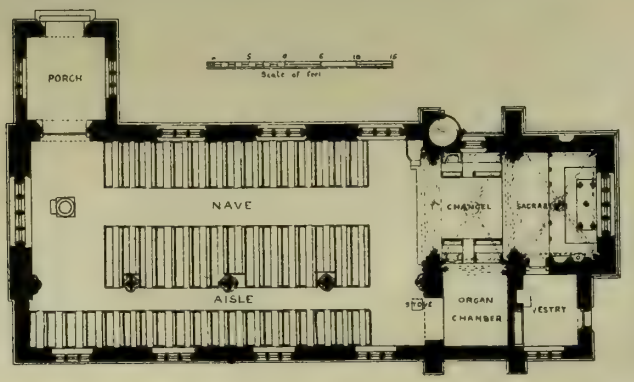
Plan

Measd and drawn by J.W. Wallace. March 1880

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CH·OF·S·GEORGE·CLASCOTE·NR·TAMWORTH

Basil Champneys ARCHITECT



GROUND PLAN

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A COUNTRY HOUSE

P.J. MARVIN ARCHT

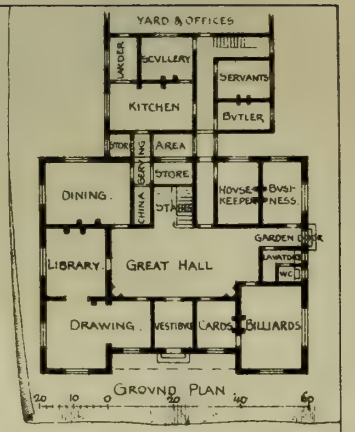


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ARCHITECTURAL REMAINS IN ARIZONA.

TO the student of history nothing in Arizona equals in interest its architectural remains. Now that the railway is finished, many of these are comparatively accessible—the famous Casa Grande being only a few miles from the station of that name, while numerous other ruins exist in the districts around Florence and Phœnix.

A few miles from Phœnix are the ruins of two or three towns and the remains of two stupendous canals, one of which is 40ft. wide, and in former times drew its supply of water from the river near the mountains, 20 miles distant. In this neighbourhood are also the ruins of a building occupying a parallelogram of 20ft. by 130ft., with walls still over 10ft. high. At from 12 to 14 miles of Phœnix, at La Tempe, are remains of what must have been a populous city, and also another system of canals and reservoirs. Ruins of a similar description to those of Casa Grande have been found in the Rio Verde valley, on Pueblo creek, and at Aztec pass.

Casa Grande, discovered by Father Kino, 300 years ago, is situated near the Gila, a few miles from Florence. The main building is about 55ft. square, and four stories in height, with traces of two more stories. Each story contains five rooms, two 35ft. by 10ft., the other three 24ft. by 9ft., and all of them 9ft. in height. The openings which once served for doors are 3½ft. high, 2½ft. wide at the base, and 2ft. wide at top. The whole of the interior is neatly plastered, the plaster perfect as when first put on. This building is surrounded by a wall, which, when perfect, was perhaps 15ft. high, and 6ft. thick at the base, and within this are several smaller apartments, besides a sort of watch-tower at the south-east and south-west corners.

The towns of the Moqui and Zuni, the former in the north of Arizona, and the latter just over the border in New Mexico, are in so many respects similar to the ruins scattered on plain and canon, that they evidently belonged to the same civilisation; but whether the Indians are the remains of a separate tribe, or the remnants of many tribes, is one of the problems of the history of America. In the Gila valley, 120 miles from Tucson, are the famous Piedras Pintedas. A heap of rocks, about 50ft. high, is covered with rude figures, geometric, comic, anatomical. Here are squares, circles, crosses, triangles, snakes, toads, and vermin: men without heads, and dogs without tails. The sketches show considerable similarity to the Aztec Calendar Stone, in Mexico. It is a tradition with the Indians that those stones were put there in the time of Montezuma to record treaties between different tribes.

NEW CEILING AND WALL.

A NOVEL lath has been recently patented by Mr. Walter J. Garvey, of 407, Chestnut-street, St. Louis, Mo. It consists of a bar of plaster of Paris cast in a mould around a stiffening and strengthening wire. The edges are tongued and grooved, so that the entire series of laths may be locked together. These laths are made in lengths of 12, 16, 32, or 48in., as may be required. In width they may vary between 1½ and 2in.

The laths are secured in place by wires looped over nails driven into the sides of the joists. The contiguous ends of the laths are separated a short distance, and the intervening space is filled with plaster, making a smooth joint, and at the same time fastening the laths by enveloping the wire core, which is allowed to project beyond the end of the lath. As soon as the laths have been thus applied and fastened, the white plaster coat or finish may be at once put on, when the work is complete. This style of wall and ceiling may be made much quicker than by the ordinary methods, thereby saving three-fourths of the time required to finish the walls of a house, and when done, according to the *Scientific American*, it is harder and more durable than ordinary lath and plaster walls and ceilings, besides being entirely fireproof. The inventor states that this wall will not crack, as its peculiar construction admits of considerable change in the frame of a building without affecting the walls. The lath may be manufactured where it is used, or it may be readily shipped to any point where needed.

THE NEW RAILWAY TO HARROW-ON-THE-HILL.

ON Monday June 28th, the Metropolitan Railway extension to Harrow-on-the-Hill will be opened, and will supply a want long felt. The line from the Swiss Cottage, viâ Willesden Green, Kingsbury, Neasdon, Wembley Park, Uxendon, and Woodcock Dell, to the foot of Harrow Hill, runs through some of the finest suburban scenery near London. The stations are built in red brick, in a style somewhat after that of Queen Anne. Already many inquiries are being made daily for residences in the neighbourhood, in anticipation of the facilities which the new line will afford by very frequent trains and moderate fares. The distance from Harrow to Baker-street is nine and a half miles. Harrow is one of the most beautiful neighbourhoods near London, and with more attention on the part of its local authorities to matters of drainage, and an improved water supply, the maintenance of the roads, and better supervision of house-building operations, cannot fail to attract residents. The school, under the care of its present head-master, Dr. Butler, who is as kindly and courteous a gentleman as he is a ripe scholar, has attained a position equal to that of any public school in the United Kingdom; and other educational advantages are offered to middle-class inhabitants in connection with a lower school, the scheme of which has lately been sanctioned by the governors of Harrow School. What is most wanted at Harrow at the present time is the presence of a few men with capital and taste to do for the locality what Mr. Carr has done at Bedford Park. Some good houses have been erected in the town itself during the past few years, but the majority of those built in Greenhill, Roxborough, and other adjacent villages, are very inferior as regards style, construction, and sanitary arrangements, and are very highly rented.

CHURCH ARCHITECTURE AND ARRANGEMENTS.

THE above subject came on for discussion on Monday last, at the Liverpool Church Conference, a paper being read by the Rev. John Sheepshanks, Vicar of St. Margaret, Anfield. Mr. Sheepshanks said he presumed he had been asked to prepare the paper as being incumbent of one of the best-constructed and, architecturally speaking, most useful churches of the city. Pretending to no more knowledge of scientific architecture than was to be found in any ordinary English clergyman, he looked at church architecture almost exclusively from a practical point of view, believing, as he did, that a well-constructed and well-appointed church-building was a most useful weapon in the hands of the parish priest. The waste of money, work, and time, and the anxiety caused by the enlargement of churches, and in providing "additional accommodation," had been deplorable; and when a church had been enlarged, not infrequently, from an æsthetical point of view (an aspect of the matter which was by no means to be disregarded), it had been spoilt. When economy had to be considered, which was the case in regard to the great bulk of modern churches, the chancel was commonly far too small for the church upon the smaller scale on which it was originally designed, and when the original church had been enlarged by the addition of one or two side-aisles, the lengthening of the nave, or the erection of transepts, the chancel was so insignificant, so out of proportion to the building, often looking more like a recess than anything else, that the dignity of the divine worship was greatly impaired. A great saving would be effected if, whenever a large population was expected in the neighbourhood, the churches were at the outset designed and constructed upon a large scale. Indeed, where the funds were small, rather than be induced to run up a small cheap church it would be far better to be content with erecting at first a portion of a church, to be completed in due time. And in this case it was better to begin with the chancel, because people would be more readily induced afterwards to subscribe for the increase of the accommodation rather than when sufficient accommodation had been secured, to make an effort for the building of a suitable chancel, in which no additional seats would be provided for the public.

As to the style of architecture, he thought it would be great unwisdom to suppose that they should be tied down to the Gothic or any other specific style. The churches should be capacious, dignified, impressive, suited for our Anglican mode of worship, and while he by no means underrated the value of a grand exterior, it was the interior to which their attention should be mainly directed, and as the Holy Communion was the only form of common public worship prescribed by the Saviour of the World, and was therefore the great central act of our worship, they would require the chancel to be regarded as an all-important feature in the planning of the churches. When the chancel was frequently nothing more than a mere bay in the east wall, and the sacrarium an insignificantly-small area, the divine service performed there could hardly be rendered with proper dignity, to say nothing of rubrical exactness. So far from being mere recesses, it was evident that the chancels should be spacious, well-proportioned, and dignified, and the arrangements be so disposed as to provide as the very first object for the rendering of worship in a solemn and dignified manner. At the same time he deprecated too much adornment. The effect he would have should be produced rather by fine dimensions and fair proportions than by elaboration of details; and such a church as he had sketched, each with a good staff of working clergy, would serve the purpose of three or four of the ordinary town buildings.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—The annual dinner of this Association was held on Thursday week at the Grand Hotel, Colmore-row. Mr. William Hale presided, and Mr. R. B. Morgan occupied the Vice-chair. Among those present were Mr. George Ingall, the newly-elected President, Messrs. J. W. Tonks, T. F. Proud, W. Wallis, A. Freeman Smith, A. Clere, A. Reading, F. E. F. Bailey (Walsall), E. Wood, and W. H. Kendrick (West Bromwich), Fred. G. Hughes (Hon. Secretary), &c. After the usual loyal toasts, the President proposed the toast of the evening, "Success to the Birmingham Architectural Association." Mr. Morgan responded, and Mr. Ingall then gave, "The Profession," to which Mr. Reading responded. The President proposed the toast of the "Kindred Arts," which was responded to by Mr. Wallis and Mr. Tonks. The remaining toasts were, "The Retiring President," "The Honorary Members," "The Visitors," and "The Officers." During the evening songs and recitations were given by several of the members.

COMPETITIONS.

GLASGOW.—The number of separate parcels received up till twelve o'clock on Tuesday night, and which the authorities imagine contain separate sets of designs for the municipal buildings, was ninety-three; the parcels, have, however, not been opened yet. The committee have not yet decided as to whether, or when, the plans will be on view.

WESTMINSTER.—New offices for the churchwardens, overseers, and vestrymen of the united parishes of St. Margaret and St. John, Westminster, are about to be erected at a cost of £15,000. Among the usual requirements a large public hall, to accommodate 1,000 persons, will be provided. In order to obtain designs for the buildings, a competition was instituted, and the following twelve architects were invited to compete, two only declining the invitation, one of whom was Mr. Shaw:—Messrs. Lee and Smith, T. E. Knightly, W. Bardwell, J. P. Seddon, Charles Barry, R. Norman Shaw, R.A., W. S. Trehearne, Messrs. Hunt and Steward, E. Power, J. H. Walton, Messrs. Mann and Saunders, and John E. Trollope. The site of the building is in Great Chapel-street, between St. James' Park and Victoria-street, behind Christchurch Churchyard, Westminster. The designs were sent in on Tuesday, the 8th inst., and no decision has yet been determined upon: but the Committee met on Wednesday for the first time, to consider the plans received.

A vicarage is about to be built at Killinghall, near Ripley, Yorks., from the designs of Mr. W. S. Barber, architect, of Halifax.

PARLIAMENTARY NOTES.

THE THAMES VALLEY SEWAGE SCHEME.—In reply to Mr. Cubitt, Mr. Dodson said, on Tuesday, the report of the inspectors of the Local Government Board which had been received by the Department on the subject of the scheme of the Lower Thames Valley Main Sewage Board had been referred back to the inspectors for further information, and, as his hon. friend was aware, the matter was one of unusual importance, involving, as it did, interests of great magnitude, and could only be disposed of after the most careful consideration. When a decision had been arrived at he would see if the report could be laid on the table; but he might say that, as these reports were intended for the guidance of the Department, it was not usual to produce them.

THE DRAINAGE OF LONDON.—In answer to Sir G. Campbell, Sir W. Harcourt stated, on Monday, that no information had reached the Home Office to the effect that the provisions of the Metropolis Local Management Act with respect to drainage and sewerage were seriously neglected. He was informed by the Metropolitan Board of Works that the drainage and sewerage of all houses, except those connected with the main sewers, were under the control of the vestries and district boards, who were alone responsible for them. If, however, information as to the non-observance of the Act in question reached the Home Office, it would be his duty to consider whether further legislation on the subject would be desirable.

THE MERSEY SUBWAY BILL.—This Bill was approved by the House of Lords Committee on Tuesday, the 15th instant. For the promoters of the Bill, Messrs. John Fowler, London, and Messrs. Low and Thomas, Wrexham, attended as engineers; and Mr. Kirby and Mr. Picton, Liverpool, as valuers for the property required for the undertaking. The subway is intended to join the city of Liverpool and the town of Birkenhead by an underground roadway, constructed in rock of red sandstone, under the Mersey. This will enable direct cart traffic to be carried on between the docks on both sides of the Mersey, and be a means to shippers and merchants of saving large sums now expended in lighterage. Besides bringing the Birkenhead docks in direct communication with Liverpool, the general public will not be forgotten, as foot-passengers will have also the enjoyment of the tunnel or subway.

CHIPS.

Christ Church, at Sayers-common, a hamlet two miles from Hurstpierpoint, was consecrated, together with the burial-ground attached, on Wednesday week. The church is Early Pointed in style, and consists at present of a nave only. The materials are flint and red brick for walling, with Bath-stone dressings, and the high-pitched roof is covered with red and black tiles. The seats are of pitch-pine, stained and varnished, and accommodate 180 persons. The architect is Mr. Charles Barry, Ex-P.R.I.B.A., and the contractor, Mr. C. F. Hollands, of Hurstpierpoint. The cost, excluding special gifts, was £2,300.

The parish-church of Grandborough is about to be restored. The contract has been taken by Messrs. Marshall and Boyse, builders, of Buckingham, and will be commenced at once.

The reclamation of a large arm of the River Fergus, in county Clare, is being carried out. The work is part of the scheme authorised by a recent private Act of Parliament, by which an area of 11,000 acres will be recovered. The contractor is Mr. Drinkwater, of Ballyale, who has erected corrugated iron dwellings on the mainland and on the little island of Avanna, for the 400 men employed, who are paid 12s. a week each.

A Local Government Board inquiry was held at Wells, Somerset, on Wednesday week, before Captain Hildyard, with reference to an application for sanction to borrow £3,500 to carry out works for the treatment and disposal of the city sewage. Mr. Ellis, C.E., of Exeter, is the engineer for the works, and a plan proposed to be adopted is that of deodorisation with lime and carbolic acid, and mechanical filtration to be carried on an area two acres in extent. The scheme was opposed by several residents, who urged the adoption of a more distant site with irrigation.

The memorial-stone of a new Baptist chapel, at Totterdown, Bristol, was laid on Monday. The style is Italian; and the building will seat 820 people, at a cost of £2,175. Mr. Alf. Harford, of Bristol, is the architect, and Mr. A. J. Beaven, of Bedminster, the builder.

The foundation-stone of a new Church school was laid at Hollingworth, near Glossop, on Saturday last, by James Sidebottom, Esq. The cost of the building is being defrayed by Miss Lucy Sidebottom. Messrs. Williams and Hope, of Dinting, are the contractors for the masonry.

Building Intelligence.

BARNDARRIG.—The Catholic Archbishop of Dublin opened on Sunday, the 6th inst., the new church of SS. Mary Immaculate, Michael and John, at Barndarrig, County Wicklow. It has been built from the plans and design of Mr. Edward Hague, of Dawson-street, Dublin, the tower and portions of foundation of an older church being re-used. It comprises a nave of five bays, and a chancel of two bays. The windows are of two lights under an enclosing arch, with tracery in heads, the east window being of four lights. These are filled with stained glass representing saints. Between the windows are large stone canopied buttresses, carried up above the parapets as pinnacles.

BETHNAL-GREEN.—A new mortuary opposite the Vestry-hall has just been opened. The old structure was for years a standing local disgrace; and when, at length, the parochial authorities awoke from their lethargy, and resolved upon razing it and erecting in its stead a mortuary second to none in the kingdom, a question of "vested interests" arose, and a protracted ecclesiastical suit resulted. This terminated, and the vestry's legal position judicially defined, plans were prepared by Mr. Gathercole, the vestry surveyor, and tenders invited, Mr. A. S. Judd's, builder and contractor, of York-street, Globe-road, E., being accepted from amongst the following:—Messrs. Cook, £1,995; Lucas Brothers, £1,600; Steel Brothers, £1,595; Wood, £1,587; Johnson, £1,578; Thomerson, £1,550; Wire, £1,500; Wilson, £1,495; Beal, £1,475; Mattock Brothers, £1,453; Ennor, £1,390; Judd, £1,375. The structure externally is composed of Luton grey bricks, intermixed with Portland stone, presenting a very neat appearance. Internally, the floor is of patent Victoria stone; the coffin rests are 2in. slate slabs, supported on cast-iron cantilevers; the roof and joinery is of pitch-pine, varnished. There are also infectious, non-infectious, and *post-mortem* rooms. Perhaps, however, the greatest feature, from a sanitary point of view, is the superior ventilation, and the ready means of cleansing.

HEREFORD.—The foundation-stone of a new Foresters' Hall and Working Men's Club, was laid on Monday at Hereford. The premises consist of two dwelling houses, one recently occupied as the Inland Revenue Office, and this it is proposed to divide off with a passage as a public entrance to the Assembly Hall in the rear, whilst the remaining apartments will be utilised as reading, retiring, and other rooms, for the use of the Club. The other tenement will also be divided off with a passage giving a second or private entrance approach to the Assembly Hall in the rear. The Assembly Hall to be erected in the rear of the Club premises will be approached right and left by two spacious porches with folding doors, the hall itself containing a floor area of 88ft. 6in. in length by 31ft. 6in. in width, affording seating accommodation for 500 persons. The style adopted is Romanesque. The tender of £800 submitted by Mr. Thomas Lewis, of Hereford, builder, has been accepted, and the work, is to be carried out from the designs prepared by, and under the superintendence of, Mr. Geo. Cowley Haddon, of Hereford and Malvern, architect.

HUDDERSFIELD.—Plans for the new Theatre, prepared by Mr. B. E. Entwistle, A.R.I.B.A., architect, King-street, Huddersfield, and Chapel-street, Southport, have been passed by the Corporation, and contracts have been let this week. The front to Ramsden-street will be 60ft. in width and will be of boasted ashlar, and the side to Bull and Mouth-street, which is 118ft. in length, will be hammered-dressed stonework. The Theatre will accommodate about 2,600 people and is so constructed that every sitting in the building will have full command of the stage. The gallery and amphitheatre are approached by two separate stone staircases, 4ft. 6in. wide, and will have three capital exits. The pit will accommodate about 1,100 people, and has also three excellent exits. From the pit floor, staircases descend on either side to the refreshment bar and sitting-room. The whole of the basement level is utilised, having eight small and two large dressing-rooms, besides ballet-room, property-room, band-practice room, &c., The hallkeeper's office, carpenter's shop, luggage-room, and other conveniences, are arranged upon the mezzo floor, between the stage and basement level proper. The foyer, prompt office, manager's office, star room, bill room, &c., are on the stage level.

LAMBETH.—On Monday, June 14th, the principal stone of the Lambeth Infants' School building was laid by Miss Tait. The site for the building was granted by the Archbishop of Canterbury out of the Palace grounds for the purpose. It has a frontage upon the main street a little south of Lambeth Church. The schools will accommodate 300 children, and will cost, with teacher's residence, about £2,500. They are being erected by Messrs. Belham, of 115, Buckingham Palace-road, and the quantities were taken out by Mr. William Allport, surveyor, of No. 1, Queen Anne's-gate, Westminster, from the designs and under the superintendence of Mr. John P. Seddon, architect, of No. 1, Queen Anne's-gate, Westminster.

LONDON SCHOOL BOARD.—At the meeting of this board, held on Wednesday, the tender of Mr. J. F. Sargeant, of 2, Tudor-road, Hackney, amounting to £6,240, was accepted for the enlargement of the school in Haggerston-road by 800 school places, and that of Mr. J. Marsland, of York-road, Lambeth, for the enlargement of Waterloo-road school (now in course of erection by this contractor) by a further 200 places, on the contract schedule of prices, with an addition of 5 per cent. as compensation for the rise in the price of building material. For a schoolkeeper's house to be added to Thornhill-road school, Finsbury, an expenditure of £350 was authorised; and for furniture and fittings to the following enlarged schools the following sums were voted:—Queen's-gardens, Brompton, 240 fresh places, £151 5s. 3d.—a cost of 12s. 7d. per head; Alexis-street, Bermondsey, 400 extra places—10s. 8d. per head. It was reported that the Queen's-road school, Brompton, would be opened on July 5th; and the following schools and enlargements will be completed and ready for opening immediately after the midsummer holidays:—St. Clement's-road, Notting-hill (new school); Star-lane, Fulham (enlargement); Harwood-road, Fulham (enlargement); Waterloo-street, Hammersmith (enlargement); Hargrave Park-road, Upper Holloway (enlargement); Wenlock-road, New North-road (new school); Beresford-street, Walworth (enlargement); Warple-way, Wandsworth (new school); and Alexis-street, Bermondsey (enlargement and cookery class-room).

MANCHESTER.—The contract for covering the land in Deansgate fronting the Upper Campfield Market, and extending from Tonman-street to Liverpool-road, has been let to Messrs. Elms and Evans, of the Beehive Works, Warwick-street, Greenheys. The designs for the buildings, which include a lending library and ten handsome shops, are in the Classic style, and are intended to be built of brick, with stone dressings. The whole of the basement will be cellared. The pile of buildings are to be erected from plans prepared by Mr. John Allison, the city surveyor. The sum to be paid for the work is £12,200, and it is to be completed within twelve months.

NORTON LEES, NEAR SHEFFIELD.—This church has just been simply but effectively redecorated, the chief artistic work having been expended on the chancel wall, roof, and roof-panels. The wall over the altar-table has been divided into three panels, each appropriated to a figure. The central panel represents the Saviour with uplifted hand in the act of blessing. St. Peter and St. Paul respectively occupy the side panels, with auxiliary embellishments. The paintings and decorations are by the art-firm of Powell, Bros., Park-square, Leeds.

SALFORD, LANCASHIRE.—The Corporation Public Baths which have been erected in Blackfriars-street were formally opened by the Mayor, Alderman Robinson, on Wednesday last. The building has a frontage of 71ft., and extends backwards 131ft. to Ravald-street. The arrangements are at the entrances for ticket office and waiting rooms, separate for gentlemen and ladies. The men's plunge-bath water space is 81ft. by 24ft., the one end being 3ft. 8in. deep to the water line, and the other end 6ft. 6in. deep. The sides of this bath, as also the women's plunge-bath, are lined with white enamelled fire bricks, and the bottoms are laid with 6in. by 6in. white tiling. The women's plunge-bath

has a swimming space of 32ft. by 16ft., and the depth varies from 3ft. to 4ft. 6in. The side walls of swimming-baths, which form the pathway or walking-space, are covered with a massive moulded concrete coping, with inverted channelling to carry the dripping water away which accumulates from the bathers, and this is covered with wood lattice-work to form the floor-line which gives access to the side dressing boxes, of which there are 50 in number to men's, and 12 to women's plunge-bath. The basement contains two (25 horse) boilers. The roof is formed with wrought-iron principals and wood louvres, and iron purlins, and the ceiling formed to the raking line; the interior walls are faced with stock bricks to plunge baths, and the remaining walls plastered and moulded cornices. The front of the building is faced with Ruabon stock bricks with moulded terra-cotta from the same locality, and the style of architecture adopted is of the Queen Anne period. The whole of the windows are glazed with cathedral tinted glass. The middle portion of the front elevation has a moulded brick cornice and iron gutter, and on each side there are gables with moulded stone copings, and filled in with ornamental terra-cotta panelling. The cost of the building is about £10,000, the contractor being Mr. John Wilkinson, of Pendleton; the general arrangements and supervision are by the borough engineer (Mr. A. Jacob); the architectural work by Messrs. Brockbank and Wormall of the engineer's department; and the whole has been carried out under the superintendence of Mr. John Handford, clerk of works for the Borough Corporation.

SCARBOROUGH.—The Westborough Unitarian Church in this town, Rev. D. Agate, Minister, has been reopened, after renovation and partial decoration, its walls having been previously white and bare. The chief artistic work is at the east end, in the part corresponding with the ordinary chancel. Here, instead of a window, is a large recessed panel, now divided into three compartments, in each of which is a figure of one of the three Christian Graces, viz., "Faith," "Hope," and "Charity," painted in strong outline, with the addition of but little colour, and relieved by a dull gold screen. Within a pointed arch above the figures, the sun is rising above the dusk shadow of night, the brighter stars yet shining in the heavens. On the arch itself, in letters of gold, is the legend from 1 John, i. 5, "God is light, and in Him is no darkness at all." The reredos of the altar beneath bears the legend, "God is Love." The wall spaces on either side of the figures and above the arch are suitably ornamented with strong bands of coloured scroll work, dividing a more delicate diaper. A rich dossal hanging, an ornamented surbase, a dado round the whole church, and a slight band of ornament, emphasising all the windows, complete the design. The work has been carried out by Messrs. Powell, Bros., Park-square, Leeds, under the superintendence of Messrs. Holtom and Connon, also of Leeds, architects.

SOUTHWARK.—Amongst the numerous schemes suggested for perpetuating the memory of Bishop Wilberforce, was the establishment of a Mission in South London. A little iron chapel in Albany-road, Camberwell, has been at length replaced by a permanent church in Coburg-road, Old Kent-road. The architect, Mr. Norman Shaw, has shown, according to the *Guardian*, an enterprise more bold than is perhaps commendable in his choice of a style. As far as our contemporary can see, it appears to be a sort of cross between Dutch Gothic and Queen Anne. The plan embraces a nave of four bays, its length being 100ft. by 75ft., and it will be divided internally into three equal aisles by means of three pairs of octagonal columns, which will support groined vaults of wood, the ridges east and west and north and south being of equal height. At present only half of the nave has been built, the west end being bricked up and faced externally with slate—an arrangement which accentuates with singular boldness the incompleteness of the structure. The columns as well as the internal walls are of red brick with moulded capitals of the same material; but the lower portion both of columns and of wall are panelled apparently in plaster. The vaults are painted a light drab, but not with any intention of concealing the material, for the planking is almost ostentatiously displayed. At the east of the nave is an oak pulpit by Mr. Baker Wigram, of Oxford-street, a memorial of John Sutton Utterton, Bishop-Suffragan of Guildford, Archdeacon of Surrey, who laid the memorial-stone of this church, May 24, 1879, but was called away from earth before its completion. By means of six stone steps access is gained to the chancel, which is 40ft. long by 20ft., and which is separated from the nave by a screen, very open to the springing of the arch, but filling up the arch itself with a kind of tracery. The plan includes two choir aisles of one bay each. That on the north side is used as an organ chamber, but the opposite one is not yet built. Another step leads to the sanctuary; next comes a step for the communicants (for whom, by the way, no rail is provided), and then three steps to the holy table. Thus the altar has a total elevation of eleven steps. It is of good size, and has a shelf on which is a handsome cross flanked by two candlesticks and as many vases. Two large tapers also stand in front of it upon the chancel floor. Behind the altar is a dossal-hanging surmounted by a tester-like canopy. The present accommodation is for about five hundred. The church was consecrated on Saturday afternoon.

WARRINGTON.—The tender of Mr. George Napier, builder, City-road, Manchester, amounting to £8,690, for the erection of the Warrington Union New Workhouse Schools has been accepted. The plans are in the Queen Anne style, and the architects are Messrs. John Pierpoint and Son, Bold-street, Warrington. The buildings, which are laid out in such a way as to admit of future extension to accommodate double the number of children provided for by the present plans, comprise a school for 200 scholars, with equal accommodation for boys and girls, and with sufficient capacity for 250 if found necessary, the schoolroom being 102ft. by 18ft., with four class-rooms, each 18ft. by 16ft. At the north-west angle of the land will be erected a small hospital for infectious diseases.

WEST PELTON.—Last week a new church, erected at West Pelton, in the county of Durham, was consecrated. The church is built to accommodate about 430 people, and consists of a chancel, 34ft. by 19ft.; nave, 68ft. by 29ft.; north and south transepts to nave, each 26ft. by 12ft.; and vestry on the north side of the chancel, 24ft. by 14ft. 6in. The style of architecture resembles that of the early part of the fifteenth century. The walls are built of stone. The whole of the work has been done by Messrs. Walter Scott and Son, of Sunderland, under the supervision of Mr. Storey, the clerk of the works. The decorative painting was done by Mr. George Baguley, Newcastle. The architects were Messrs. Austin, Johnson, and Hicks, of Newcastle.

CHIPS.

The *Dublin Freeman's Journal* again complains of the manner in which the bequest of Foley is being carried out. It states that although the great Irish sculptor left by will the models of his works to his native country for purposes of instruction, nearly all the 187 models existing at his death are retained at South Kensington and elsewhere in England. The only examples to be seen in the hall of the Royal Dublin Society are the "Hampden," and "Falkland," from the gallery of St. Stephen's, London, the "Boy Bathing," a statue of "A Parsee Gentleman," "Maternity," another semi-nude figure with children, a small female figure, the "Burke" and "Goldsmith," statuettes, and some few busts.

An inquiry was held at Sowerby Bridge, on Friday, before Mr. Robert Morgan, C.E., inspector, with reference to a sewerage scheme for the district. The scheme has been prepared by Messrs. Utley and Gray, civil engineers, of Halifax, and will deal with the domestic sewage on a site between the railway and river Calder, by the precipitation effected by lime and black ash waste, a process now adopted in the neighbouring district of Tong. The estimated cost of the scheme is £15,144, and the population of the district to be sewered is about 10,000. No opposition was raised to the scheme.

Mr. John Mortimer, architect, of Elland, near Halifax, has been appointed surveyor to the local board of that district, at a salary of £25 per annum.

The following four architects, Messrs. Arthur Blomfield, Arthur Young, Romanie Walker, and H. O. Shephard, take part to-morrow in the amateur dramatic performance which is to be held at St. George's Hall, in aid of the fund for the enlargement of the University College Hospital. The pieces are "New Men and Old Acres" and "Retained for the Defence."

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

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RECEIVED.—W. M.—M. and Co.—E. and J.—M. and Co.—T. H. H.

ONE OF THE CANDIDATES FOR THE APPOINTMENT OF ARCHITECT TO THE SCHOOL BOARD OF TOTTENHAM (should have sent his name and address if he wished his letter to appear.)—W. E. P. (Write B. T. Batsford, 52, High Holborn.)—A. D. (The No. is Nov. 5, 1875. Two copies can be sent post free for ninepence.)—SUBSCRIBER. (Such queries are advertisements.)—BUILDER'S CLERK. (Banister Fletcher's book, E. and F. N. Spon, 48, Charing-cross.)

"BUILDING NEWS" DESIGNING CLUB.

LIST OF SUBJECTS.—A. A gamekeeper's cottage, comprising a parlour, living-room, and kitchen, besides a gun-room. Three bedrooms and a box-room to be provided with conveniences. Plans of floors, one elevation, section, and a sketch. Scale, 1-6th of an inch to the foot. B. A summer-house in timber. Plan and sketch 1in. scale.

NOTICE.—This will conclude our present series of subjects.

DRAWINGS RECEIVED.—Mot, Motto, J. L., Edwin, Amos, Clansman, W. in W., Tom Tit, Le Fainent, Hubert, Jack, Palmam qui Meruit Ferat, Times, Castello, Jeptha, Manx, Lancaster, H., Pace, Jack in Circle, Veritas Vincit, 1880, Pupil J., Gerald, X. L., Ernest, Ap Adam, Our Praises are Our Wages, Eko, Pro Bono Publico, Nil Desperandum.

NEXT WEEK will be published the
MIDSUMMER DOUBLE NUMBER
of the BUILDING NEWS, containing, as usual, eighteen pages of illustrations and extra matter. Price eightpence. The new volume of the BUILDING NEWS commences with the following number (July 2), and affords a favourable opportunity for commencing new subscriptions. The title and index to Vol. XXXVIII. will be issued in the number for July 9, and cases and bound volumes will be on sale shortly after.

Correspondence.

IRON FILINGS IN PORTLAND CEMENT.

To the Editor of the BUILDING NEWS.

SIR,—As the subject of Portland cement is now being so fully dealt with in the BUILDING NEWS, I send you the following observations in

the hope that I may be able to elicit from your readers some explanation or confirmation of them.

About two years since I was experimenting with some cement that gave a very low breaking weight; it was coarsely ground, but there were no signs either to sight or touch that it contained any foreign matter. In order to ascertain its nature, I put it through a process of washing as if searching for gold, and was much surprised to find a residue of long spiky fragments which, on being tried with a magnet, proved to be iron filings. I then searched the raw cement with the magnet and found it mixed with a very large percentage of these filing or borings. I took the matter up with the dealer, who at first entirely denied the presence of iron, and indeed ridiculed the idea; however, when I put the magnet into a heap of cement and drew it out bristling with fragments of iron, he was for the moment dumbfounded; but, recovering himself, explained, after a few minutes, that it was all a mistake, and that we had been supplied with "patent iron cement" in error.

Since the above incident, I have made a practice of trying all the cement. I have examined with a magnet, and found in a great number of cases iron more or less present. The makers, when taxed with it, have denied any admixture. If there is any practical good to be gained by mixing iron with cement, it is well perhaps that it should be generally known; but if it is only used to adulterate and increase the weight of the cement, this letter may put your readers on their guard.

I send you a sample of some of the larger particles of iron I have just taken from a cask. —I am, &c., MAGNET.

VENICE AND ST. MARK'S

SIR,—The spasmodic excitement which has been affected on the subject of St. Mark's Church at Venice by the members of the Society for the Protection of Antient Buildings, and by the people who figured at the Oxford meeting, is a subject of pity more than anything else. I have observed with pleasure the judicious and considerate tone in which you have discussed the question of the repairs now in progress ever since attention was called to them some months ago, and I am convinced that you have carried with you the sympathies of the great majority of persons who are really qualified, from their own observations as well as from general knowledge, to form an opinion on the matter. A visit to Venice is one of the pleasures—or shall I say the penances?—through which most countrymen of Shakespeare and Otway who possess the needful means and time, think themselves obliged to pass, and as I have not escaped the experience, perhaps you will allow me to state my impressions, which I shall endeavour to do soberly and truthfully.

I do not recommend any person whose olfactories are very sensitive to tread the same path. Venice is a city built in the most absolute defiance of all the maxims and precepts of modern sanitation. The boasted canals are merely open sewers, as anyone traversing them in a gondola and disturbing their filthy depths by the action of oars speedily finds out. This is a subject on which Smollett would have been eloquent; but on the principle of *verbum sap.*, I prefer leaving it to the imagination of your readers. The Mediterranean may be, as it is called, a tideless sea, but the Adriatic most certainly possesses tides which are very distinctly perceptible. At Venice, near the head of the gulf, a stretch of miles of sand and weed is laid bare, though not dry at low water, and the exhalations from this, under the hot sun of Italy, must occasionally rival even those of the canals. No one who has entered Venice by the splendid railway bridge over the Lagunes constructed by the Austrian Government to connect it with the mainland at Mestre, can have failed to observe this. As Mr. Ruskin has written with such passionate enthusiasm of the Stones of Venice, it is to be presumed that he found the atmosphere congenial; but viewing the architectural realities of the place, apart from the very interesting associations called up by its picturesque history of centuries in duration, I much doubt if such a feeling would have been stirred up in anyone else. No one would think of awarding high praise to St. Mark's, but for the fact of its having been reared nearly nine hundred years ago by Byzantine architects. When one reads the abuse lavished upon some architects for breaking up their fronts—witness the National Gallery of poor Mr. Wilkins, and St. Thomas's Hospital by Mr. Currey, which latter, I think, far transcends most Italian works of architecture—it is difficult to conceive how anyone should have launched out in praise of the façade of St. Mark's. The interior of the church is so hopelessly dark that it requires a stay of two or three hours in it to accustom the eyes to the obscurity so far as to make out much of either outline or detail; but there are few indeed who have patience to pass through such an ordeal. I shall not analyse its details minutely, since it is one of the best-known buildings in Europe; but the above points are generally overlooked or omitted by those who assume a tone of high-flown laudation, nor do I feel called upon to enlarge on the subject of the restorations. Surely the countrymen of Brunelleschi, Leonardo da Vinci, and Fontana may be very well trusted to decide for themselves whether or how far these are required, and can safely be carried out, and these have shown lately that their national spirit is far too high to allow them to thank strangers for unsolicited advice.—I am, &c., VITRUVIUS RESIPISCENS.

SIR,—I noted the error in your report of A.A. meeting on 28th ult., to which Mr. White has fairly drawn attention.

There are others in the report of my remarks, *e.g.*, the dates of the mosaics; but I did not think what passed at our meeting was of so much importance as to necessitate the taking up your space in correcting; the fact being that the A.A. is mainly a *students'* association, and the "discussions" are scarcely of national interest.

At the meeting I was attempting to give the *alteram partem*, as it is held by people on the spot, who are probably the most interested and the most likely to know about the stability of the fabric; but I did not *defend* the alteration of *plan line*, nor the cleaning off of the *age stains*, and I hope you will allow me to say that I regret both of these as much as Mr. White himself.—I am, &c., HUGH STANNUS.

Kennington Park-road, June 15.

SIR,—Much has been written and said on the artistic merits and demerits of the work done on the north and south sides, and proposed to be done on the west façade, of St. Mark's.

I should like to add to this the view of a practical mason on the manner in which the work referred to has been done, and the best way of dealing with the remainder.

While leaving the artistic question to those competent to deal with it, I should like to endorse all that has been said as to the raw, cold appearance of the new work. Mr. Stevenson says it looks as if dirty water had trickled down it. My own impression was worse than this, and I had to make a nearer examination of the upper part of the north side to satisfy myself that it was marble. The appearance is just what would be produced by using a dirty limewash on a white plastered wall, care being taken to move the brush nearly vertically.

The statement that the foundation, and with it the structure, is unstable, does not seem unreasonable at first sight, situated, as it is, almost in the Lagune; but when we look at the sound condition of the massive Campanile, but a few yards removed, and more than 300ft. high, not to mention the Ducal Palace itself—a heavier structure than St. Mark's probably, in proportion to area—one cannot for a moment admit the supposition, without a very careful examination; and the fact that the old foundation has been used to carry the new structure is conclusive.

The restoration, so far as it has gone, is anything but what one is accustomed to see and do under good Gothic architects in England, when dealing with an ancient building.

A few pieces of sculpture and carving have been retained—the greater part of the capitals, and the elaborate crockets and finials. Almost everything else is new, the ashlar and veneering entirely so. It may be said that the old columns have been re-used; but in many cases we have no proof of this except the statement made, as their identity and value as ancient work have been destroyed by rechiselling, and if marble is liable to deterioration, similar to other limestones after the weathered face has been removed, they have suffered irreparable injury. A few of them may be recognised as old, the masons not having gone in deep enough to take out all the holes and indentations; but in other cases, and more especially the granite shafts, I should take them for new.

Not only is the marble casing so different to the old in colour and disposition of vein, but totally different in size of slabs and manner of fixing. The old slabs remaining on the west front vary from about 4ft. by 1ft. to one third of that size (with the vein running in all directions), and are attached, as described, by hooks driven through the joints into the brick structure. The hooks are similar to those used for securing lead flashings, but with double heads, thus securing two stones at once. They were originally all of copper probably, but, unfortunately, a number of iron ones have been introduced. The facing is worst in the south-west portal: several slabs are missing, and others loose. They have failed from three causes: first, many of the nails have lost their hold in the brickwork, which is in places undoubtedly bad for a few inches in, and this, while not enough to endanger the fabric, is quite sufficient to endanger the casing, and probably the mosaics. The bricks are of a soft nature, and not calculated, apparently, to stand a great deal of wet. The rain has been allowed probably to find its way down between brick and marble, through inattention to the joints of the marble roof of the vestibule, and the gradual perishing of the brickwork and consequent loosening of the nails has been the result.

I do not like Mr. Scott's idea of covering this roof with lead; for, with a little attention, the whole thing might be kept weather-proof, a splendid example of which may be seen in the marble roof of the Cathedral of Milan. A second cause of failure is that the nails have in some cases caused the marble to perish round them until holes are formed larger than the nail heads, and finally, and most remarkable, some of the slabs have bent and bulged outwards in the middle, as though by a gradual settlement, but caused probably by the débris from the perishing brickwork accumulating behind them, until I presume they have broken and finally dropped out. All three of these stages of decay or failure may be seen in the south-west portal at present time, where one of the slabs has a bulge of nearly 2in.

Here also is the best place for examining the manner in which the new work has been done. The walls have been re-erected with soft bricks and very inferior mortar. A knife can be easily pushed its whole length into the joints, and pieces of mortar taken out. I have some by me now, which, with the slightest pressure, would crumble to dust.

The various bases, lintels, &c., have some little hold in the wall. The casing consists of large slabs of grey, streaky marble, without any cross veins, and reaching from the top of moulded course, corresponding with bases of columns, to the top bed of capitals, or underside of lintels; many of them would be found to be 10ft. 6in. long, and from 16in. to 21in. wide, by 1½in. thick, and set with a very fine joint—so fine, in some cases, that they hold no mortar, and there is just room to introduce an ordinary address-card into the joint, and all are kept ⅜in. clear of the brickwork. There is no means of fixing apparent on the face, except that, at intervals of 3ft. in the height of the vertical joints, a small notch has been cut in the corresponding edges of the slabs, to allow of pouring melted lead to secure cramps at the back: but these holes are so small that, from my experience in using lead, I should say that, in half the cases, it would be chilled in the hole before reaching the cramp, and feel confident this must be so in many instances.

Small copper cramps have also been introduced into the back, three or four feet apart, and fastened to the brickwork, but how secured to the slabs I could not ascertain; but they can be seen a few inches from the edge of the last slab, fixed.

Looking at the nature of the bricks and mortar, it seems inevitable that the settling together of the brickwork must have the effect of bending or buckling the long slabs, and I am surprised that it has not already taken place. So much for what has been done; and, with reference o what remains to be done, I have no hesitation in saying, after having had a very varied experience

as a working mason, foreman, and builder, in restoring ancient buildings, that the west façade, and all the mosaics of the domes, can be rendered as safe as the new work already done, at, probably, 1-20th of the cost, without in any way tampering with the greater part of the structure.

The mosaics have evidently left the brickwork in some instances, and are partially kept in place by nails similar to those used for the marble, and, therefore, need properly securing. This could be accomplished by erecting an inside scaffold to the dome intended to be treated, and the whole internal surface lined with a substantial coat of plaster of Paris, proper precautions, of course, being taken to prevent the plaster adhering to the mosaics, and thus injuring them on removing the lining. This core should then be properly shored, so that it would carry the dome, if need be, in the manner of a centre; previously to lining, two or three, or more, small holes might be opened in plain spaces in the mosaics, and corresponding holes left in the core; the work would then be done from the outside of the dome by cutting holes, where requisite, some close to the bottom, and others higher up; and, from these, thoroughly clean and wash out the cavity caused by the Mosaic leaving the brickwork. This space should then be filled up with a suitable cement, very great care being taken in testing it beforehand, to avoid anything of a shrinking nature on the one hand, or of "blowing" on the other. If necessary, a few neat copper nails could be inserted as an additional security.

In treating the façade, I would first of all prepare slabs for all the bare spaces, fitting them to their places; they should then be taken, old and new, and laid out in their courses ready for refixing, thus insuring their reinstatement in correct position. The faulty brickwork should then be cut out to the depth of a half-brick, and made good with brick of first-class quality in cement, at the same washing-out and grouting any cracks that may be discovered. The slabs should be secured as originally with copper nails, and, being small, they could be attached as the work proceeded, so that the ends of many of the nails could be turned up or down as cramps. The other repairs, as piecing, &c., could be treated in the regular way.

The wavy surfaces of the floors will always be a fruitful source of conjecture so long as they are allowed to remain; but should the authorities determine to destroy the portion west of the choir screen, some observant eye may then note the underside of the large slabs, whether they are straight, and thus showing that the upper side was chiselled to the line it now carries, or, on the other hand, if corresponding with the upper side, the shape has probably been caused by a very gradual sinking which the marble followed. Mr. Street's observation of the solidity of the foundation certainly points to the former theory. It is worthy of notice, and I have not seen it mentioned, that the only other church in Venice, so far as I am aware of, having a floor corresponding in material and design to St. Mark's, viz., St. Donato at Murano, also has the same undulating surface.

One thing, however, does not admit of two opinions, and that is the effect of the level and geometrically correct floor in the north aisle when compared with the old. It would be interesting to know what was done with the material from the old floor, as the new one varies as much in material as workmanship. One thing in reference to the floors should be noticed. In several places there are loose tesseræ, and the church could not be swept without removing some of them. If the bare spaces were made good with cement so as to secure the adjoining work, this would be obviated. I picked up several loose tesseræ in the north transept and west of the south aisle of choir. In a good photograph taken since the removal of the S.W. scaffolding, the appearance of old and new marble may be compared, also the variations in levels of step, cap, parapet, &c., and in a view taken from the "Torre dell' Orologio," or clock-tower, at the N.W., the curved plan of front may be detected, and the projection westward of the new work as pointed out by Mr. Street. S. B. BURTON.

Newcastle-on-Tyne, June 15th.

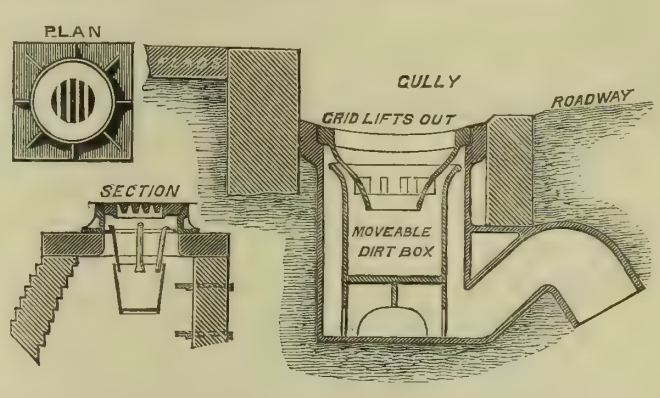
SEWER VENTILATOR AND MANHOLE COVERS.

SIR,—About six weeks ago I noticed a letter from Mr. Rawlinson in the BUILDING NEWS upon the above subject, and was rather surprised to find him still advocating the ventilation of manholes by side chambers, the only improvement upon his practice of 10 years or more ago being to make the covers circular instead of oval in plan.

There are several objections to side-chamber ventilators, and I think those engineers and surveyors who have many to keep in working order will endorse my view. The more direct ventilation can be made the better, but side-chambers cause it to be conducted through a tortuous passage. I have invariably found them either entirely or partially blocked up with road dirt, which can only be removed in spoonfuls with a spade. They necessitate two covers in the roadway, one solid for access to the manhole, and another an open grid for ventilating the side chamber.

Now, I contend, with all deference to so eminent an authority as Mr. Rawlinson, that the manhole cover itself should be made to ventilate directly over the sewer, thus at once doing away with the necessity for two covers and occupying so much less road space. The road-dirt can be intercepted by a galvanised iron bucket suspended by iron hooked straps from a rim cast upon the inside of the cover frame. This bucket can be lifted out, emptied, and replaced easily and quickly on removing the cover.

I inclose tracing of some ventilators, manhole covers, and gullies, as laid down in this city five



or six years ago by Mr. Mansergh, with some slight subsequent alterations in detail by myself which illustrate my meaning. The same principle is applied to each case, namely, that of having a movable bucket or dirt-box for collecting road detritus, which can be emptied in a moment. They are most efficient in action, and the manhole covers and ventilating or lamp-hole covers are precisely similar in pattern, but 18in. and 14in. internal diameter respectively. They are circular in plan, which I consider is the best shape for a macadam road, but for paved roads the square or rectangle are the best, as all other forms but these necessitate the cutting of the setts in paving round them, which is a source of expense and inconvenience.—I am, &c.,

R. READ, City Surveyor.

City Surveyor's Office, Gloucester, June 15.

HAYMARKET STORES.

SIR,—I quite agree with Mr. Verity that it is time this matter ceased in the architectural press, and I have taken steps to get the question tried by the proper legal tribunal.

I must ask you, however, to let me reply to one or two of Mr. Verity's statements. The matters referred to in my last letter are actual facts, sworn to and proved in open court.

I believe Mr. Verity incapable of writing a falsehood, but he has been misled. His statement that the Dangerous Structure notice as regards the ironwork at 28, Haymarket, was finally disposed of by the Board of Works on the 23rd March is *utterly untrue*. It was before the Building Act Committee *yesterday, June* 15, occupied half a sheet of their agenda, and is still adjourned for further consideration.

Mr. Verity is also mistaken in considering that the Haymarket has many disagreeable associations in my mind; on the contrary, I regard my official connection with the accidents which happened, both at Mr. Verity's own building in Oxenden-street, and the one at the corner of Panton-street, with unmixed complacency and satisfaction.

After those events I determined to enforce to its full extent the liabilities of owners of dangerous structures. The result, though troublesome to myself, has been eminently beneficial to the public. Since the energetic proceedings which I then inaugurated under Part II. of the Building Act, the annual number of dangerous structure cases in the metropolis has increased from about 1,400 to nearly 4,000. Imitation is the sincerest flattery, and I am content with the fact that the profession and district surveyors have followed my example, and that magistrates have constantly indorsed my proceedings.

Mr. Verity ridicules the idea that the Haymarket case bears any analogy to that of the Stores.

At both buildings accidents have happened.

In both cases party-walls were in question.

Two days before the accident happened in the Haymarket the late Mr. Barron *refused* to allow me to *inspect his premises*. I promised to call the following week; but, on the Friday previous, his house fell in and killed him. Mr. Verity says I may inspect the *drawings of his party-walls*, but *refuses* to let me examine the *drawings of his iron-work and concrete floors*. These really comprise the whole of his building, except the external shell. The working-plans of the Stores showed old and defective party-walls, underpinned, raised on, and thickened with only 6in. brick casing. This irregular construction I stopped, but it took seven days' attendance at the Police-court, extending over weeks, and a special application to the Home Secretary to do this. I might have asked for costs from the Stores, but forebore to do so. Fortunately for me, other architects in my district generally succeed in *settling* these party-wall differences without calling for the interference of the district surveyor.

Now, as regards ironwork, the same contractors who supplied the ironwork to the building which fell in the Haymarket had also supplied the iron construction to the Stores, and after the lengthened proceedings at the inquest which they attended in that matter, they ought to be by this time conversant with the Building Act. As the result principally of my evidence in that case, the law has now given power to the district surveyor upon requisition to inspect plans and sections of buildings. Mr. Verity says ironwork and fireproof floors are *exempt* from this rule. A legal tribunal must now settle this question.

Having seen something officially of the hardship and suffering which was caused to many innocent persons with respect to both the Oxenden-street and Haymarket accidents, I protest, on the score of common humanity alone, against such occurrences being designated by the word "bogey."

It is quite true I have refused to meet Mr. Verity, the reason being that at our last interview on the building, when two of Sir Joseph Bazalgette's assistants were checking some calculations as to the ironwork, Mr. Verity thought fit to call me by an epithet which may possibly be appropriate to a salamander, but certainly not to a district surveyor in our colder clime, and as he still declines to retract what I thought at the time was only a lapsus linguæ, I decline to meet him.—I am, &c.,

ROBERT WALKER,
District Surveyor of St. Martin's-in-the-Fields.

21, King William-street West, Strand, June 16.

LISIEUX CATHEDRAL.

SIR,—I do not wish to be considered hypercritical, but think that Mr. A. L. Tate's sketch of the south-west doorway of Lisieux Cathedral, published in your last issue, requires some explanation from its author to account for its many and important inaccuracies. If Mr. Tate considers that his sketch is an improvement on the original, or shows the way in which he would "restore" it if he had a chance, then of course it is not necessary to criticise; but if it is intended as a representation of what exists—and no remarks state that it is otherwise—then my comments will not be out of place.

A few years ago, Mr. E. W. Godwin gave your readers some interesting notes on Normandy, and referred to the masterly cusping of this doorway; but instead of the trefoil being pointed, as Mr. Tate plainly indicates, it should be *circular*, and very powerful and perfect in its form. Again, the vertical mouldings behind this trefoil spring from the foliated band which is carried across opening, and *not* from a shaft, as the sketch shows, there being only three long shafts on each jamb. This discrepancy partly accounts for Mr. Tate's poor little shaft to the doorway itself, and which is an impossibility as shown, and unlike the actual treatment. The sketch also shows quatrefoils worked on the soffit of the outer arch; these are imaginations of the author, and give a tame and unsatisfactory appearance. Further, there is a horizontal string-course immediately above label of arch, thereby inclosing the spandrels; but Mr. Tate ignores this, and shows the foliated sinkings in quite a different position.

I forbear to mention other smaller points, and can only express a hope that those who give the world their sketches may be more careful and accurate, and that the spirit of the old men may not be lost by misrepresenting their design and work.

Two years ago, I made a sketch of this beautiful doorway, and Mr. Tate is welcome to see my interpretation of the original, or I shall be happy to send it you for publication if you wish, together with a more detailed sketch of the old timber house which Mr. Tate shows on the same sheet.—I am, &c.,

HAMPDEN W. PRATT.

3, Long Acre, London, W.C., June 15.

[Send, and we will publish if suitable.—ED.]

SUNDAY-SCHOOL PLANNING.

SIR,—As one who has had some experience in Sunday-Schools, both as a teacher and superintendent, in Bristol and Manchester, and as one present at the last meeting of the Architectural Association, permit me to make a few remarks and suggestions on the above subject.

The system advocated by Mr. Maylard, and illustrated by numerous plans, of a large central room, more or less semicircular in form, with class-rooms ranged round, radiating from the superintendent's desk, is perhaps theoretically good; but, as was evident from the remarks of more than one speaker, the questions of cost, lighting, roofing, and anything like a satisfactory elevation, were felt to be some of the many difficulties which might supervene between the theory and its practical application.

It was suggested, with good reason, that a building so planned could be of little or no use for other purposes, and this, in conjunction with the above-named questions would, I should say, render the prospect of the erection of any number of such schools very problematical. Setting aside, for the present, therefore, Mr. Maylard's proposal, and presuming that Sunday-school teaching must, with few exceptions, continue to be carried on in buildings either in the main devoted to, or capable of being used for, other purposes, I will endeavour to show how one or two difficulties, giving rise to many others, which superintendents and teachers have to contend with in the management of their classes, may be considerably lessened.

I am very strongly of opinion that a superintendent should at all times during school-hours have complete supervision of all classes taught in the main schoolroom. We have, as Mr. Sulman said, to deal with facts; and I know that where supervision is not maintained, the conduct of a class having an inexperienced teacher may be such as to upset a whole school.

While, however, I submit that the superintendent should have such a view of the school as to be able to detect at once the quarter from whence any misconduct arises, I would urge most strongly the desirability of, as far as possible, isolating the classes, as the one fact of some ten or twelve classes being taught "in the open" may be held as among the chief drawbacks to effectual Sunday-school work.

To attain this result by simpler means than those proposed in Mr. Maynard's plans, and with special reference, I believe, to the ordinary oblong room, Mr. Sulman suggested the more general use of folding or sliding wooden screens, and the only disadvantage which I can foresee in them, as compared with an idea which has since suggested itself to me, is that they might be somewhat more cumbersome, inconvenient, and costly.

Much, too, was said about the best mode of seating the scholars for teaching, and opinions differed between the use of chairs, which Mr. Maynard suggested, and ordinary forms. I have never seen chairs used, and should, for many reasons, certainly not recommended them. Mr. Maynard's plan of forming almost a complete circle with the teacher and scholars may be again good in theory, but practically I know it to be the case that very frequently, when a teacher is addressing those on his or her left, those on the right, or *vice versâ*, are doing all they can to negative his best efforts. With regard to the use of forms, when placed to form three of a square, Mr. Maynard's objection that the angles of a square are inconveniently distant from the teacher is certainly a sound one, but here also, in thinking of what schools should be more than of what the generality of them are, he omitted to mention another fact which, in his experience, can hardly have escaped his notice, viz., the mischievous delight boys sometimes feel in accomplishing a good "accidental" spill.

To state now as concisely as I can the one or two ideas which have occurred to me with regard to the above-mentioned matters, I would say that, given an averaged-sized oblong school-room, with two good sized class-rooms for senior scholars adjoining, each furnished with a table and chairs, the superintendent's desk should be placed on one side of the room with classes ranged along the opposite side, one or more of the classes at either end of the room, and one on either side of the desk or rostrum. With the exception of these last, the classes should be separated by means of blinds working on rollers, and attached to the wall, and capable of being drawn out for use to the extent of six or seven feet in the direction of the rostrum. These, when not in use, would be inclosed in a long narrow box, just large enough to contain the blind in which the roller would be fixed. The lid of the box might be hinged from the top, and might serve as a top rail, which, meeting the pole at the extremity of the blind when drawn out, would help, with the pole fixed in a socket in the floor, to keep the whole in position. The blinds might be of double thickness if desired, and the nature of their material, as opposed to the resonant property of wood, would serve to deaden any noise there might be in the schoolroom. The classes on either side of the superintendent might be inclosed by portable screens of the same material in wood frames. The vacant places in the middle of the room would be available for the two senior classes, at the opening and closing of the school.

As regards seating, I would suggest that forms, with or without backs, in the form of a quarter circle, to seat five or six, might be made for the special use of Sunday-schools. These, if properly constructed, would be found very difficult to upset. Two might be sufficient for any ordinary class, and together would bring the scholars to a semicircle before the teacher.

What I have said would apply alike to male and female schools. The proposed arrangement of screens might be modified or improved upon to suit circumstances. The infants would, of course, be entirely distinct and apart.

I might say more as to general arrangement and detail, but as it might be out of place here I will not.—I am, &c.,

June 15th. ROBERT F. HODGES, A.R.I.B.A.

SUNDAY ART EXHIBITIONS.

SIR,—The readiness with which you have on former occasion given publicity to the Sunday Society's efforts to provide recreation for the people on Sundays induces us to ask you to announce the following arrangements for the Sunday opening of the Grosvenor Gallery and the Hanover Gallery, by kind permission of their respective proprietors, Sir Coutts Lindsay and Mr. S. Weil.

On Sunday, June 20, the first exhibition at the Hanover Gallery, including Hans Makart's great picture of the Entry of Charles V. into Antwerp, will be open to the members of the Society, and on the two following Sundays, June 27 and July 4, the public will be admitted by means of free tickets which will be issued to those who apply by letter, sending a stamped and addressed envelope to the Honorary Secretary, 6, Dudley-place, W. On each Sunday the gallery will be opened from 3 till 9 p.m.

The Grosvenor Gallery will be opened to the members of the Society on Sunday, July 25, and to the public on Sunday, August 1, by tickets to be had on written application as above.—We are, &c.,

DUNRAVEN, President.
MARK H. JUDGE, Hon. Sec.

Sunday Society, 9, Conduit-street, W., June 15.

A new kind of floor for skating-rinks has been put down at Prince's. It is the invention of Dr. Calantarients, of Scarborough, and consists mainly in a mixture of the carbonate and sulphate of soda, forming a crystalline mass which offers about the same amount of resistance to the passage of a skate-iron as ice. The new floor has the great advantage that it will last for many years at a small expense. It cuts up just like ice, but is easily repaired and smoothed by a specially-adapted steaming apparatus.

The Church of St. Thomas the Apostle, in the Isle of Harty, Kent, was reopened on Tuesday week, after complete restoration.

Intercommunication.

QUESTIONS.

[6148.]—**Romanesque Architecture.**—Would some kind reader give me the name of a work on Romanesque architecture, something similar to Brandon's "Analysis of Gothic Architecture"?—WILD IRISHMAN.

[6149.]—**Valuation of Buildings.**—Will some reader kindly inform me what percentage is allowed for depreciation in general and per annum for brick or stone buildings such as workshops, warehouses, or mills, when such property has to be valued?—J. H.

[6150.]—**Valuation of Property. (Page 1079 "Gwilt's Encyclopædia.")**—Will some kind reade answer the following? Should not the 25 years' purchase in the example cited according to the 4th table read 21·482184 years (say, 21½ years), and the total for fee simple, £1,061 instead of £1,230?—R. A.

[6151.]—**Desks in Schools.**—Could anyone inform me if any schools have been passed by the Education Department (School Board schools) with a double set of desks in the same school? The schools to be 40ft. wide and 60ft. long. The number of scholars to be accommodated being 400 boys in the one school. School to hold 200, and 200 in class-rooms. If 20ft. wide schools must be 120ft. long to obtain proper desk room, would a double school be allowed?—T. P. H.

[6152.]—**Compensation.**—A, B, C, D, are respectively proprietor, builder, engineer, and ironmerchant. A. builds a property, B. is sole contractor, C. sub-contractor to B. in ironwork, D. is contractor to C. for a part of the work. What D. provides is found not to be according to specification, and is rejected and returned. D. now provides according to specification, but the work has been stopped two weeks in consequence of waiting for the proper material. Proprietor A. now refuses to pay unless compensation for delay is allowed. D. maintains there is no agreement in regard to time, and refuses to allow any compensation. Could anyone kindly state through your columns whether A. can lawfully retain damages?—J. H. G.

[6153.]—**Sea-Sand.**—Can any of your readers tell me what to put on a wall to prevent the dampness from sea-sand in plastering showing?—C. F. M.

[1654.]—**Hydropathic Establishment.**—Can any reader refer me to any published plans or book upon an institution of this sort? Have there been illustrations in past numbers of the BUILDING NEWS?—A. B.

[6155.]—**Echo.**—I should feel obliged if any reader would advise me how to cure an echo in a room 30ft. by 20ft., with an 18ft. ceiling (including 3ft. cornice). Would deafening with lime and engine-ashes below flooring-boards cure it, deafening having an inch coat of plaster on top?—J. M.

REPLIES.

[6086.]—**How to Test White-Lead.**—In the BUILDING NEWS of April 9th I asked for a method of testing this, and I am surprised there has been no reply. Painters' lead is so largely adulterated, and so much complained of, that I expected my query would be very quickly answered. Being disappointed in this, I have inquired further, and have come across the following extract, bearing upon this question, and should be glad if any correspondent who has tried the experiment would favour me through this column with the result. "White-lead is very often adulterated with sulphate of baryta, or commonly barytes. This is much more transparent when ground with oil than white-lead itself, and will materially impair that property for which white-lead is valued, viz., that of covering down well and solidly. White-lead adulterated with baryta has, generally speaking, a bluish sort of look; it is semi-transparent. It has not that opacity that pure white-lead has. Take a small piece of white-lead and put it into a test tube, and add to it a little nitric acid or aquofortis and some water. If the lead is pure the whole of it will dissolve in this liquid, and we shall have a clear solution. If it does not dissolve there is a white precipitate. It will fall down to the bottom of the tube, and that precipitate is sulphate of baryta. Sulphate of baryta is insoluble in aquafortis, but carbonate of lead and most lead salts are soluble in it. There is another very excellent test for the purity of white-lead, which is this: If you take a small portion and grind it up with a little carbonate of soda into a small pellet about the size of a pea, and then put it upon a piece of charcoal and hold it in the middle flame of a blowpipe for some short time, the sulphate of baryta becomes decomposed and you get sulphide of sodium formed. If this sulphide of sodium be acted upon by an acid liquid, sulphuretted hydrogen is given off, which could not be formed from carbonate of lead, for in it there is no sulphur at all, and inasmuch as sulphide of baryta is the impurity for which we have to look, the presence of sulphide after this treatment indicates that it was with the white-lead which was examined." From a lecture by Mr. Barff on "Artists' Colours and Pigments" at the Society of Arts about January, 1871.—H. G.

[6141.]—**Architect's Certificate.**—In a legal sense, yes; in common sense, no. If the builder demands payment for work not done, and the architect endorses his claim, the employer can set aside his contract in equity, but the onus of proof will lie with him, and he must be very sure of his right. Or he may, if so minded, take his remedy by paying the builder's claim and sueing the architect for the loss.—B.

[6141.]—**Architect's Certificate.**—By law a proprietor is compelled to pay the amount certified by his architect. If he thinks the work has not been fully done he must look to his architect. The architect is properly the best judge as to whether the work has been fully done or not, and is the responsible agent to his client.—G. H. G.

[6144.]—**Pupils' Indentures.**—The clause stated is a usual one, and I believe in law proceedings can be taken to enforce compliance.—G.

[6147.]—**Science and Art Examinations, South Kensington.**—"Fortus" will find all he requires for Advanced Building Construction, which is the only examination relating to architecture held by the department, in the three vols. of "Notes on Building Construction," published by Rivingtons. The papers set in past years can be obtained at the stall in South Kensington Museum.—HOLDER OF FIRST-CLASS ADVANCED.

[6147.]—**Science and Art Examinations, South Kensington.**—If "Fortus" has Gwilt's Encyclopædia it contains all he needs; if not, Rickman's "Gothic" and Chamber's "Civil Architecture," will answer the purpose.—J. W. C.

[6146.]—**Architect's Charges.**—I am sorry I cannot remember the court where the decision I named was given, nor the time, it being upwards of twelve or thirteen years ago. But the facts are very clear in my mind, and probably mention of it will bring it to the recollection of some of your readers, though if the decision (a most extraordinary one) has dropped out of sight it is all the better on public grounds. It struck me as singular at the time that the only notice taken by the Press was in one or two cases, where they fully endorsed the opinion of the Bench. But I have since always found it to be the case, where trade or professional customs or interests are concerned, the Press or the public are too ready to look on such matters as some form of latent roguery.—B.

STATUES, MEMORIALS, &c.

PLYMOUTH.—St. Andrew's, Plymouth, has one of the finest interiors in the West of England, and few churches can boast of so interesting an array of old mural monuments as its walls display. A memorial-brass has just been added to the list, erected to the memory of the originator of Plymouth china. It bears the following legend:—"On the return of 100 years from his death, this tablet in memory of William Cookworthy—born at Kingsbridge, April, 1705; died at Plymouth, October, 1780—is erected by his great-great-grand-daughter, Sarah Crewdson, of Kendal, A.D. 1880." Around are appropriate Scripture mottoes. Mrs. Crewdon is the daughter of Francis Fox, a well-known Plymouth philanthropist, who died at the beginning of the present century.

WATER SUPPLY AND SANITARY MATTERS.

SANITARY LEGISLATION.—The President of the Local Government Board received on Monday a deputation from the Council of the Social Science Association, consisting of Mr. G. W. Hastings, M.P., Mr. F. S. Powell, Captain Douglas Galton, C.B., and Dr. Alfred Carpenter, who waited upon him for the purpose of urging the importance of certain needed amendments in the sanitary laws. The suggestions of the council, which Mr. Dodson characterised as of high value and importance, were embodied in the following resolutions:—"(1) That, in order to lessen the evils resulting to health from the growth of suburban districts outside the boundaries of towns having urban powers, authority be obtained to bring both the districts within the boundaries of the town and the suburban districts in every case, whatever be the nature of the local authorities, within the control of one sanitary authority, having urban powers; the central authority to have power to act, for this purpose, by provisional order; no application from any local authority being required. (2) That the Council, while unprepared to recommend at the present time an entire conformity of rural to urban powers, is, nevertheless, firmly of opinion that the distinction between them is maintained with serious disadvantage to the community in regard to the control of new buildings; and it would represent to Government the importance of giving to urban and rural authorities power to make building by-laws relating to the same subjects, the by-laws themselves to be adapted in each case to the wants and circumstances of the locality. (3) That in any further amendment of the law provision be made for the better securing the healthy condition of houses before they are occupied, by enacting that no new building be occupied as a dwelling-house until the drainage and water-supply thereof have been made and completed, and until a certificate have been given by a duly qualified person appointed by the local authority for those purposes, that the same is fit for human habitation. (4) That in any future amendment of the law provision be made for the compulsory registration of infectious diseases; the case to be reported to the local authority by the householder upon information given to him by the medical attendant."

SELECT COMMITTEE ON METROPOLITAN WATER-SUPPLY.—The Select Committee of the House of Commons met at noon on Tuesday, under the presidency of the Home Secretary, to inquire into the water-supply of the metropolis. Mr. E. J. Smith, a member of the Institute of Engineers, and who was connected with the late negotiations with the water companies, was the first witness called, and his examination had not closed when the Committee adjourned to Friday.

LEGAL INTELLIGENCE.

ARE BELLS FIXTURES?—In the Perth Small Debt Court, on Monday, Sheriff Barclay had to decide the question whether bells are fixtures or movables in a Board School-house. The point came up as a counter-claim for £3 7s. 6d., brought by the Coupar-Angus School Board against George Morgan, late their schoolmaster, for removing the bells from the teachers' residence, and the ground of controversy was cleared, as no evidence could be produced on either side as to who put in the bells—earlier trustees of the school or the teacher's predecessor. Sheriff Barclay, in his judgment, stated that the English reference to the point in judges' decisions went to show that bells were essentials to a house, like keys, and so passed with it as fixtures. Lord Tenterden, in 1830, held that "bells hung by a yearly tenant, at the sole expense of the tenant himself, but allowed by him to remain fixed to the freehold after the expiration of the term, become the property of the landlord, and do not, even when afterwards severed by the landlord, resume the character of chattels; so that the tenant might trover for them." (Brown p. 84). In Weston *v.* Webster, decided in 1869, it was held that "a bell hung upon a frame, and fastened to it by a hasp, the frame being nailed to the cupola of a barn, was a fixture, and passed by a conveyance of the estate, the bell having been used in connection with the barn for ten years." (Brown, p. 117.) These two judgments were the only cases of bells that appeared on the books. (1) In the absence of proof as to who placed the bells in the house, the legal presumption was that the owners did so. (2) It was proved that the bells were attached to the walls with spikes driven in, and that two skilled tradesmen gave their opinion that they had been fixtures. (3) The teacher, on the Board refusing to pay for the bells, removed them, fracturing some of the wall-plaster; but (4) when the defenders refused to buy the bells, he ought to have left them, and have sued for their value. For these four reasons, the counter-account of the School-board must be allowed.

Our Office Table.

THE supporters of the Artists' Benevolent Fund dined together at the Freemasons' Hall on Saturday evening, the festival marking the close of the seventieth year since its institution. The object of the fund is the relief of the needy widows and orphans of artists who have contributed to the Artists' Annuity Fund, for which the support of the public is neither asked nor received. During the past year 60 widows and 18 orphans were granted annuities from the Benevolent Fund, and the sum thus expended amounted to £1,264. Mr. Beresford Hope, M.P., presided at the dinner, at which many ladies were present. Mr. Gambier Parry having proposed "The Health of the Chairman," the latter invited the company to toast "The Royal Academy." The compliment was acknowledged by Sir F. Leighton, P.R.A., who took the opportunity of contradicting the supposition that the absence of himself and many of his colleagues from previous festivals was due to any lack of sympathy with the society which those before him had assembled to support. He concluded by proposing "The Artists' Annuity Fund." Mr. J. Fahey acknowledged the toast, and Mr. G. Godwin, F.R.S., replied to that of "The Fine Art Societies," which was subsequently proposed. The subscriptions to the fund with the legacies lately left to it, which were announced before the company separated, amounted to £2,086.

AN Art Museum and Library has recently been added to the resources of culture at Rugby School. The Art Museum already possesses a permanent collection of considerable interest, which is enriched from time to time by loans of pictures and other works of art. But in addition to this, its normal use, it has already had more important exhibitions, and on Saturday a loan collection was opened to the public in the Museum, where it will remain till the end of July. It comprises works by the Old Masters of various schools, as Michael Angelo, Bellini, Corregio, Giorgione, Luigni, Murillo, Titian, Van Dyck, Velasquez, Wouvermans, and others. The English school is well represented by Reynolds, Gainsborough, Cooke, R.A.; Cotman, Old Crome, Danby, De Wint, David Cox, Duncan, Copley Fielding, Birket Foster, A. W. Hunt, C. R. Leslie, Morland, Erskine Nicol, F. Walker, Yeames, and others. In ornamental and decorative art there are examples from South Kensington of Persian, Japanese, Chinese, and Indian objects, illustrating every phase of the art-products of those nations. Queen's College, Oxford, lends a curious assemblage of objects, some of interest from their workmanship, others from their associations, amongst which is a silver trumpet, which may in other days have advised the dons and collegians that the board was spread and the dinner ready. There are several other collections, some of a miscellaneous character. The collection has been brought together by the exertions of Dr. Jex-Blake, head-master of Rugby, and also arranged by him, assisted by Mr. T. M. Lindsay, the curator of the museum and art-teacher to the school.

THE enlargement of Holyhead old harbour, has been so far completed as to enable a formal opening by the Prince of Wales to take place yesterday. Hitherto the traffic has been carried on at a one-sided station and quay, but what is now provided will give separate and distinct passenger platforms, quay walls, goods sheds and sidings, for the export and import traffic of the harbour, and the up and down traffic of the railway. The water area of the old harbour has been increased from 10¼ acres to 24 acres, with a uniform depth of 13ft. at ebb and 30ft. at flood of spring tides, and 18ft. and 23ft. respectively at neaps. The length of quay has been increased to 4,000 lineal feet, and there are upwards of 15 miles of sidings; an additional goods shed, 750ft. in length, has been constructed on the new quay, and the existing graving-dock being inadequate for the company's steamers, a new one has been built, with a length of 390ft. along the keel-block line, and a total length at coping level of 410ft. The entrance is 70ft. wide at top and 64ft. 6in. at invert, where there is a depth of 15ft. at high water of the lowest neaps. The entrance is inclosed by a wrought iron caisson, which carries a line of railway from the company's station on the one side to the public quay on the other.

THERE were forty applicants for the appointment of architect to the Tottenham School Board, and the election took place at the meeting of the Board last Thursday week. At a previous meeting of the Board, the candidates were reduced to the following six gentlemen: Mr. Thos. Arnold, M.R.I.B.A., 10, Basinghall-street; Mr. Chas. Bell, M.R.I.B.A., 9, New Broad-street; Mr. E. Ellis, 9, Fenchurch-street, and Tottenham; Mr. S. W. Grant, M.R.I.B.A., 14, Duke-street, Adelphi; Mr. J. Tanner, 26, Finsbury-circus, and Tottenham; Mr. T. A. Tregallas, 33, Finsbury-circus, and Tottenham. After a series of ballots, Mr. Thomas Arnold and Mr. Edward Ellis, of Tottenham, were equal, when the Chairman gave his casting vote in favour of Mr. Ellis, who was declared elected.

MANY persons have doubtless heard of the famous travelling stones of Australia. Similar curiosities have recently been found in Nevada, which are described as almost perfectly round, the majority of them as large as a walnut, and of an irony nature. When distributed about upon the floor, table, or other level surface, within two or three feet of each other, they immediately begin travelling towards a common centre, and there lie huddled like a lot of eggs in a nest. A single stone removed to a distance of three and a half feet, upon being released, at once started off with wonderful and somewhat comical celerity to join its fellows: taken away four or five feet it remains motionless. They are found in a region that is comparatively level, and is nothing but bare rock. Scattered over this barren region are little basins, from a few feet to a rod or two in diameter; and it is in the bottom of these that the rolling stones are found. They are from the size of a pea to five or six inches in diameter. The cause of these stones rolling together is doubtless to be found in the material of which they are composed, which appears to be loadstone or magnetic iron ore.

WE have received a small treatise dealing with that somewhat recondite and rather profitless subject, the principle of proportion of the Great Pyramid. Mr. John S. Lee, the author, has taken the trouble to make a careful comparison of the heights computed in accordance with the different theories, taking the length of the base as 761ft. 8in., and the deduced height of 484ft. 9in. as furnished by Mr. Piazzi Smyth, as the best authenticated data. We may at the threshold say that Mr. Smyth accepts in the main the theory known as the Taylor theory,

broached by Mr. John Taylor, who asserts that the vertical height of the great Pyramid bears the same proportion to the perimeter of its base, as the radius of a circle does to its circumference, hence it has been called the π theory. Comparing the other theories with Mr. Smyth's dimensions, Mr. Lee shows clearly enough by his figures that the result of Plutarch's geometry gives 23ft. in excess of the height deduced from these premises, while the Jomard Triangle makes the height 8ft. 9in. in deficit of that number. The author proceeds to discuss the theory of Herodotus, known as the Proportional triangle, which gives a very close approximation to the assumed height (or 484ft. 5in.). This is done arithmetically and afterwards by geometry, and the author concludes that "the great Pyramid triangle within the limits of the most approved measurements, does comprehend both the right-angled proportional triangle and the π proportion, and these two proportions are so nearly alike that it is impossible from mere mechanical measurements to decide which of them may have been in the mind of the architect; the weight of probability, however, is decidedly in favour of the triangle."

MR. EDISON has laid down an electric railway, which appears to be an imperfect copy of that to be erected for practical work by Dr. Werner Siemens in Berlin, and which is on view at the Düsseldorf Exhibition. Mr. Edison has already put down a considerable length of electric railway at Menlo-park, and is about to add to it in order that he may test the power of his electric motors to haul trains up gradients which would severely tax the ordinary locomotive. It is proposed to utilise the electric system in the St. Gothard Tunnel, where the available water power and the turbines already in position offer facilities for a capital experiment.

THE proposal of Mr. Ruskin to "arrange (at Walkley) such a museum for the artisans as they have not yet dreamed of," is now fairly before the public, and the Professor announces that "he is ready to receive subscriptions for St. George's work from outsiders—whether zealous or lukewarm—in such amounts as they think fit." He has "ground enough and place for a pleasant gallery for such students as Sheffield may send up (to Walkley) into the clearer light." If the "outsiders" are willing to assist Mr. Ruskin in providing funds towards enlarging the present building (and many have already done so) the museum will probably become a permanent local institution, well stocked with valuables, which shall have passed the critical examination and approval of their possessor. In acknowledgment of Mr. Ruskin's desire to encourage gratuitous education in art, and thus elevate the taste of the public, the committee of the Nether Hallam Conservative Club recently sanctioned the proposition of a member to open a subscription towards the museum extension fund, and it was met with a response to the amount of £7 10s.

CHIPS.

Messrs. F. W. Reynolds and Co. are removing their machinery business to new premises at Acorn Works, Edward-street, Blackfriars-road, a few minutes' walk from their present address, 73, Southwark-street. A list of builders' machines for disposal at reduced prices, in consequence of the approaching removal, which appeared in our advertisement pages last week, is well worth the attention of readers desirous of buying really good machines at reduced prices. Builders and others may be reminded that Messrs. Reynolds and Co. have adopted for some time past the hire-purchase system, by means of which machinery earns its cost before being paid for, we believe with equal advantage to many customers who have availed themselves of the system, and to themselves.

Exeter Hall will shortly become the property of the Young Men's Christian Association, Aldersgate-street. The terms of purchase have been decided; £15,000 is wanted for the necessary alterations required by the Board of Works for making the egress and ingress more satisfactory, and for adapting the various rooms to the uses of the association, as well as for the improvement of the two halls.

Mr. Ezra Wostenholm, mason and builder, of Hanover-street, Sheffield, 70 years of age, when leaving the town-hall of Sheffield on Thursday week, was seized with dizziness, and fell over the balustrades of the stairs on to the stone pavement. His skull was fractured by the fall, and he died in a few minutes.

A memorial-tablet to the late George Moore, of Bow-churchyard, has just been erected in the south transept of Carlisle Cathedral. Within frames of black, veined and white marbles is a three-quarter bust of Mr. Moore, designed by Mr. G. F. Watts, R.A.

A chancel screen is about to be erected in the parish-church of Cuckfield, Sussex, as a memorial to the late vicar. Mr. G. F. Bodley is the architect.

The local board of Battle, near Hastings, are about to augment their water by the conveyance into the reservoir of a spring just discovered in Archer's Wood, Robertsbridge-road, which is estimated to yield 80,000 gallons of water. Mr. Blake, of Accrington, is the engineer.

Tenders have been accepted for an hotel, fronting the Town Hall-square, Rochdale. The front elevation (40ft. long) is in a simple Gothic style, built of Yorkshire pitch-faced parpoints with polished dressings. The architect is Mr. James Cheetham, Whitehall-street, Rochdale.

The memorial-stones of a new Primitive Methodist chapel and schoolroom were laid on Monday week in Plough-lane, Battersea. The buildings will accommodate 400 adults in congregation, and 500 Sunday scholars, and will be of plain substantial character. The cost will be about £2,300. Mr. Charles Bentley is the architect, and Mr. Stocken the contractor.

A new English Congregational Church was opened at Flint on Monday.

At Brotton, near Middlesborough, on Thursday, Major Hector Tulloch, R.E., Local Government Board Inspector, held an inquiry respecting an application from the Local Board for leave to borrow the sum of £2,800, for the purpose of new sewage works, and the improvement of private streets. The surveyor to the local board, Mr. Downey, explained the plans, showing that the roads improvements would cost £2,852, and the construction of sewers £350, together equal to a charge of £7 8s. per house. The inspector pointed out the grave objections to grant private loans for long terms of years, and said the Local Government Board discouraged such proposals.

The Town Council of Ayr decided on Monday to accept the tender of Mr. Young, of Edinburgh, amounting to about £2,200, for the construction of an esplanade on the South Beach.

A new pier is in course of erection at Hythe, near Southampton, for a private company, and will be opened early in July. Mr. J. Wright is the engineer for the work, which is, as far as the sea portion is concerned, nearly completed; but the exact site of the toll-houses and waiting-rooms at the approach was only decided upon by the shareholders on the 5th inst.

The Metropolitan Board of Works have agreed to purchase the rights of the lord of the manor over Hackney Commons.

A new church is about to be built at the corner of Ducie and Tintern-streets, Lambeth. Messrs. Habershon and Fawckner are the architects.

A new Church of St. Paul is about to be built in Ferndale-road, Brixton, S.W. It will seat 1,600 persons, and will cost, for erection, above £8,500. The foundation-stone will be laid on the 1st prox.

The Montrose town and police commissioners re-let, on Monday, the contracts in Section No. 2 of the Mid-links improvements, the lowest tenderers, both for masonry and ironwork, having refused to take up the contracts. After a protracted discussion, it was resolved to accept the next-lowest tenders for the work, which were Messrs. Hampton and Brown for masonry, and Messrs. A. Brown and Co. for iron.

Hammersmith, Putney, and Fulham bridges are to be opened free of toll by the Prince of Wales to-morrow (Saturday).

Mr. Vicat Cole, painter, and Mr. John L. Pearson, architect, were, on Wednesday, elected Royal Academicians.

MEETINGS FOR THE ENSUING WEEK.

TUESDAY.—Architectural Association Dinner. Holborn Restaurant. 7. p.m.

WEDNESDAY.—City Churches Protection Society. Annual meeting at Mansion House. Paper by late Sir Gilbert Scott, to be read by Mr. G. G. Scott, M.A., F.S.A. 4.30 p.m.

Lamplough's Pyretic Saline is refreshing, most agreeable, and the preventive of FEVERS, BILIOUSNESS, SMALL POX, SKIN DISEASES, and many other spring and summer ailments. Sold by chemists throughout the world, and the Maker, 113, Holborn Hill. *Use no substitute* —[ADVT.]

Holloway's Pills and Ointment present the readiest and most reasonable means of removing hereditary, constitutional, and chronic disorders associated with impure blood and unhealthy skin. Scurvy, scorbutic affections, unseemly eruptions, enlarged glands, and other blemishes yield to these purifying remedies, which eradicate the seeds of the complaint and avert mischief.

Westwood Quarries, near Bradford-on-Avon. (Established 150 years).
WILLIAM GODWIN can supply best FREESTONE from the Original Westwood Quarries) in any quantities. Prices on application to the above, or to Gerrish and Co. (Limited), Redcliff Backs, Stone Shipping Wharf, Bristol.

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FARLEIGH DOWN
Supplied in any Quantities on the Shortest Notice.
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CHARLES TRASK,
Norton-sub-Hamdon, Ilminster, Somerset.
—[ADVT.]

McLACHLAN & SONS, 35, St. James's-street, S.W. Builders, Decorators, and House Painters. Designs and Estimates.
General Repairs and Alterations Executed.
Experienced Workmen always in readiness, and sent to any part of the country.—[ADVT.]

TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender—it adds to the value of the information.

AYR.—For the construction of an esplanade on the south beach, for the Town Council:—

Young, Edinburgh (accepted) ...	£2,200 0 0

BIRKENHEAD.—For four shops, Oxton-road, Birkenhead. Mr. Joseph Brattan, architect:—

Forde	£2,964 0 0
Thomas	2,740 0 0
Legge	2,696 0 0
Snape	2,630 0 0
Marks	2,600 0 0
Bleakley (accepted)...	2,550 0 0

BLACKHEATH, S.E.—For works of painting and fencing on Blackheath open space, for the Metropolitan Board of Works:—

Hudson (accepted).

BRAMLEY.—For small detached house at Bramley, Surrey. Mr. Henry Peak, architect, Guildford. Quantities supplied:—

Swayne, W., Guildford	£1,430 0 0
Pearce and Clark, Guildford ...	1,100 0 0
Garnett and Mills, Guildford ...	1,086 0 0
Moon, Guildford	1,010 0 0
Martin, Wells, & Co., Aldershot...	1,000 0 0
Squelch, Bramley	962 19 0
Mitchell, Bros., Shalford	949 15 3
Etherington, Albury	525 10 0
Miles, Albury...	913 2 5
Brown and Son, Bramley* ...	830 7 7

* Accepted.

BRAMLEY.—For pair of small semi-detached houses at Bramley, Surrey. Mr. Henry Peak, architect, Guildford. Quantities supplied:—

Swayne, T., Guildford	£1,568 0 0
Swayne, W., Guildford	1,555 10 0
Pearce and Clark, Guildford ...	1,540 0 0
Garnett and Mills, Guildford ...	1,524 0 0
Moon, Guildford	1,436 0 0
Squelch, Bramley	1,380 10 0
Etherington, Albury	1,341 10 5
Mitchell, Bros., Shalford	1,329 0 0
Miles, Albury	1,292 3 10
Brown & Son, Bramley (accepted)	1,233 1 8
Martin, Wells, & Co., Aldershot	1,217 0 0

CATERHAM.—For the rebuilding of Marsden House, near Caterham, for Sir William Clayton, Bart. Mr. William Barber, architect. Quantities by Mr. Geo. Mattras:—

Staines and Son, London	£7,944 0 0
Patman & Fotheringham, London	7,450 0 0
Lathey, Bros., Battersea Park ...	7,300 0 0
Naylor, J. G., Rochester	7,293 0 0
Thompson, W., Caterham... ...	7,240 0 0
Wallis & Clements, Maidstone ...	7,147 0 0
Seager, Sittingbourne (accepted)	7,130 0 0
Crossley, Bromley, Kent	6,989 0 0

COLCHESTER.—For pulling down and re-erecting a part of the "Marlborough Head Inn," at Colchester, for Mr. W. E. Grinston. Mr. Horace Darken, architect:—

Capon, Manningtree	£437 14 0
Oldridge, Colchester	337 10 0
Everitt & Son, Colchester (accepted)	289 0 0
Dupont, Colchester	288 0 0

COLCHESTER.—For alterations to a house in Pownall-crescent, Colchester. Mr. Horace Darken, architect:—

Pitt, W.	£140 0 0
Chaplin, W.	125 0 0
Start, S.	121 5 0
Shepherd, C.	120 0 0
Garwood, S.	119 0 0
Dupont, F.	117 0 0
Everitt and Son	116 5 6
Oldridge, C. H. (accepted)	107 0 0

[Only Colchester builders tendered.]

THE BUILDING NEWS.

LONDON, FRIDAY, JUNE 25, 1880.

WATER-COLOURS AT THE BURLINGTON FINE ART CLUB.

THOSE who are anxious to study the progress of water-colour painting during the present century, or who desire to become acquainted with the characteristics of the works of water-colour artists, now deceased, who were born in or subsequent to the year 1800, will find the loan collection now open at the Burlington Fine Art Club, Saville-row, W., afford them an admirable opportunity. The exhibition, chronologically, includes two classes of drawings—first, those of a few old men who, born before 1800, have died since the last Exhibition of the Club in 1871; and, second, of those whose full course of life was run within the period of the last 80 years. It has, therefore, an interest beyond that afforded by the actual merit of many of the drawings. It represents the work of a transitional period of the English school of water-colours, in which the student may trace the progress of the art, the use and handling of pigments, the changes in style and processes, and the beginning of the present school. In casting a hasty glance round the room we are led back to the time when the Classic landscape held a favoured place among painters, as we see in the work of Finch, Varley, Jackson, and others; when it was the fashion to sketch ruins of abbeys for topographers and engravers, like those we meet with in the laboured and exquisitely neat drawings of Girtin, Bartlett, and Allom; when the Academic school was at its height, and water-colours became the fashionable pastime of young ladies and amateurs, and the drawing-room album was considered the fitting receptacle for the most polished sketches. The observer of method and manipulation may also learn much from an examination of the drawings here brought together. In the earlier period he will find, for example, the conscientious use of pure water-colour pigments, without the tricks resorted to by later artists; at the same time he cannot fail to notice the effeminate conventionalism of manner and deterioration induced by the application of the art to engraving, and by the taste of the day in the publication of annuals and topographies; how it lost its vigour in the neat finish of such works as those by Allom and Bartlett, whose labours and sketches were greatly in request by the publishers of the day. To the architectural artist, the drawings of Nash, Prout, Burgess, are particularly interesting. Let us briefly notice some of the works of the representative artists brought together. We first come to a remarkable series of sketches by W. J. Müller, representing figures and groups. "Interior of Turkoman's Hut," "Turkish Mill," and those numbered 8, 9, 10, 18, 14, are all bold and characteristic; remarkable for effective grouping of light and shade. The groups of figures are sketched vigorously in burnt umber and red, on a yellow-ochre ground, with a freshness and depth of shadow, and a decision of handling that well earned this artist the repute of being a "prince of sketchers." Müller is said to have painted with his left hand. His "Erectheium in Athens" (11) is a well toned view between the caryatides; the colours are laid on and blended in simple washes. The work of Thomas Seddon, who died in 1856, is shown by a small drawing of the "Sphinx at Ghizeh" in quite a pre-Raphaelite manner, and may be taken as one of the first instances of the new school after it had rejected the mannerism of the Academic rules. The work of G. Shalders is also imbued with this spirit. Joseph Murray Ince, who died in 1860, a pupil of David Cox, is represented by a small drawing, in a stippled style, of Rhayader Church, Radnorshire. The sketches by W. H. Bartlett, as those of Tintern, Bolton, and Fountains Abbeys, are particularly noteworthy, though they have been hung too high for inspection. In them we can trace the influence of the mania for illustrated publications like those of Beattie's "Scotland," the "Danube," and the "Bosphorus." The drawing is weak and effeminate, and the colouring, in light and pearly tints, shows the object of the sketches, which was to produce pictorial prettiness rather than accurate architectural delineations. Bartlett was a prolific designer for albums and annuals, and was engaged by John Britton. Thomas Allom, who died in 1872, was another topographic artist, whose views in Britton and Brayley's works, and other popular publications, are well-known. His drawings are all delicate but spirited, and the detail far above the average, but it must be remembered Allom was educated as an architect. His small view of Leicester, in sepia, only 6in. by 4in., shows extremely fine handling and a soft effect of distance. The "Altar-piece," in the lower room, is a grand design for the period, and the execution and detail are both extremely delicate; *e.g.*, the ranks of canopied niches and painted glass. The drawing is in sepia, and is a good specimen of architectural draughtsmanship. We must not omit to name a sketch of much power by the late Frederick Lee Bridell, an artist who, if he had lived longer, would have achieved a great name in landscape. It represents sunset, "Coast of Italy." The fine rocky headland, illumined by the setting sun, and the dark roadway in front, are introduced with much grandeur of effect. His "Lake Lugano" also exhibits depth of colour and true poetic feeling. The figure in 23 A, and the woman and child, 23 B, are by W. E. Frost, and show clever outlines, partly etched in brown and coloured. Cromek, a painter of interiors, is represented by a small interior, "Chapel of St. Ursula, Subiaco." Admirers of marine subjects cannot fail to be pleased with the views of Margate and of the Thames, by G. Chambers, who died in 1840. They are thoroughly imbued with the influences of his earlier sailor life, and there is a charm of freshness in the water and sky of the series. J. C. Schetky was another marine painter of note, and his fine drawing of the "Bellerophon" is a masterly work. The aëriel effect of the atmosphere and the dark cloud behind the ship, and the details of rigging show a thorough knowledge of the sea. The "Windmill," by the late Henry Bright, of Ipswich, is a fine mellow study of landscape, broad in treatment, and exhibits a pictorial composition of much power and beauty. Sam Bough, of Carlisle, was a skilled artist in both oil and water-colour. We have here evidence of his latter proficiency in a view "At Henley-on-Thames," grey and cold, but effective. John Frederick Lewis, one of a family of artists, is represented by several admirable groups of figures, displaying a thorough acquaintance with Eastern life and manners, a forte in which he has excelled. We particularly notice the very striking study, called "A School at Cairo," in which every detail, from the old turbaned master, to the open-trellised window of a Moorish dwelling, is finished with consummate care. The "Study of a Group for Picture of the Proclamation of Don Carlos" exhibits excellent grouping and colour. The faces in No. 51 are highly expressive, and the artist has truthfully realised the brightness and textures of Eastern life in the costumes, vases, and lilies, in No. 57. As an architectural drawing, we may call attention to the sketch by J. Wykeham Archer, of "Monument to Alfred, King of Bernicia," at Bewcastle, lent by Mr. R. Phené Spiers, as an interesting specimen of colouring of the period we are reviewing. The tints of the obelisk in the corner of the building, and the cast shadow thrown across the angle, are skilfully and delicately handled, and the Celtic ornament and foliage in the obelisk itself are interesting and well drawn. Perhaps few drawings have now a greater historic interest than those of F. O. Finch, who died in 1862. He belonged to the old school of Classic landscapists who delighted to introduce ruins of temples and porticoes into their views. In Nos. 63, 67, 68, and 69 we have a very choice collection of the style. The colouring is simple without the use of opaque pigments, and the temple element is present in three of the specimens. They are all finished landscapes, laboured in detail; the foliage is finical in manner, and we find the pedantry of the old school uppermost. Bolder and more vigorous in conception is the work of G. H. Harrison, seen in Nos. 61, 78. W. Bennett, as a painter of forest views, stood high. In No. 71, a bridge and waterfall, the rock and foliage are boldly sketched and spirited, and the work contrasts with the works of Finch. No. 72, "East Cliff, Hastings," is dexterous in the hazy sky and cliff. Mr. A. Herbert's work, No. 70, is bright and Turneresque in the sea and sky. In another branch, that of a figure-painter, the works of George Cattermole, who died in 1868, stand high. In a vigorous employment of red and brown, grouping, and in decisive outlines in shadow, he secured a place. Thus, in his "Card-players," the "Death Warrant," and "The Armourer," we have the qualities of dramatic power, animation, and a rapid decision of handling, all eminently characteristic; in a few strokes of the brush, we have all the pictorial effect of the most elaborate finish. In picturesque grouping of figures, the drawings of F. W. Topham also are worth study. No. 141, "Barnaby Rudge," is a clever study of countenance; the colouring is rich and deep in tone. Refined and delicate are the figures in "Wayfarers," where a blind man is being led by a boy. It is the work of F. Walker, an artist of original genius, who died in 1871, and who was the founder of a school of water-colour painting. An architectural drawing of merit is the "Interior of Church at Ypres," by John Burgess, a celebrated painter of architectural subjects. The "West Front of Chartres" (151), and especially the "Chateau of Blois" (169), are fine drawings. There is a vigorous touch in the grey shadows and scumbled effect of the last, with its fine Renaissance canopy over entrance. The work of William Wood Deane possesses an interest, he having been educated for an architect, though he devoted his time to architectural painting. "The North Porch of Chartres" is a grand drawing of this fine portal; the canopied figures are drawn with effect, and the chiaroscuro and grey tone of colour exhibit a sense of truthful rendering. We note also No. 102. Several works of P. F. Poole, who died last year, are to be seen; we make note of his "Spirit of Solitude" (149), ideal and suggestive. W. Riviere, the father of Mr. Briton Riviere, A.R.A., is represented by a sketch at Dover, light and spirited; but we pass on to notice a pleasing sketch of Folkestone (159), by O. Oakley; and the striking and characteristic portraits by Daniel Maclise, R.A., whose work (86-94) displays considerable power and much humour. They are all drawn in Indian ink and umber. Another remarkable sketcher who had the gift of delineation by a few strokes of the brush was T. Leeson Rowbotham, who died in 1875. His beautiful and

highly-finished scene in the Isle of Wight (80) charms by its crisp yet delicate manipulation. The sea and wood in the distance, and the rock in the foreground, are exceedingly bright and clear in colour, and the picture is as highly finished as the "Sketch of Old House at Rouen" (79) is sketchy. Several works of this master have been reproduced by chromo-lithography. E. W. Cooke, R.A., was a versatile and prolific artist, and a man of scientific attainments. His marine and coast studies are numerous; but he was also a student of architecture under the elder Pugin, hence we see the correctness of his "Gateway" at Honfleur (184), with its angle-turrets. No. 185 is fresh. Another artist who made marine and architectural subjects his study, was J. Holland, and he was equally an expert in flower drawing. We mention particularly his "Benediction" (120), a Venetian scene; a powerfully-painted subject, in which the blending of blue and brown, the chiaroscuro, and the Venetian palaces, make up almost a fairy-scene. The composition of No. 124 is more confused. His "Flowers" (129 and 30), are bright and sketchy. The drawings of Joseph Nash, the highly-gifted architectural sketcher and colourist, will attract particular attention from the architect. His "Interior of Chapel, Ightham" (111), is a very spirited sketch, the screen and pulpit, panelling and painted glass of choir are put in with a few brown lines on a warm-toned ground. The open-timber roof of Hall at Ockwells, and the grand bit of Renaissance in the Drawing-room at Speke, with its rich carved over mantel, are particularly characteristic of this master. His figures are cleverly introduced, and his browns are often relieved by a dash of red, as in the scarlet curtain introduced in the last-named drawing. The most elaborately finished water-colour drawings fail to give the effect of many of these sketches, which were so well suited for reproduction by coloured lithography. Two or three other artists claim notice. Aaron Penley ranks among the more favoured artists of landscape of the old Academic school. We take, for instance, No. 166 and 192, one marked by minute handling and a crisp, though rather mannered, style of foliage, and the other by a granulated effect produced by sponge. E. M. Cotman was also eminent as a landscape-painter, and J. W. Allen must be named for having been one of the earlier school in which landscape effect was heightened by abbeys and other devices. No. 49 is an example. The work of H. Herries, as shown in 81, is full of sparkling freshness; and A. G. Vickers must be named also as a marine painter. Many who have the time and patience might very profitably learn as much of the history of the water-colour school from an hour or two at this collection, as they would acquire from a perusal of a history of English artists. The catalogue is a model of its kind. There is a masterly sketch of the period covered by the present collection, and the artists' names are alphabetically arranged, with short notes of their characteristics.

BUILDING CONTRACTS IN BANKRUPTCY.

THE forfeiture of materials in the event of a builder's bankruptcy has long been a common clause in building agreements, and one that, until recently, was presumed to be legally binding. This effort on the part of landlords or landowners to provide for possibilities, and make themselves safe as against the builder's creditors; whether represented singly by the sheriff, or in a body, by the trustee, is, indeed, an old topic of dispute in our courts of law. It was thought, however, that the ingenuity of conveyancers had succeeded in framing a proviso to which objection could not be taken, and which, based upon decided cases, was as sound in principle as it was satisfactory in practice. This comforting consolation was greatly encouraged by the judgment of Vice-Chancellor Bacon, when sitting as Chief Judge in Bankruptcy; but it has now been rudely shaken, if not entirely shattered, by the recent decision of the Court of Appeal, reversing these judgments and laying down rules that are of far-reaching application. Before dealing with this latest authority of *Ex parte Jay, in re Harrison* (L.R. 14, Ch. Div. 19), it will be well shortly to consider what has been the state of the law hitherto upon this complex question.

For all present purposes the case of *Brown* v. *Bateman* (L.R. 2, C.P. 272) may be taken as the first decision of importance. There the contract stated that "All materials which should have been brought upon the premises by the builder, for the purpose of erecting the buildings, should be considered as immediately attached to, and belonging to the premises, and that no part thereof should be removed therefrom without the lessor's consent." A creditor of the builder having levied execution upon these materials, they were claimed by the landlord. The Court of Common Pleas held that this agreement gave the lessor such an equitable interest in the materials as to disentitle the sheriff to seize them under an execution against the builder. But the whole ground of this decision was, that the contract, in effect, gave the landlord, from the very time when it was entered into, an equitable interest in the chattels so mentioned, or, in other words, a clear equitable right to the materials, without any further intervention on the part of the lessor. There was thus a present passing of this equitable property when the agreement was executed; and this is really the whole point of principle involved. But it must also be borne in mind that there was here no question of bankruptcy, or of the rights of creditors generally.

The next important decision was that of *Ex parte Dickin* (L.R. 4, Ch. Div. 524), which unfortunately got no further than the Chief Judge. The clause in the contract upon which this case turned was to the effect that the building-club might, through their architect, stop all further progress of the works, and seize and retain all materials, if the builder failed to carry on the buildings, or if he became bankrupt. The contractor received a large sum on account; but upon 30th May he filed his petition for liquidation. On the 2nd June, the architect gave him notice under the agreement that, as he had neglected to go on with the works, the club would, at the end of two days, employ someone else, and they shortly after took possession of all plant and materials on the estate. The trustee for creditors under the builder's liquidation then claimed these materials as his property, and the question came for decision before the Chief Judge. He held that the club were entitled, as against the trustee in bankruptcy, to retain what they had seized, that seizure being a protected transaction within the meaning of section 94 of the Act of 1869. It will be observed that, although the architect wisely worded his claim to take possession of the materials on the ground that the builder had not gone on with the works—he had, in fact, made no default of this description, and the real reason for the seizure was clearly to be found in his liquidation. The Chief Judge, somehow or other, persuaded himself that this case was the same as *Brown* v. *Bateman*, where there was not even a question of bankruptcy; but his decision need not longer be discussed here, as it has now been so "distinguished" by the Court of Appeal that it may be looked upon as if actually overruled. Lord Justice Cotton could, indeed, only support the judgment by giving a reason for it which the chief judge never thought of, and charitably supposing that he meant to hold that a lien on the chattels had been conferred upon the landlord from the very making of the contract, the power to seize in the event of a bankruptcy only being added to the interest that had previously vested.

Coming now to the recent case of *Ex parte Jay in re Harrison*, we find there an agreement which is substantially the same as that in *Ex parte Dickin*, with a clause providing that, in the event of default by the builder in the performance of any stipulation, or of his becoming bankrupt, all improvements and materials should become absolutely forfeited to the landlord. In January, 1879, the builder filed his liquidation petition and, at that time, there was a large quantity of material upon the land. He had then made no other default, and the question was whether the lessor or the trustee in the liquidation was entitled to this property. The Chief Judge followed his own decision in *Ex parte Dickin*, and held that the materials went to the landlord under the clause of the agreement, which he considered perfectly valid. With marvellous perspicuity the Chief Judge put the point thus:—"The debtor says in effect, 'If I become bankrupt, that which is mine shall become yours.' There is no objection to such a contract as that. He became bankrupt, and therefore the right of the landlord took effect, and the materials became his property." And the Chief Judge actually said that the agreement was the same as that held valid in *Brown v. Bateman*.

Lords Justices James, Brett, and Cotton have now, in complete concurrence, reversed the whole of this rule upon every point of principle and practice. Strange to say, however, they do so mainly upon a ground, of which, though pressed upon him in argument, the Chief Judge took no notice whatever. They hold that the case is governed by the whole current of decisions from the time of Lord Eldon downwards, the principle of which is that a simple stipulation that upon a man's becoming bankrupt that which was his property up to the date of the Bankruptcy should go over to someone else, and be taken away from his creditors, is void, as being a violation of the policy of the Bankrupt law. There could be no doubt whatever that in this case the landlord's title was founded upon the debtor's bankruptcy, and that, in fact, this was an attempt to support a preferential claim. Our old friend, "the policy of the Bankrupt law," has been so little heard of lately as to be in danger of being forgotten. But the Court of Appeal have now thoroughly awakened that slumbering principle, and its application to this class of case is at once obvious. The very reason for drawing these agreements is to secure the landlord in the event of the builder's bankruptcy, or, to put it plainly, to give one creditor an advantage over the others. It is now clear that this cannot be done by means of such rough-and-ready methods as those pursued in these recent cases, and, we believe, now adopted as a common clause in such agreements.

But the point remains whether the course pursued in *Brown* v. *Bateman*, cannot still be safely adopted. The purport of the provision in that case was to give the landlord an immediate equitable interest in the materials that came upon the land as soon as they did so, and to say nothing whatever about the event of bankruptcy. But though this plan may be worth trying, it is weak in at least two places. The Court of Common Pleas held that such an agreement was not a Bill of Sale within the meaning of the old Act of 1854. But the recent statute is far wider in its scope, and would almost certainly be held to include such an equitable interest, thereby entailing registration and its consequences. Then, it must be remembered, that a clause of this

kind has not yet been held binding and valid as against a trustee in bankruptcy. The conclusion, therefore, that comes from a consideration of this recent case is, that it will, for the future, be difficult, if not impossible, so to shape a contract that shall stand good when put to the trying test of what is, and what is not, contrary to the policy of the Bankrupt law.

A RECENT VISIT TO RUSSIA.

THE monument of Peter the Great, at St. Petersburg, is an object worthy of special notice: not that it is superlative as a work of art; but that it is colossal in its proportions, and a work of considerable engineering skill. It is a remarkable feature in the character of the Russian people that they associate their public works with the stupendous; we see this in the great bell at Moscow, in the columns of the St. Isaac, and the Zazan Cathedral; in the Alexander column, and in the fabric of the palaces. We take this to be a factor that counts with them as an element of splendour; we know not whether to class these colossal works as the outgrowth of civilisation or semi-barbarism; but certain it is that the Russians correspond more closely in their monoliths with the ancient Egyptians than with any modern race, and, in the size of their buildings, more closely with the old Romans, the builders of the Colosseum, than with any other people.

In the embellishment of the new capital of St. Petersburg, the Empress Catherine II. played a conspicuous part; not the least of her works was the statue in question, which bears her name and the date of 1782.

On the shores of the Gulf of Finland, some miles from this great city, stood a granite rock, upon which, tradition said, Peter the Great witnessed a naval action between the fleets under the Russian flag and that of his enemies the Swedes. This rock, far removed from the native outcrop of granite, was a colossal example of the drift deposits strewn by glacial action over the north of Europe. The rock in question, half-buried in alluvium, was of the first order in size. Upon examination it was selected as a favourable block or pedestal upon which to place a statue of their sea-king. This block, when raised from its bed, was found to be 45ft. in length, 30ft. in height, and 25ft. in width, the weight of it being computed at something over 1,600 tons.

Its removal to St. Petersburg was a great undertaking; we are told that it was a work of five weeks' duration, that it travelled over an iron road, and that it was moved on cannon-balls by five hundred men, assisted with windlasses and a great number of horses. Be this as it may, it is certain that it reached the city, as it now stands at no great distance from the north façade of the St. Isaac Cathedral. In the dressing of this block as a pedestal an accident occurred, which ended in a reduction of its size; it is now said to be 43ft. in length, 20ft. in height, and 14ft. in width; but we are of opinion that the latter is an error, as its width with the writer was eight paces, against a length of nineteen paces.

This colossal block still retains its water-worn face, and its outline strongly reminds one of Landseer's lions at the base of the Nelson Column. On the head, as it were, and pawing the air, is the horse, bearing as its rider the statue of Peter the Great. These bronze figures are of enormous proportions, the group being 17½ft. in height. The attitude of the Czar is that of reining in a spirited horse on the edge of a precipice—a position in which firmness of character and great presence of mind are admirably pourtrayed. The artist for this work, like that of most of the great undertakings in the city, was a Frenchman—in this case a M. Falcourt. The attitude is said to have been suggested by a great rider of that time, who performed the feat of reining up his galloping horse at a given line on its course, and balancing its fore-parts in the air. The weight of the metal in this statue is given as sixteen tons; its general position suggests that the difficulty of poising has been successfully overcome.

THE BRIDGES OF THE CITY

where the "Neva" is crossed, were, in old times, of boats, and two in number; these have been replaced by bridges of granite and iron, one arch of which is constructed for the passage of vessels. These bridges are situate towards the east and west of the city, the latter, of light arches, being known as the "Neva Bridge," a conspicuous feature in connection with which is a votive chapel, an edifice of great cost and beauty, one that bears the outward impress of Mons. Montferrand, the architect of the St. Isaac Cathedral. The floating-bridges thus superseded have been removed to other points between these historic sites, and the communication between the right and left banks of the river is now of the first order. These floating-bridges, in one case, rest upon seventeen covered or decked boats, and in the other upon fourteen boats, the land side being carried for some distance upon piles. On the approach of ice the largest, the Fortress bridge, is removed, and a highway is constructed on the ice itself. On or about these constructions smoking is strictly prohibited, and notices to this effect are displayed in half a dozen languages, of which that of our country, otherwise forgotten, is conspicuous. This, we are told, is a relic of the early part of the last century, when smoking was prohibited in the public streets—a somewhat necessary by-law when the city was mainly constructed of wood.

Our notice of this great city of the North must terminate with a somewhat hasty glance at

THE IMPERIAL AND OTHER PALACES.

The ancient palace of the Czars was situate within the walls of the fortress or Kremlin of Moscow, a building somewhat Asiatic in its style and arrangements. With the growth of the new capital, palaces of great magnitude, European in every detail, sprang into existence: of these buildings there are great numbers; but the largest, and that most widely known, is the Winter Palace, the residence of the Emperor and the seat of his Court. At the period of our visit the attempt upon the life of the Czar had just been made in Moscow, and the outer world, to no purpose as it transpired, were denied entrance to this celebrated palace. The site chosen was the south bank of the Neva, along which an embankment has been constructed at enormous cost. The western end looks out towards the Admiralty buildings, a range of offices, &c., occupying a frontage of 1,350ft., and an end elevation of 630ft., which, as one edifice, is considered the largest in the world. The south of this great palace overlooks the square, in the centre of which rises the far-famed Alexander column. The eastern end abuts upon a range of palaces, which gives to the embankment of the river the name of "The Palace Quay." This celebrated palace, the architecture of which may be classed as French-Italian, is not overpleasing in its details; the material of construction, bricks and stucco stained a dull red, does not win from us much in the way of favour. This residence was commenced in 1754, and occupied eight years in building. Its frontage is 455ft., and its end elevation 350ft., the height being 80ft. The vicissitudes of this building have been great, for in 1837 it was reduced to a shell by fire. Its reconstruction was a work of magic, for it was ready to receive its Imperial master, "Nicholas," in two years after the accident. This rebuilding of the palace was carried on regardless of either climate or cost. To surmount the obstacle raised by the former, the whole fabric was encased in wood, literally boxed up, and warmth was given within by stoves, and light by artificial means; relays of men were pressed on the work night and day, and it is current conversation to-day that hundreds of them died by the poisonous or pestilential atmosphere. It is said of the Imperial family that they never use a room in which one of their ancestors has died, and that prior to the great fire a large part of the fabric had been relegated to the dead, a circumstance that rendered the fire a positive relief. The finest rooms in this palace are the Throne Room and the White Hall, or *Salle Blanche*, each of which are faced with white marble, and contain columns of the same material, to support the ceilings. The drawing-room of the Empress is remarkable in the walls and ceiling being gilded. Galleries throughout this great palace are legion; and pictures, mostly illustrative of Russian battles, victorious generals, and tented fields, are seen on every hand. This warlike atmosphere must at times pall upon the most devoted advocates of the sword. This was the case with the Empress Catherine, who in 1765 built a new wing to the palace, from designs by Vallin de la Motte, a Frenchman. This was arranged as a place in which she could retire from the cares of State, a circumstance that caused it to take up the name of the Hermitage. Additions have been made from time to time, but the greatest, which closely approached to a reconstruction, took place between 1840 and 1850, under the able superintendence of Leo von Zlenze, of Munich. The style adopted by this architect was Greek in its simplest and purest form. It may truly be said there is no building in the great empire of Russia that carries with it more interest than the hermitage attached to the Winter Palace at St. Petersburg, for in it is stored a wealth of art, in the form of gems and cameos, of works in oil by the old masters, of treasures from Classic lands, &c., that is almost beyond our conception. In drawing a picture of this building in English colour, we may say that it is a Royal palace in which is stored the contents of the British Museum, the National Gallery, and the South Kensington departments. Although a part and portion of the great palace, free entrance to the same is rarely denied to the public. Approaching it, we are impressed with its size, forming, as it does, a parallelogram of 515ft. by 375ft., the plan of which is broken by two inner courts, or quadrangles. Approaching the entrances, we pass beneath a porch or vestibule, supported by square columns of sandstone, the only example of this material we have so far seen in the country. These features are flanked by colossal figures, Telamones, or Atalantes, placed on pedestals, and posed in the attitude of supporting the entablature with their necks and shoulders. These statues, ten in all, are 17ft. 8in. in height, and highly wrought and polished in black basaltean trap. As a group, they have a truly noble effect.

The doors of the lobby, made of some hard kind of wood not far removed from mahogany, are opened by porters wearing the Imperial livery, a conspicuous detail of which is their scarlet capes, powdered over with those ominous birds, double-headed black eagles. To the right and left are corridors of the ground-floors, where are stored antiquities of Egypt, Greece, and other historic lands, but which, at the date of our visit, were not open for public inspection. Our course lay up the grand staircase of sixty-six steps, where are situate the *salons* of art. This construction of white marble, about 24ft. in width, is placed between walls

of highly-polished scagliola, illustrative in this case of siena marble, but in the case of other walls, doors, window-dressings, &c., of white marble, with dadoes of various colours. The doors throughout, made of the wood we have already mentioned, a wood we were not able to identify, are of great size, and richly mounted in white or coloured woods, the ground inlaid, in some cases, with brass, which has a very rich effect. The floors are of wood parquetry, or of wood mosaic, highly polished. The latter, formed of 1in. cubes, are rich in both colour and design, throughout which the oak and ash are very noticeable. Flooring of this character is largely used in the city, where there are several establishments, in some cases employing upwards of five hundred men. Like other details in costly materials, we find flooring of this kind carried to great excess.

One of the suburban palaces has its best floor in black ebony, inlaid with flowers of mother-of-pearl, and the walls faced with polished malachite. We here allude to the palace of "Isarskoé Sélo," some fifteen miles distant from the capital, which possesses other costly rooms, one of which has the walls faced with polished amber, in which are worked moulds, panels, enrichments, shields, and Imperial devices. This costly material was the gift of Frederick the Great of Prussia to that august Empress Catherine the Second. We see nothing of this questionable splendour in the Hermitage, which is one of the latest works in Russian palace building. The most pretentious fittings we noticed were one large room, where the dado was executed in tulip and satinwood, the latter wood being largely used for mouldings and inlays throughout the whole suite of rooms.

In our next, we propose to notice the art objects in these *salons*; after which we will journey on to that truly Russian city, Moscow, which, as the ancient capital of this great and powerful kingdom, will furnish us with some highly interesting notes.

(*To be continued.*)

THE ART OF SHADING.

FEW rules are broken more frequently than those of shading architectural designs. Among architects and artists there is an understood license in representing shadows, as there is also an allowable freedom in perspective. It would savour of pedantry to require an artist to adhere strictly to the letter of the rule in these cases; as it would tend to restrict his freedom and limit his resources. But we feel there is a large number of architectural artists who appear to acknowledge only one law, namely, their own caprice, and who have unbounded faith in it, and whom it may be as well to remind that there are rules for representing shadows as well as for drawing in perspective. To them, the shading of buildings is merely a mode of using pencil, sepia, or grey, wherever a projecting feature has to be thrown out; they certainly have no idea that the art is based on scientific and mathematical principles. When an elevation for a building is finished or a perspective coloured, the shadows are thrown in at random or introduced for the purpose of emphasising a projection, without reference to the actual position of the sun in relation to the building, and seldom with any reference to the modifying influences of the form of the objects, the angle of the rays of light, or the shape of the surface upon which the shadow is cast. Reviewing briefly the principal mistakes fallen into in cast shadows under the general heads of inaccurate delineation, depth, and artistic value of relief, we may refer to the general principles upon which shadows should be drawn.

The determination of shadows chiefly consists in defining the outline, though another and interesting branch of the subject is in giving the proper intensity of tint or shade to each part of the surface which receives them. The theory of shadows is based on the assumption that light is propagated in straight lines, and for the purposes of the architect, the rays may be considered parallel. It is well worth the object of clearing the mind of all misapprehension that a few leading points should be remembered by the artist. In the first place, he has two general cases to consider: one is in which the opaque bodies which cast the shadows are bounded by plane surfaces having rectilinear edges and angles, the second where the shadow is bounded by curved surfaces. In the first instance the problem is reduced to the simple one of finding the shadow of certain straight lines or edges being the boundaries of planes. As the bodies which cast the shadows are known in form and position with respect to the planes of projection, their edges are readily found. The rays of light meeting a straight line, whose shadow has to be determined, form a plane given in position, and its intersection with another surface can also be found. Briefly, then, the process, as far as bodies bounded by planes go, is first to find the edges which divide the illumined from the dark part, and, having found them, to draw planes through these edges parallel to the direction of the rays of light, and to connect the intersection of these planes with the surface receiving the shadow. In architecture, the edges are generally vertical and horizontal, therefore the assemblage of rays passing through the vertical forms a vertical plane, and, of course, the trace of the vertical plane on the plan will contain the horizontal projection of the shadow as well.

When the case of bodies casting shadows bounded by curved surfaces is taken, we may conceive a series of tangent planes to the surface of the body, drawn through the luminous point. By determining the points of contact, we arrive at the required curve. These observations show that the art of shadowing is really nothing more than one of the applications of descriptive geometry. The simplest illustrations, if kept in mind, may prevent one falling into errors in casting shadows on surfaces. We all know that the shadow of a horizontal feature produces a curve upon a concave surface, the deeper portion of it making the curve bend downwards, while, upon a convex surface, the shadow appears reversed. We can also imagine the effect of the rays falling upon sloped surfaces, lengthening and deflecting the shadow, &c.

There is a convenient rule in architectural drawing that the line of shadow should be drawn at an angle of 45° on the elevation as well as on the plan, the obvious advantage of which is that every shadow represents the exact projection of the part which casts it, and the depth of recesses or porticoes can be readily estimated by the eye, since the breadth of shadow will equal the depth of the recess in every case. In the accurate delineation of cast shadows, as all students know, a plan and elevation of the projection, or other cause of obstruction of the light, are required, and the lines are drawn at the required angle from the prominent corners of the object. The depth or breadth of the shadow is determined by the intersection of the line or ray with the wall or surface. It is necessary that the reader should distinguish clearly between a thrown or cast shadow, and a part in shade. The former may be defined to be that part of an object or building which is deprived of light by the interposition of another body; the latter is any part of an object or building that is not directly exposed to the rays of the sun. Though the rule given above is exceedingly simple in its application to plain projections from vertical surfaces, it becomes more obscure when the surface or plane upon which the shadow is projected is not in a vertical or parallel position, or when it is broken up into recesses, or is bent or curved, as a concave or convex wall. It is in dealing with cases of this kind that the draughtsman falls into error. The art of projecting shadows is really an application of the principles of descriptive geometry, and it is necessary at the outset that the student should perfectly comprehend the conditions of the rule we have referred to. As shadows are projected at an angle of 45° both in plan and elevation, it is evident that the real direction of the sun's rays will be the diagonal of a vertical plane passing through the diagonal of an imaginary cube whose sides represent the width and height of the shadow, and the direction of such a line will be at an angle of 35° 16′ with the horizon, a conception which ought to be clearly kept in view. In projecting the shadows of a rectangular recess, the principles of operation are clear enough; the rays are drawn at the angle both on the plan and from the upper left-hand corner of the recess. A perpendicular is then erected from the point where the ray cuts the back wall in the plan, and its intersection with the ray in elevation determines at once the vertical and horizontal shadows. Directly we get beyond rectangular projections and parallel surfaces, difficulties appear, as we may often see in the amusing attempts made in showing shadows cast upon walls at different angles in plan and other irregularities of surface. One of the most ordinary of cast shadows is that of a cornice upon the wall below it. When both are parallel, as in the ordinary front of a building, the problem is simple enough; but if breaks of windows and bays occur, or the cornice crowns a wall curved on plan the shadow takes a broken form or assumes a gradually deepening shade from the lighted to the shaded side. Yet we have seen circular buildings shadowed like rectangular ones. Apsidal recesses and circular niches with hemispherical heads are a positive snare to the artist, and very few accurate delineations are to be met with. The concavities are generally shaded as if they were rectangular. But a commoner source of error arises when a shadow is projected on a sloping surface as a roof. Let us instance a chimney-stack or tower rising above the eaves. In many representations we find the outline of shadow has been shirked, or the angle of it is drawn at variance with the slope. In perspective views the most absurd delineations are seen. The tops of the shadows of square chimney-stacks we observe drawn in various slants but the right one. If the draughtsman in this case imagined the bounding-edges of the top of chimney or its plan produced two planes, one parallel to the roof (the back line of chimney-top) and the other at right angles with it (its side), and imagined the intersection of these two planes with the roof-surface, he could not possibly err, as we often find. In obtaining the projection of the shadow cast by a stack or tower, the section or slope of side must determine the point at which the rays are cut by the roof. Another common instance of inaccurate shadowing is the projection of gable-shadows on roofs, or those of dormers. We have seen many of these drawn as if the surface receiving the shadow was vertical instead of slanting, finials to dormers thrown upon the roof in a position parallel to the objects themselves, or the shadow broken in the most fantastic manner.

Among the many abuses of the art, one of the most common is the width of shadows, and the depth of tone given to them. With a view of aiding the student anxious to make himself master of this useful kind of projection, we may make a few observations referring to points not generally considered.

One thing to be remembered is that cast shadows vary in degree with the source and distance of the light, and that they are considerably modified by reflected light from adjacent objects. The part of a shadow nearest the object throwing it, or the source of light, is invariably the strongest and most defined, gradually becoming less so as it recedes. In general, the darkest part of a shadow will be found in juxtaposition to the brightest part or the lighted side, and this rule is a very important one to bear in mind. When the plane of the surface on which the shadow is thrown is perpendicular, or nearly so, to the rays of light, the cast shadow more or less resembles the shape of the object, and the shadow assumes a distorted shape as the receiving surface is inclined more from the right angle. Upon convex surfaces, the forms of shadow become very subject to distortion, according to the degree of convexity. We have not touched upon various other incidents of cast shadows, upon their greater definition and decision upon angular surfaces, but we leave for another occasion some remarks upon the more subtle and delicate modifications produced by reflection, juxtaposition with high lights, the degrees of shade upon surfaces of different inclinations and forms, merely adding now that the value of cast shadows is that of expressing relief and conveying to the eye the form of surfaces not otherwise realised in geometrical drawings.

THE PARISH-CHURCH OF ST. MARY, STONE, KENT.*

IN his opening remarks, the author congratulated the members on having assembled in one of the most beautiful specimens of Early English Gothic churches, for its size, to be found anywhere in the kingdom. Of the date of the erection there was no record; but from the mouldings of its stonework, its windows, piers, and arches, they could read that, with the exception of the Wylshyre Chapel and vestry, it must have been built between 1260 and 1280. An earlier church was referred to in Domesday as Estanes, then held by the Bishop of Rochester; but of that church no traces could be found, except, perhaps, the Roman tiles worked into the walls here and there. From an early period the Bishops of Rochester had a manor-house in the parish, which was destroyed by fire at the close of the 12th century, and rebuilt by Bishop Gilbert de Glanville on the west side of the churchyard. The comparatively modern farm-buildings now existing there were the property of the see of Rochester until 1856, when they were alienated. The patronage of the church still rests with the Bishop of Rochester. No alterations were made to the Early English structure till the following century, when a small vestry or muniment-room was built on the north side of eastern bay of chancel, and the windows at the west end of nave and aisles, and in the west bay of south wall, were inserted. Some fear seems to have been felt at this time for the safety of the tower, for its piers were strengthened, and new caps and bases inserted, the work of these not being earlier than 1350, although the mouldings of the arch above are nearly a century earlier. At the same time the eastern piers of the tower received additional support by means of flying buttresses, now seen inside. From documentary evidence, as well as marks in walls, there could be no doubt that prior to the Reformation a rood-loft was thrown across the church between the first and second bays of nave from east. The upper part of the tower seems to have been rebuilt, in close imitation of 15th-century work, after the destruction of the steeple and nave-roof caused by lightning, January 14th, 1638. By a petition and twelve articles against Mr. Chase, the rector, presented to the House of Commons by the parishioners, it appeared that for more than ten years the nave was suffered to remain in ruins, and for four or five years "the arched roofe of the chauncell, for want of sufficient cover," was suffered "to become broaken and decayed, and above 200 or 300 foote of the windowes to remayne unglased, so that wee wre often inforced to forsake our pewes for shelter from wynde and weather; nor could the Communion Table be kept drye in tyme of rayne." The author next drew attention to the proportions of Stone church and Westminster Abbey, dwelling upon the importance given to proportion by the 13th-century arthitect. Proportion was, he remarked, the metre, and the stones, with their mouldings and carvings, the words and notes with which the architect made his poems in stone. The knowledge of geometry was revived in the 12th century, and was ardently followed by Grostete, Bishop of Lincoln, and others employed on the great buildings in England as well as on the Continent. Salisbury, Lincoln, Westminster, Winchester, and the Abbey Church of St. Denis, near Paris, were all good examples of the effect which geometry had on architecture; indeed, without a knowledge of the former science, it was impossible to properly proportion a building or the detail which gave expression to it. The author showed sections of the arch-mouldings of the trefoil-headed arcading round the chancel, which proved that the equilateral triangle governed all lines, and Mr. Street had also demonstrated that the same principle determined the width of nave and aisles, the position of the columns, and the heights of the various parts of the church. The setting out of buildings on this system continued in vogue till the beginning of the 15th century, when in France a change was effected by the introduction of the isosceles triangle, and its compound the pentagon, in place of the equilateral triangle and its compounds, the hexagon, duodecagon, &c. Pommerage, in his history of the Abbey of St. Ouen, at Rouen, mentioned that a pupil of Alexander de Berneval, architect to the church, first introduced the figure of the isosceles triangle in designing the great rose-window in the north transept, and that the master was so enraged with the clergy for preferring that to his own window in the south transept, designed on the equilateral principle, that in a fit of jealousy he killed his rival and was himself condemned to death. Mr. G. E. Street had advanced the following conclusions in support of his opinion, that Stone Church and Westminster Abbey were designed by the same architect:—

"1. The arcades round the chapels of the choir at Westminster are almost identical in shape and design with that round the chancel at Stone. The proportions of their trefoiled cusps are very peculiar, and as nearly as possible the same. The spandrels are filled with foliage carved exactly in the same spirit. The labels are terminated upon small corbels level with the capitals; a very unusual arrangement. The arcades rest upon a stone chamfered seat; and the arch-moulds, though not the same, are of the same character, and both of them undercut at the back. 2. Window tracery. The original window-tracery at Westminster is the same as at Stone. The windows in the south triforium of the nave are of precisely the same character as the window discovered in the chancel at Stone. The latter are remarkable for the great width of the lights (3ft. 1in. and 3ft. 10in. in the clear), and this is very characteristic of the Westminster windows. The windows at Stone are remarkable also for very broad chamfered tracery bars on the outside, corresponding with very rich mouldings on the inside. The triforium openings at Westminster are treated just in the same way on the side next the triforium, and a comparison of the triforium of the choir and north transept there with the east window of the north aisle at Stone would well illustrate the identity of character. The stone cusping in both is let into grooves, in the way common in early tracery. (3) The sculpture of foliage is very similar in both churches. The spandrels of arcades are treated just in the same way. At Westminster, sculptures of subjects are introduced here and there in place of foliage; at Stone, all the spandrels are filled with sculpture of foliage; but we find, in the thickness of the wall, one spandrel sculptured with figures, which appears never to have been used. The foliage of capitals is generally similar, and the very remarkable bosses of foliage in the chancel-arch at Stone, arranged in something of the outline of an enormous dog-tooth, are all but repetitions of the similar archivolt enrichments in the triforium of the north transept at Westminster. The roses round the archivolt of the south door at Stone are of the same kind as those round the inside arches of the north transept at Westminster. The foliage carved in the form of crosses in the quatrefoils over the chancel-arch at Stone are repeated in a quatrefoil over the door in the cloister at Westminster, leading to the private apartments of the abbot. The crosses are not identical in their treatment, but the idea is the same and one of rare occurrence. The materials used in the Abbey and at Stone are as nearly as possible the same. The wrought stonework is executed in Caen stone and Gatton stone, a great deal of chalk is used for wall-lining and groining, and all the shafts are of marble. (5) Finally, the same general system of proportion is observed in the minster and in the village church. In both, the width from the aisle walls to the centre of the columns is equal to half the width of the nave. At Westminster, the height is given by three equilateral triangles, whose base-line is the width across the nave from centre to centre of the columns; and two of these triangles give the height for the springing of the groining, and the third the height of the groining to its apex. At Stone, if we erect triangles on the same base-line, the first gives the top of the caps of the nave arcade; the second, within very little, the height of the top of the wall; and the third may very well be supposed to have marked the height of the ridge of the timber-roof. The width of the bays in the nave of Stone is equal to the diagonal of half the width of nave; and the width of the bays in the chancel is equal to the diagonal from the centre of one column to the centre of the nave or aisle opposite the next column; whilst the height of the chancel is given by two triangles similar to those in the nave, whose base is the width from centre to centre of the groining shafts. I do not wish to lay too much stress on any one of these points of resemblance. It is not to be expected that two churches built by the same architect, so unlike in size, in position, and in dignity, should show anything more than some general resemblance of character. But I cannot help thinking that when I have pointed to such a general agreement in the proportions, the materials, the sculpture, and the details, as we find at Stone and Westminster, it would be almost enough to decide the question, even without the final and conclusive evidence afforded by the all but exact identity of the cusping, and the general similarity of design in the wall arcades in the two churches, which must either have been copied one from the other, or designed by the same architect."

Mr. Gough added that it was with regret he could not altogether agree with so great an authority as Mr. Street. The system of proportion mentioned by him, viz., the equilateral triangle, prevailed in nearly all the buildings of the period, and could not be considered as evidence that both were designed by one architect. There was, undoubtedly, a great similarity in the arcades of both church and minster, especially in the somewhat singular cusping, and the tracery of windows, and the spirit of carving also showed a close resemblance. But was it not probable that the general proportions of these buildings were laid down by the bishops and clergy, and much of the detail left to the individual taste of the art workman? That much was left to the workman was evident from the story of the master and his pupil, in connection with the two rose windows of St. Ouen, the 'Prentice pillar at Roslyn Chapel, and numerous similar tales. Further, it was extremely likely that one or more of the workmen who had been engaged at Westminster were employed at Stone, and perhaps hired by the Bishop of Rochester, who lived close by, and who would be likely to know the beauty of the work at Westminster. He would now point out what portions of the church were modern. To begin with the chancel, the roof-groining was new, the old having been entirely destroyed long before Mr. Street undertook the restoration, although sufficient marks remained to show its exact section. The groining ribs were of the same section as the old, but the wall ribs were merely chamfers, and not moulded. The treatment of the western bay was peculiar. Mr. Street found it had been covered with a barrel-vault, and not with the quadripartite vault used to the eastward, and he therefore carefully restored

* A condensed report of a paper read in the church described, by HUGH ROUMIEU GOUGH, F.R.I.B.A., before the members of the St. Paul's Ecclesiological Society, June 19, 1880 (see following page).

this feature. The windows appeared to be of the 15th century, but as fragments of the old groining were abundant in the walls next the windows, and as there was evidence that the groining was destroyed by the fire of 1640, it was probable that they were copies, and very excellent ones, of Perpendicular windows. The Wylshyre Chantry was roofed with a steep lean-to against the north wall of chancel, and ceiled with a flat ceiling; this made it impossible to insert a new window during the restoration of 1640, and afforded Mr. Street a hope of discovering the original chancel-window. He accordingly cut into the wall, and was rewarded by the discovery of the jambs, the monials, and sufficient tracery to reproduce the original design as now seen. The east, and subsequently the south window, were based on the same design. From the nave he removed a flat-plastered ceiling, which had been added in 1777, and the fittings, flooring, and paving were renewed. One other point about the church deserved close attention—the gradual way in which the richness of detail increased from west to east, thus leading up to and concentrating the highest efforts of art around the altar throne. Starting from the western bay on north side, they saw that the window was of two lancet lights, with quatrefoil above, the inside arch chamfered with a simple label returned without carving, the jambs plainly splayed, and the arches between nave and aisle moulded. Proceeding to the next or middle bay, the windows were found to be of the same shape, but the inside arch and quatrefoil were richly moulded, the jambs finished inside with a moulding and stone shaft, with moulded base and carved capital. The label was now enriched with a dog-tooth moulding, and terminated in heads of a king and queen at either end, while the arches of the bay were moulded with greater richness than that just seen. In the eastern bay, they found that the window-jamb had two shafts, one of marble and one of stone on each side, and one of marble in the centre, from which sprang a richly-moulded rear-arch, with tracery corresponding to the window, producing a very beautiful effect, seldom met with except in clerestory windows. The arcade soffit of this bay was yet more richly moulded than the preceding one, and had in addition the dog-tooth moulding. The label was terminated, on the eastern side, by a Moor's head. The east window of this aisle, now opening into the Wylshyre chantry, was still richer than the others, and the bays of the south aisle followed the same rate of gradual enrichment towards the east. In conclusion, having referred to the singular north doorway, and suggested that the use of the chevron as an outer moulding, outside the dog-tooth, was no indication of early date, but was simply copied by the carvers from Transitional work, the author mentioned with approval Mr. Street's theory that the carving was not worked at Stone, but was sent, when completed, from elsewhere—an hypothesis borne out by the numerous fragments of worked and carved stone found built into the walls.

ST. PAUL'S ECCLESIOLOGICAL SOCIETY.

THE first country visit of this society for the present summer took place on Saturday afternoon, when about fifty members visited Stone and Swanscombe in North Kent. Greenhithe was reached by rail about half-past three, and a short walk back by the railway embankment side brought the party to

STONE CHURCH.

The edifice was not unfamiliar by name to the members. Mr. G. E. Street, R.A., in his lecture on "Thirteenth-Century Architecture," read at St. Paul's Chapter House 13 months since, referred to Stone Church as a noteworthy example of Early English work of great dignity and elaboration for so small a structure, and at the same time recommended his hearers to diligently compare its mouldings and tracery with those of the same period at Westminster Abbey, and mark their coincidence of treatment. The church consists of a chancel of three bays, nave also of three bays, with north and south aisles, extending to western face of the tower, west porch, and on north side of chancel a Later chantry to the Wylshyre family, and a vestry. The outline of the building is on the north well broken by these additions, and by the fact that the chancel is of considerably higher pitch than the nave, rising indeed almost to a level with the low embattled parapet of the tower at the west end. On the north side of nave is a doorway of great beauty although shattered and dilapidated. The mouldings are of 13th-century character, but contain a band of roses, irregularly disposed as ornament, outside this the dogtooth, and on the outer line a free and very rich chevron. The nave-windows are of two lights, with quatrefoil heads; those in the chancel are large and wide three-lights, and were inserted by Mr. Street (who thoroughly restored the church in 1860-1) in lieu of Perpendicular ones previously existing. The interior of the building is yet more interesting. The beauty of the proportions at once arrests attention, while the steady increase of richness from west to east grows upon the spectator, and the refinement and purity of the details make the church one to be lingered over. The nave-arcade is richly moulded, and is supported by clustered stone columns, with Purbeck shafts set at the angles, the caps being sculptured with crisp foliage. On the west face of the chancel-arch is a broad band of rich foliage so disposed in quatrefoil-fashion as to resemble the dogtooth ornament. The rich trefoiled arcading round chancel, the windows (especially the eastern ones of nave, which are double-mullioned) the groined chancel (Mr. Street's reproduction), and the mouldings throughout suggest the work in transepts and choir of Westminster Abbey, visited by the society a fortnight previously. But Mr. H. Roumieu Gough's paper, read in the church and reported elsewhere, enters so fully into the details of this beautiful church, that we will here content ourselves with adding that some architectural notes on Stone Church will be found in the BUILDING NEWS for June 20, 1879, and a sketch of the exterior of the building, taken from north-east, also by Mr. Maurice B. Adams, was published in our issue for November 7, 1879. In proposing a vote of thanks to Mr. Gough for his lecture, Major Heales, F.S.A., expressed the satisfaction of the members that their country visits should commence in a building of such peculiar beauty and grace, and referred to the admirable style of the carving throughout, to the free use of the dog-tooth ornament, and to the proportions of the structure and the slenderness of the piers, monials, and shafts. Mr. Street seemed to have done a great deal in the way of restoration, but had executed his task with great judgment and skill. Canon Murray, the rector, described the church as it appeared prior to restoration, and gave details of the interesting discoveries by which Mr. Street was enabled to reproduce the groining and side-windows of chancel. Traces of the great fire of 1640 were yet to be seen in the tower and elsewhere, and Mr. Street found that the beams of the former roof had been charred in the walls. On the aisle wall might still be seen some dim frescoes, which were discovered during the works; they appeared to be: The Descent from the Cross, in the centre, with the Virgin and Child to the left, and perhaps the Annunciation to the right.

The members then walked through the hop-fields, which promised a rich harvest, to

SWANSCOMBE CHURCH,

an aisled structure, and having a massive west tower finised by one of the low slated spires common to the south-eastern counties. On entering, the unusual width across chancel-arch as well as aisles was very apparent. Traces of all periods were evident, from the Transitional Norman of the south aisle and tower to Classic tablets and the elaborate Modern Gothic altar-tomb of richly-sculptured marble, erected by Mr. Erasmus Wilson, F.R.S., to his sister. The same physician bore the sole cost of the entire restoration of the nave, which was carried out about half-a-dozen years ago under the superintendence of Mr. Freeman, of Greenhithe, acting in conjunction with Mr. George Vulliamy, the architect of the Metropolitan Board of Works. At the west end of nave is a rudely-carved and much dilapidated font, of rough stone, and Early English workmanship. Although broken and almost shapeless, it is still used for baptism. In the church the rector, the Rev. T. H. Dandy, B.D., read a paper descriptive of the building, which he considered to bear the marks of the wind and weather of above 900 years. For the tower he claimed a Saxon-Transitional origin, circa 950 A.D., relying as evidence upon the "Roman" bricks worked in here and there, the long-and-short work, and the simplicity of the masonry. The south window of tower, he showed, was chiefly constructed of "Roman" bricks, and was double-splayed. Following the chronological order of erection, Mr. Dandy next directed attention to the remains of an arcade in chalk, carried above the chancel arch, which he considered to be a Norman screen. On either side of the chancel exist edges of the setting of Norman semicircular windows, also in chalk-stone, and of the same date. As Swanscombe was part of the estate given to Bishop Odo, the Conqueror's brother, he assigned as the date of the Norman chancel at 1070 A.D. The rector next called attention to the dilapidated font of Caen stone, and to the nave arcades, the soffits of which are square, edged with a small roll member, and these he regarded as Early-English of the first period. The chancel had been tampered with by the insertion of Early-English lancets, and in the latter part of this century was erected the present chancel-arch and its oak screen—now used to divide off the tower-arch; and of somewhat later date was the blind clerestory. About the year 1200 the north and south aisles were thrown out, and to these were afterwards added side-altars. About the same time a large rood-loft was thrown across the church at the first bay from east, of which the stone stairs on south and aumbry on north still remained. About 1320 a further enlargement was made by lengthening the chancel one bay eastward, when a fresh west window was also inserted, of similar character. The oak lectern, now restored to its former use, was of very late and florid Decorated character, of about 1377. In the north aisle were inserted low but good Perpendicular windows, and yet later were three monuments of the Weldon family, lords of the manor for 308 years; of these, the earliest showed full-length effigies of Sir C. Weldon and his lady, of the 17th century. Mr. Grimshire proposed a vote of thanks to the rector, remarking on the many styles illustrated in the church. The extremely early origin ascribed to the tower was not concurred in by all present, although it was conceded to be of rude, but possibly Late Norman construction, and it was conjectured that the free use of long narrow tiles in the splays of windows, and as bond-courses, might be accounted for by the free use of the materials from the Roman Via close by.

A CELTIC CAMP.

Having pushed their way between the undergrowth of Swanscombe Wood, by miry and tortuous paths, the members assembled on a large and lofty mound in the centre, on which, amongst oaks and elms, were two large yew-trees. Here Dr. Lory Marsh gave a lecturette, informing the party that they stood on a Celtic camp, thrown up for purposes of temporary defence about two thousand years ago. Messrs. Harris and Roach-Smith had thoroughly examined the district, and, with himself, had ascertained that the ditch, or vallum, at the foot went completely round the mound. It was probably enclosed by stakes. The great Roman road from Dover to London passed at the foot of the hill, and the field opposite was still known as the Castle Field. The idea that it was a tumulus must be abandoned in face of the facts. It was a curious question whether this was always part of a forest, and he was inclined to think it was. The yew-trees before them gave some idea of the antiquity of the mound.

A MODERN HAMLET CHURCH.—ALL SAINTS, PERRY-STREET.

The day's programme ended with tea at Springhead, but in the evening the party separated, some visiting the new church built for Mr. Fuller Russell, at Northfleet, and a smaller section proceeding to the new church of All Saints, erected from Mr. James Brooks's designs, in the hamlet of Perry-street, near Gravesend, being courteously shown over the building by the vicar, the Rev. — Jackson. The church is built of coursed Kentish ragstone inside and out, with Bath dressings, and is complete even to the carving of caps, the only exception being the reredos yet to be added. It bears evidence at every point of the style of its architect. The solid walling, the deeply-splayed lancets, placed high up in the walls, the peculiar but very appropriate nave roof, a kind of barrel-vault of closely-set principals, with cross-ties

above, an instance of the benefit occasionally resulting from the necessity of modifying a design, are all such as we might expect from Mr. Brooks, and the whole has a substantial and dignified, if somewhat heavy, appearance. The windows, however, are not very abundant, and we believe it early becomes dark, owing to the smallness of the openings in the great wheel window at the west end. The east window, a triple light of Early Decorated character, is of excellent proportions. It is filled with stained-glass, by Clayton and Bell, illustrative of the dedication to All Saints, and forms part of an iconographical scheme carried throughout the church. The small drips connecting the square caps with the circular drums of arcade piers, and the similar drips on the north and south jambs, are mannerisms not altogether to be admired. A circular pulpit of polished grey and inlaid marble, a special gift, greatly brightens the appearance of the eastern part of the church. The altar-slab is a solid piece of dark grey marble, 3in. thick, and of large dimensions, incised with the Five Wounds. The low benches and all other fittings are of plain and substantial character. The church was built between 1869 and 1872 by Mr. Thomas Blake, a Gravesend builder, at a cost of about £4,000. The interior, looking east, has twice been illustrated in the BUILDING NEWS—Mr. Brooks's original design, on February 9, 1872, and as carried out, November 13, 1874.

THE "BUILDING NEWS" DESIGNING CLUB.

DESIGN FOR A VILLAGE SCHOOL.

WE are not quite satisfied with the planning of the design we place first, that of "Alfred's," though the entrances are well disposed, and the general scheme is a good one. The buildings have an incoherent look, and the master's house is not economically disposed. The schoolroom, about 40ft. by 18ft., has two groups of desks, and a class-room at each end, one for infants next the house, and the other for senior scholars. In style, a brick treatment, with Queen Anne features, has been chosen, suitable on the whole; but the house with its gables and pedimented windows is too formal for a village. "Castello" has much to recommend it, the general or mixed schoolroom, 40ft. by 18ft. (accommodating 76), has a gallery projection at one end, and an infants' or class-room for 34 opposite, with a sliding door. The girls and infants have a side entrance at the north-east end, and the boys have an entrance at the other end of school between it and the house. It would have been better if their positions had been reversed. The house is convenient and compact, and adjoins, though we see no doorway between it and the school, which would have been a convenience. The entrances to the school are fitted with lavatories, and the boys' forms a passage through into the playground; the stoves are in a good place. We like the elevation; the house is agreeably joined, and the style (Gothic, with brick and timber framing in the gables) is treated simply, with good detail. The hammer-beam roof is unnecessary, and a simpler form would have answered. Very like the last, but reversed in general arrangement, is the design by "Edwin," a very simply treated and pleasingly-grouped building, which competes very closely with the former. The school is planned like the last, with a gallery recess, and an infants' class-room forming a cross gable; the latter is for 36 pupils, while the mixed school provides for 64. The author makes a private entrance from house to school, and lavatories are provided in recesses in the girls' and boys' entrances. Economy has been regarded in the construction, and the design is appropriate. The sketch is pleasing, but rather rough, and the plans lack detail. "Jack" sends a clever sketch in his usual vigorous style; but the design is too cut up into parts, and the house is intricate. The mixed school, 36ft. by 18ft., has a gallery, and an infants' room is made to project on one side of the room in a central position shut off by sliding doors. On each side of infants' school is a porch, with lavatory and hat-pegs, &c., but these are cramped. The materials proposed are red sandstone plinth and dressings, and red brick walling; the inside of school to have a tile dado of interlocking tiles. The long elevation shows a curious combination of roofs, and we do not admire the treatment of master's house, which is more irregular than picturesque, in spite of its ingenious planning. "Sub Rosa" is a long, narrow, low-roofed building, with gabled windows breaking the roof, and a house at one end. A mixed school for 54, and an infants' class-room for 24 at one end, and a class-room for 22 at the other, make a straggling plan. Curtains are shown between the rows of desks. One defect is the absence of communication between school and class-room, except through the porches, and the entrance to house is cramped and unsatisfactory. Elevations are in a plain but suitable style. "Ap Adam" has a fairly good plan, but the desks are too close together, and the mixed school has more windows than necessary or desirable. The author allows 1,070 superficial feet, or 10·70ft. per child, and prices it out at £1,208 9s. The elevation and details are suitable, and the design is characteristic. "Burswell" shows a sketch, the general composition of which is appropriate. The mixed school and class-room are well-disposed, and the entrances good, but the details of seating and roofing, the plan of house, &c., are defective. "Merlin" is a motto well-known to us; the elevation of school is appropriately treated in brick, and the details are effective. In the planning we find fault with the girls' entrance passage, and the position of infants' school, which might have been combined with the class-room, and it is convenient to be able to throw the class-rooms into the large room by sliding doors. The drawings are neatly got up. "No. 90" is not happy in the entrances; the boys' is cramped, and the detail of plan is defective. With the exception of the chimneys, we have not much to find fault with in the elevation, which is Gothic in style. "Howard" has no idea of school-planning, the mixed school including infants, and the position of entrances close together at one end would baffle all management, and the class-rooms are awkwardly disposed. The sketch and elevation are the best part of the design; these show brick and stone below, with timber-work in the upper story of house, and some good grouping. "Eko" is well grouped and suited in style, but the plan of class-room and its lighting, and the entrances, are not the best. "Toledo" exhibits a fair plan in its distribution; dual desks are shown, but details are not worked out in the most judicious manner. The chief failing of "1880" is that the plan is too straggling, and the schoolroom too long. The same may be said of "Pupil J.," who is certainly improving in his work; the sketch is pleasing, but the plan of house confused. "Our Praises are our Wages" is neatly drawn, and there are a few good details; but the infants' class-room, separated by the girls' entrance-passage from the mixed school, is unnecessary. "H." is not without merit, but the style is ill-chosen, and the house and class-rooms might be improved. "Nil Desperandum" is too straggling in its arrangement, and the mixed-school too long. "North" is picturesque, but the plan hopelessly confused. Among other designs of some merit, but defective in planning, we may name "Jack in Circle," "Clansman" well grouped; "Motto J. L.," "Mot," "Tom Tit," "Manx." In most of these, the house is not well connected with the school, and the class-rooms, lighting, or entrances have been ill-considered. In "Clansman," "Tom Tit," and one or two more, the seats and details are not shown.

In a second group we place a number of other designs, which in both elevation and arrangement fall below the standard, and we shall endeavour to arrange these in the order of their merit. "Hubert" is too ornamental: the bell-turret and timbered gables are overdone; in plan the class-rooms are cut off from school-room by a passage, for what purpose we fail to perceive. "Pro Bono Publico" is a carefully-figured set of plans, but the schoolroom is too long; the elevation would have been better without the perspective, which is incorrectly drawn in its lines. In "Ivanhoe" the seats and class-rooms are ill-arranged. "Timeo" shows his boys' and girls' entrances close together, which is a mistake, and his tower is an unnecessary feature. "No. 2" is a trifle better. "X. L." shows the desks in the four corners of schoolroom, and the class-rooms on each side, but we fail to see the merit of the symmetry, either in plan or elevation; the drawings are neat. "Ernest's" elevation is in a carpenter's Gothic style, and attempts too much. "Veritas Vincit" is a plan that would defy classification: there is only one entrance. Why the corridor between school and class-rooms? "Excelsior" is also a well-conceived plan, after which we can only name "D'Ewes," "Lancaster," "Palmam qui Meruit Ferat," "Tace," "Belteshazzar," and "Ogmore."

A WOODEN BRIDGE.

For this subject "Binny" and "Edwin" stand together. We rather like "Binny's" idea of trussing the best, and he has adopted a pleasing style of wooden framing for the sides, a Japanese design, the lower panels being filled in with basket work, and the upper portion having open railwork. The gate is a simple right-angle arrangement, hinged at the angle. "Edwin's" design shows the bridge carried by curved ribs of timber, scarfed in the centre, and having struts at each end, springing from brick piers. The sides are simply fenced in with cleft oak pales. The design is suitable, and the end gates of good form. "Sub Rosa" is rather too muscular, though it forms a good truss, and the details are bold and would be effective. A turnstile at the end is shown. "Jack in Circle" is a level platform, too much like a plank with sides of upright and cross-pieces, chamfered and varnished; it lacks boldness. "Hubert's" sketch is ornamental, but wanting in simplicity; it looks like a portable drawbridge; it is also too narrow, and the iron cantilevers at the ends would look finical without adding to the strength. "Gerald"—This is a commonplace species of panel bridge, but without merit. "Le Faineant" is rather too elaborate a conception. The design looks more suited for cast-iron than wood; the coat-of-arms and crowned helmet in centre, and the spandrels, are a kind of ornamentation that seems a little out of date for a small bridge over a stream. "Gemshorn" is panelled with cross braces, stop-chamfered; the posts are also stop-chamfered and carved, and the design is a little too ornate. "D'Ewes" is a double-span bridge with a centre pier. It looks like a railway viaduct in elevation, and the curved brackets below arches and detail are meaningless additions. None of the sketches quite realise our ideas of a wooden bridge. Many of the truss bridges of timber that carry our turnpike roads suggest better models; and if we inquire the reason why they please us, we shall find it in the fact that their builders used their timber in the most self-evident and constructive manner. In the designs we have received, the authors have mainly turned their attention to the railings; they have not made a feature of the platform, nor the most effective mode of carrying it, and a source of picturesqueness has been lost.

CITY CHURCHES PROTECTION SOCIETY.

THE first annual meeting of the City Church and Churchyard Protection Society was held on Wednesday afternoon in the Egyptian Hall, Mansion House, the Earl of Devon in the chair. The hon. secretary, Mr. Henry Wright, read the annual report, which stated the society was established, in the first instance, because of the scheduling of the church of St. Mary-at-Hill by the Metropolitan and Metropolitan District Railways Completion Bill. It had been successful in protecting this and other churches and churchyards from the operations of the Railway Bills of last and the present session. A committee had been appointed to visit and report upon the condition of City churchyards. At Exeter, a scheme for the destruction of five churches had been abandoned for the present, and a church protection society was being formed in that city. Since the formation of this London Society last year no scheme of removal had been set on foot, nor had a single church been destroyed. The report concluded with the following sentences:—"The work is no ordinary one which this Society has undertaken, in an age which is, above all things, utilitarian; but reverence for art, antiquity, and religion still retains some dominion on the minds and affections of the thoughtful and the cultivated. The Society does not wish to be officious, but the executive are prepared to watch with vigilance and oppose with determination, every fresh scheme of destruction as it is broached."

The Secretary then read a lengthy letter addressed by the late Sir Gilbert Scott in 1854 to the late Dr. Blomfield, Bishop of London, in which a strong protest was raised against the

desecration of the sites of churches. It was pleaded that there were no congregations, but this the writer considered to be due not alone to the removal of the resident population, but to the inefficiency of the arrangements, and the non-residence of the clergy. The merchants of the City ought to maintain the churches as places for prayer, and also as centres of mission-work. As a lover of art, of antiquarian associations, and of the most picturesque features of the City he pleaded for the retention of these architectural ornaments. The Right Hon. Cavendish Bentinck, M.P., in moving the adoption of the report, mentioned that so far back as 1860 he opposed Mr. Bouverie's Bill in the House of Commons, and succeeded in saving four churches from destruction, and six years later, with the help of others, was able to preserve the beautiful tower of St. Mary Somerset. That structure was now vested in the Corporation, and he warned them not to allow it to be taken down by a side-wind. He was not a man of taste, and hoped he never should be one. There were, however, differing tastes, and he protested against entrusting the reparation and "restoration" of the churches of Wren to church architects of Gothic proclivities. He regretted the alterations which had been made in St. Andrew's, Holborn, and several other of these churches, of which St. Michael's, Cornhill, was, perhaps, the worst case. Within a stone's throw of that room, the nobly-planned church of St. Stephen, Walbrook, was undergoing plaster-skinning, although its architect never intended that the bare stones of the tower should be revealed. Although, as he had said, and perhaps because, he was not a man of taste, he had been put on a committee for decorating St. Paul's Cathedral. The first thing that committee decided upon was to entirely destroy the interior of Wren's greatest design under Mr. Burges, whose scheme was adopted by a large majority in the committee and subsequently by the Chapter. However, he was glad to say that eventually Mr. Burges was shown out and his design sent after him.

Lord Talbot de Malahide seconded the adoption of the report, and dwelt upon the beauty and variety Sir Christopher Wren gave to his City churches, the skill shown in their planning and erection, and the pictorial effect they gave to our London streets. All antiquaries must regret their destruction. While he had more sympathy with the earlier styles of ecclesiastical architecture, he was impressed by the evil and danger which threatened the restoration of these buildings, and was aware of the actual damage that had occurred in the work when carried out by architects of a different school. Major Joseph, as churchwarden for St. Mary Aldermary, replied to the last two speakers, defending what had been done in the church of which he was an official. That building, at any rate, was a Gothic church, remodelled by Wren, and they had simply restored it to its former state, leaving a few traces of what was done by Wren. He uttered a protest against the banter which had been heaped upon the City by Mr. Cavendish Bentinck. As for St. Antholin, great exertions were made, but in vain, to preserve the beautiful tower; failing this, all the human remains had been re-interred in the rector's vault, and a monument was now being erected to mark the site. The report was received and adopted. Lord Forbes and Mr. H. C. Richards addressed the meeting; and Sir Robert Phillimore moved—"That this meeting regrets the destruction of so many of the ancient parish-churches of the City of London, both on æsthetic and religious grounds; and pledges itself to oppose any and every future scheme for the removal of a City church, or the desecration of the resting-place of the dead within the City of London." Replying to the pleas for destruction of the churches that they were not attended, he contrasted the condition of St. Paul's 20 years ago and now, and said: Give the churches fair play; open them for prayer throughout the day; let the clergy be resident, active, and earnest; and there will be no need for complaint of want of interest in the church. The Rev. — Hall, incumbent of St. Leonard's, Eastcheap, detailed what he had done, and with success, to utilise and popularise a City church; and the Rev. J. L. Fish and Mr. Wood spoke to the same effect. The resolution was unanimously agreed to, and votes of thanks to Earl Devon for presiding, and to the Lord Mayor for the use of the Mansion-house, closed the proceedings.

A NEW RAILWAY TOWN.

THE village of Hellifield, a few miles beyond Skipton, on the main line of the Midland Railway Company to the north, which formerly had a small roadside station, has been transformed into a busy place for railway traffic, and will henceforward be known as Hellifield Junction. The station buildings are 185ft. long, and 20ft. 6in. wide. They were designed by Mr. Trubshaw, of the Midland Company, are built of stone, and comprise the usual accommodation for passengers. The internal fittings are of red deal, varnished. The ironwork of the awnings, by Macfarlane, of Glasgow, is light and handsome; Rendle's system of glazing without putty will be used for a portion of the glasswork. A new road has been formed on the south side of the station. Here are built forty cottages, in separate blocks of ten each, for the servants of the Midland Company. Unlike the cottages on the Settle and Carlisle branch of the Midland, which are handsome and villa-like in appearance, these cottages are very plain, and have evidently been designed for use rather than ornament. The outer walls of some of them are of stone, but others are composed of concrete blocks. They have gardens in front and rear, the latter large. The conveniences are placed at the end of the back gardens, and are approached by a road. Internally the cottages are as plain as externally. An urgent requirement just now is either a church or a room where Divine worship can be conducted. Mr. Robert Leak, of Normanton, is the contractor for the station, awnings, and platform; Messrs. W. Barrett and Son, of Shipley, for the subway; and Messrs. Rhodes, of Shipley, for the cottages and engine-shed. At present, this new railway town is in a rough and incomplete condition, but when the workmen have finished their labours, the navvies' huts pulled down, and Hellifield Junction is got into good form, it will assume a different aspect. The neighbourhood is picturesque and salubrious, within easy distance of Malham Cove, Gordale Scar—the finest part of the Craven district—and the beautiful valley of the Ribble.

A HOME HOSPITAL.

THE establishment of Home or Middle-class Hospitals is a new movement, for the relief of patients who may prefer the comforts of home to the treatment of the ordinary hospital. Some time ago an association was formed with the object of promoting these home hospitals, and after some difficulties and delays, the freehold of 16, Fitzroy-square was purchased, which has been converted into a home hospital. The house, a private residence, has undergone substantial repair, and has been remodelled to suit the requirements of patients. The changes made, we find from a personal examination, have been rather changes of detail than reconstruction. By the courtesy of Mrs. Bluett, the lady-superintendent, we are able to describe these in detail. The rooms remain unaltered, and the visitor might fairly take the house to be a private gentleman's residence. They have been tastefully finished with varnished wall papers of quiet and subdued patterns, and the furniture, supplied by Messrs. Jenks and Holt, of Holborn Viaduct, is in excellent keeping with the decorations. The structural alterations have been made under the supervision of Mr. Ernest Turner, architect, of Regent-street, by Messrs. Patman and Fotheringham, builders. Beginning with the drainage, we find considerable alterations have been made. The drain leading to the sewer is 6in., laid beneath the basement passage with a fall of 1 in 40, and at back and in front area inspecting manholes have been provided. Disconnection with the sewer has been made, and the house-drains are ventilated by carrying up the soil-pipes, their top ends being left open without cowls. Overflow and waste-pipes discharge in the areas or into the heads of the rain-water stacks. Bostel's Excelsior closets have been introduced, in conjunction with Purnell's water-waste preventers. In the basement are the kitchen and day-rooms for the nurses and servants, while the stables and outbuildings at the back have been converted into bedrooms. On the ground-floor, the front room opening from the hall is a day-room; the back room has been made into an accident room. Ascending the stairs in the rear of hall, there is an arched antechamber and the lady-superintendent's room on the half-landing, commanding a view of both floors; the drawing-room on the first floor, has been converted into a small ward for four beds. These are so disposed with folding-screens between them that no one patient can possibly see another; the windows have upper pivot sashes, worked by a screw, and the bedsteads have chain spring mattresses; washstands, tables, and cabinets are provided, so that every patient is accommodated with the necessaries of his own parlour. There is a lavatory and bath-room on the landing, and the upper rooms are adapted for beds varying from one to three in each room. Entering one of these, we find every requisite for the patients' comfort; a spring bed, a washstand which in some cases have tops to, and are convertible into tables, a writing-desk, a hanging or medicine cupboard, a portable bath, and screens made of a light blue chintz of pleasing pattern, that can be arranged or folded in any manner, curtains in excellent harmony with the wall paper, which is light and quiet in design and varnished. The floor is stained and polished; there are no carpets, but Persian rugs of good design are laid at the sides of the bed, and can be easily moved for cleaning. We may add, the furniture is simple in construction, and is made of polished ash or oak; crevices and carving have been strictly avoided to prevent accumulation of dust or dirt, and the design of the tables, chairs, &c., is substantial, in good taste, and reflects credit on the firm which has supplied it. In every room there is a swing sash and a Boyle's ventilator, by Comyn, Ching and Co. Grisaille glass panels are introduced into the hall door, staircase windows, and through ventilation has been insured in many cases by opening sashes over the doors of the bedrooms. On the whole, it will be confessed Mr. Turner has been successful in converting an old house into the purposes of a home hospital. The cost has been about £2,000, exclusive of furnishing. We hear Fitzroy House is to be formally opened by the Bishop of Winchester on Monday next.

MR. NEWTON ON GREEK ART.

MR. NEWTON'S sixth lecture on ancient Greek art treated of the celebrated sculptor Praxiteles. It was, said the lecturer, a matter in dispute at Rome in the time of Pliny whether Praxiteles or Scopas was the author of the group of Niobe and her children, and this question still remained undecided. The original group was in a temple of Apollo at Rome, dedicated by C. Sosius, B.C. 38, who had probably brought it from Seleucia in Cilicia. The Roman copies of this group, now at Florence, had been found at Rome in 1583. It was still a matter of controversy whether the original group had decorated the pediment of a temple or had been placed in a portico; some had proposed a semi-circular arrangement. Much of the beauty of the original sculptures had doubtless been lost in the Roman copies but they had preserved the general motive of the composition. In the untimely death of the children of Niobe and the grief of their mother we had one of the most moving incidents in the whole range of Greek tragedy, and the manner in which it had been treated in this group was in accordance with the principle of ancient sculpture in its best time, when pathetic effect was attained by expression so subdued and self contained as not to disturb too violently the permanent lines of beauty. In the British Museum was a circular relief in which the story of Niobe and her children was represented in parallel lines on the side of Mount Sipylus, and the two avenging deities, Apollo and Artemis, who were wanting in the Florence group, were introduced. The most celebrated work of Praxiteles was the nude figure of Aphrodite in a temple at Cnidus. This was the statue originally offered to the people of Cos, who preferred a draped figure of the same goddess, also by Praxiteles. It was not to be supposed that he was the first to represent Aphrodite naked, for in Carrey's drawing of the western pediment of the Parthenon she was thus represented seated in the lap of another goddess, probably Thalassa. The innovation, if any, made by Praxiteles must have consisted in this, that he made a nude Aphrodite the principal object of worship in a temple. A rare bronze coin of Cnidus showed the general motive of this statue. The goddess was represented standing by a vase holding in one hand her garment, which she had just taken off before

going into a bath. There were many Roman copies and varieties of this figure, none of which had so much claim to our attention as a statue in the Vatican, which had been unfortunately disfigured by the unmeaning tin drapery which had been added to it in the early part of this century. Another favourite subject of Praxiteles was the god Eros, of whom he made several statues; one of special celebrity, at Thespiæ, in Bœotia. At this period Eros was represented as a slender youth, still retaining something of the well-strung type of the young athlete. Such an Eros we had on a very small scale on a gold ornament found in a tomb at Camirus, in Rhodes, and now in the British Museum. It was impossible to recognise with any certainty copies of the Praxitelian Eros in any extant statue. The Apollo Sauroctonos, or lizard slayer, was another work by Praxiteles, of which we had more than one copy. The type was effeminate. Dionysos and his attendent Satyrs and Mænads furnished several subjects. Probably to the school of Praxiteles might be referred both the types of Dionysos, one of which represented him as bearded and fully draped, the other as a naked youth. In the British Museum was an exceedingly beautiful head of the young Dionysos, which was probably derived from a Praxitelian source. The myth of Demeter and Persephone was also commemorated by Praxitelian sculptors in more than one group. The Demeter found by the lecturer at Cnidus, the head of which was of exceding beauty, and other remains of statues found with it, might also be attributed with probability to the same school. In the recent excavations at Olympia a statue had been discovered, which might certainly be attributed to Praxiteles, because it corresponded perfectly with the description of Pausanias. It represented Hermes holding on his left arm the infant Dionysos. A cast of this beautiful statue was now to be seen in the Elgin Room at the British Museum. The celebrated bronze head of a goddess, found in Armenia, and purchased of Mr. Castellani some years ago, had also been attributed with probability to the school of Praxiteles. The lecture was illustrated by casts and by two fine drawings from the antique by Mr. Legros, which the Slade Professor had lent for the occasion.

THE NEW TAY BRIDGE.

THE plans under the parliamentary notices for the rebuilding of the Tay Bridge have been lodged in the Dundee Sheriff Court by the North British Railway Company. The whole bridge, from shore to shore, is shown, reduced in height so that over the middle of the fairway, where the high girders fell, the height of the girders above high-water mark of ordinary spring tides is reduced from 88ft. to 57ft. To accomplish this it is proposed to begin to lower the line in the parish of Forgan on the Fife side by a gently falling gradient until it joins the south end of the bridge, where the height of the girders will be reduced to 57ft. This height of 57ft. is continued from the end of the bridge until the eighth fallen pier is reached, when it begins to fall gradually towards the north shore. For a considerable distance on the Fife side the line falls at a gradient of 1 in 300, at which it joins the bridge, and from this point to the extent of about 600ft. there is a slight rising inclination. The line then continues almost level until it reaches the eighth fallen pier, when a falling gradient of 1 in 230 begins, and the gradient continues to fall very quickly, until towards the north shore it is 1 in 74. The spans in the southmost portion of the bridge still remaining are not to be altered in width, but the 13 wide spans of 245ft., which were in the centre of the bridge before it fell, are to be narrowed to about one-half the width by the introduction of additional piers. The first five 245ft. spans, counting from the south end of the present gap, are to be divided into ten spans of 109ft. each, and will be at the height of 57ft. above high-water ordinary spring tides. Between the fifth and sixth fallen piers there will be two spans 100ft. wide and 57ft. in height; between the sixth and eighth fallen piers, four openings 109ft. wide and 57ft. in height; between the eighth and ninth fallen piers, two spans 100ft. wide and gradually falling in height from 57ft. to 54ft. 9in., then from the ninth fallen pier to the first standing pier on the north side there are eight openings 109ft. in width, and gradually falling in height from 54ft. 9in. to 45ft. The spans of the portion of the bridge still standing at the north end are not to be altered in width, but the girders are to be lowered to suit the falling gradient of the line towards the north shore, the height of the large bow-string girder being reduced to about 26ft., and the similar girder over the Esplanade to about 18ft. The viaduct on the north shore is also reduced in height to suit the lowering of the bridge. According to the plans, the line on the bridge is to be carried on the top of the girders from shore to shore, and the kind of girders which before spanned the middle of the river will thus be dispensed with. It is not proposed to make a double line bridge, but the new piers to be erected in the middle of the river will be of such a width as will be sufficient to carry a double line of rails should that be deemed necessary. It is understood that while this is the general character of the plans of the restored bridge, they will be subject to any improvements or recommendations which may be considered expedient by the Board of Trade as the result of the recent inquiry into the causes of the fall of the bridge. Power is to be asked to enable the company to stop the traffic from crossing the bridge when the weather may be such as to cause apprehensions of danger.

ARCHÆOLOGICAL.

A VIKING'S SHIP.—A recent antiquarian discovery of a remarkable nature has been the unearthing of a complete vessel of war, a perfect Viking craft. The sons of the peasant on whose ground, at Gogstad, near the old town of Tönsberg, in Norway, the tumulus is situate began, in January and February this year, an excavation; they dug down a well from the top, and soon met with some timber. They suspended their work at this point, and reported the matter to Christiania, where the "Society for the Preservation of Ancient Monuments" took up the task, and sent down Mr. Nicolaysen, an antiquary, to conduct the investigation. Under his guidance the excavation was carried on in the months of April and May, revealing the whole body of an old Viking vessel, 74ft. long between stem and stern, 16ft. broad amidships, drawing 5ft., and with 20 ribs. The tumulus is now nearly a mile distant from the sea, but it is evident from the nature of the alluvial soil that, in olden times, the waves washed its base. The vessel had consequently been drawn up immediately from the fjord, and placed upon a layer of fascines or hurdles of hazel-branches and moss; the sides had then been covered with stiff clay, and the whole been filled up with earth and sand to form the funereal hill. In the stem of the ship, first disclosed to the eye, several interesting objects were found. A piece of timber proved to be the stock of the anchor; it was perforated to hold the iron, but of this no more was found than a few remnants. In the bottom, the remains of two or three small oaken boats, of a very elegant shape, were placed over a multitude of oars, some of them for the boats, others, 20ft. long, for the large craft itself. The form of these oars is very nearly like that still in use in English rowing matches, ending in a small, finely-cut blade, some of them with ornamental carvings. The bottom-deals, as well-preserved as though they were of yesterday, are ornamented with circular lines. Several pieces of wood had the appearance of having belonged to sledges, and some beams and deals are supposed to have formed compartments dividing the banks of rowers on each side, from a passage or corridor in the middle. In a heap of oaken chips and splinters, was found an elegantly-shaped hatchet, a couple of inches long, of the shape peculiar to the younger Iron Age. Some loose beams ended in roughly-carved dragons' heads, painted in the same colours as the bows and sides of the vessel—to wit, yellow and black. The colours had evidently not been dissolved in water, as they still exist; but, as olive oil or other kinds of vegetable oils were unknown at the time, it is supposed that the colours have been prepared in some sort of fat, perhaps with blubber. As the excavation proceeded, the whole length of the vessel was laid bare. All along the side, nearly from stem to stern, and on the outside, extended a row of circular shields, placed like the scales of a fish; nearly 100 of these are remaining, partly painted in yellow and black, but in many of them the wood had been consumed, and only the central iron plate is preserved. From the famous tapestry of Bayeux, it is well known that the ancient Viking vessels had these rows of shields along the freeboard, but it was supposed that they were those used by the warriors in the strife, and only placed there for convenience. It is now clear that they had only an ornamental purpose, being of very thin wood, not thicker than stiff pasteboard, and unable to ward off any serious hit from a sword. In the middle of the vessel, a large oaken block, solidly fastened to the bottom, has a square hole for the mast, and several contrivances show that the mast was constructed for being laid down aft. Some pieces of tow and a few shreds of woollen stuff, probably the mainsail, were found here. In the forepart of the ship was found a large copper vessel, supposed to be the kitchen cauldron of the equipage, hammered out of a sole piece of copper, and giving a favourable proof of that remote period's handicraft. Another iron vessel, with handles, and with the chain for hanging it over the fire, lay close to a number of small wooden drinking-cups.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

SOCIETY OF ANTIQUARIES.—At the meeting of this society, held last week at Burlington-house, Mr. G. Knight Watson read, in the absence of the author, Mr. R. S. Ferguson, M.A. (local secretary of the society for Cumberland), a paper entitled "A *résumé* or report on recent important antiquarian discoveries in the counties of Cumberland and Westmoreland." In it he gave a detailed account of some excavations near Brough, which had resulted in the discovery of two or three curious cists containing skeletons, with the vessels for food, as usual by their side, and sundry other cinerary remains, implements, and pottery of a rude type. He also recorded the partial examination of a Roman camp situated on the sea-coast near Maryport, in Cumberland, on the property of Mrs. Pocklington-Senhouse, of Netherhall; and intimated that further researches were about to be made on the spot. Here had been found a mutilated inscription on stone mentioning the XXth Roman legion; and also the foundations of a Roman road. Also in a cist in the neighbourhood had been discovered sundry rude implements of the Bronze period. Many of these had been dug up under the supervision of Mr. Robinson. Mr. E. Peacock also read a short paper on the antiquities of the parish of Scotton, in Lincolnshire, which once belonged to the Nevilles and the Busseys, who had erected in it a church, which had some interesting features, and at present had almost entirely escaped the hands of the restorer. The old stained glass which adorned its windows was full of armorial bearings of the Nevilles and Busseys, and so were the bosses of the ceiling. Thanks were voted to the authors of the above two papers, and to the donors of sundry books to the library of the society. Among the objects of interest exhibited were three old wooden panels from an old house at Baston, in the parish of Keston, Kent, painted with portraits of Athelstane and other Saxon kings, and executed probably as early as the reign of Edward IV., a rubbing of a curious Runic inscription which had been found on a stone in Cumberland, and had been submitted to Professor Stephens, of Copenhagen, to be deciphered; also sundry photographs of the articles mentioned in Mr. Ferguson's paper as having been lately found in Cumberland and Westmoreland; and, lastly, some coins of the reigns of Constantine and of the later Roman Emperors, forming part of a large hoard which had lately been found accidentally by an artisan on the banks of the river at Bitton, near Bristol.

COMPETITIONS.

RADCLIFFE.—The directors of the Radcliffe and District Conservative Club Company, having decided to proceed with their proposed new building, lately invited several architects to submit designs in competition. From the number submitted, the directors have selected those sent in by Mr. William Dawes, of 2, Copper-street, Manchester, and have instructed him to prepare the necessary drawings, and obtain tenders for the work. The site for the new building is situated near the new railway station at Radcliffe.

Building Intelligence.

BARNTON.—Through the munificence of Mr. S. Wade, of Winnington, a great improvement has been made in the chancel of Christ Church, Barnton, by the addition of a handsome stone reredos. It has been designed and worked entirely by Mr. Wade. The centre-piece, which is placed in a recessed panel, is a representation of the last supper, carved in Caen stone, after the picture of Leonardo da Vinci. The remaining space on each side, which is divided from the centre by panelled buttresses of red stone, on which are entwined monograms of the Trinity, is filled in with three sunk and moulded panels, the centre arch of each panel resting on carved caps, supported by red columns with intermediate thin bands left solid. The lower part of the reredos from the floor to the height of the Communion-table, consists of alternate courses of red and white Grinshill stone.

BUDE.—A new Wesleyan Chapel at Bude was opened last week. It is built in the Byzantine style. The walls are of Plymouth limestone, with Bath stone dressings, and granite plinth. Over a three-light window at the eastern end of the structure is a stone carving, representing an angel holding a book, executed by Mr. Harry Hems, of Exeter. At the eastern end is a three-light window, while underneath a recessed Communion space, paved with Maw's tiles. The length of the chapel is about 90ft., breadth about 35ft., and height about 30ft. The chapel will seat about 500 persons. Mr. Hyne, of Plymouth, is the architect, and Mr. Blackley, of Holsworthy, is the contractor. His tender was £1,560.

GOOLE.—The new Board School at Reedness has been recently completed and is now in full work. The site is a very eligible one, being open on all sides and close to the Ouse-bank. The building is faced with white bricks, relieved with red stocks round the openings, and there is a wooden bell-turret over the girls' entrance. The accommodation is for 120 children, including 40 infants, and there are separate playgrounds, lavatories, and every convenience. The design is by Mr. Clamp, of Hull, and was chosen in competition, and the works have been carried out under his superintendence by Mr. Ledger, builder, of Snaith.

GREAT THURLOW.—St. Mary's parish-church, Great Thurlow, West Suffolk, was reopened by the Bishop of Ely on Thursday, the 10th inst. after complete restoration, that of the nave being effected at the cost of the Rt. Hon. W. H. Smith, M.P., and that of the chancel by the parish. While the external walls were being stripped from plaster, it was found that the chancel had been cut down in modern times. It is now fitted with oak stalls, and with a carved and panelled reredos, and super-altar in the same wood. The new benching is also of oak, freely carved, in character with the few old stalls. The nave was formerly covered with a flat ceiling having an elaborate cornice; this ceiling is replaced by an open roof of oak. The tracery of the windows has been renewed, and the pebble-work of exterior freed from white-wash and plaster. The bells have been rehung by Messrs. Taylor, of Loughborough, and a new organ, by Mr. Holditch, placed on north side of choir. Mr. W. M. Fawcett, M.A., of Cambridge, was the architect, and Messrs. Mason and Green, of Haverhill, were the contractors.

GREAT YARMOUTH. — New Congregational schoolrooms and lecture-rooms, just added to the rear of Middlegate Chapel, were opened on Thursday, the 17th inst. The buildings are plain structures of modified Gothic character, the walling material being red brick. On the ground-floor, facing South Howard-street, are the principal and subordinate entrances, four class-rooms, minister's vestry, lavatories, and w.c.'s, and over these is a lecture-hall seated for 300 persons. The latter room has a carved wood ceiling, wood dado round all walls, a raised platform in recess at east end, and these and all the wood fittings are of pitch-pine, stained and varnished, except the platform chairs, which are of oak. Howarth's revolving ventilators are fixed in the roof. Contracts have been entered into for erecting new front to present schoolrooms, next Middlegate School, in keeping with the chapel. Messrs. Bottle and Olley were the architects, and Messrs. E. Howes and L. Cooper the chief contractors. The alterations and additions have cost about £3,000.

INCORPORATED CHURCH BUILDING SOCIETY.—The usual monthly meeting of the Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels was held on Thursday week. Grants of money were made in aid of building new churches at Glascote St. George, near Tamworth, £100; Romanby, near Northallerton, £80; Stockton-on-Tees, St. Peter, £335; and Gower-road, in the parish of Loughor, near Swansea, £150. Rebuilding the churches at Newbold Pacey, St. George, near Leamington, £50; and Llanfihangel Nant Bran, near Llyswen, Brecon, £50. Enlarging or otherwise improving the accommodation in the churches at Buckland, St. Michael's, near Broadway, Gloucester, £20; Colwall, near Malvern, £30; and Eccles, St. Mary, near Attleborough, Norfolk, £15. Under urgent circumstances, the grants formerly made were increased from £120 to £150 towards building the church at Brynamman, in the parish of Cwmamman, near Llanelly, and towards restoring the church at Luppitt, near Honiton, Devon, from £35 to £60. A grant was also made from the special mission buildings fund, towards building a mission church at South Hackney, Middlesex, £50.

KEYINGHAM, YORK.—A new vicarage has been built here at a cost of £1,500. The accommodation comprises an outer lobby, with parish-room or study adjacent; hall and staircase, 14ft. by 13ft.; drawing-room, 18ft. 6in. by 14ft.; dining-room, 18ft. by 13ft.; kitchen, 14ft. by 14ft., with scullery, larder, and out-buildings. On the upper floors are 7 bedrooms, bath-room, and w.c. The building is plain and substantial in appearance, but not devoid of character, and the interior finishings are of the best materials and workmanship. Mr. R. Clamp, A.R.I.B.A., of Hull, is the architect. Stabling and other buildings are about to be erected in connected with the vicarage, the plans having been approved by the Ecclesiastical Commissioners.

KILLAMARSH, NEAR CHESTERFIELD.—Messrs. Innocent and Brown, architects, of Sheffield, have just added another school to the fine series they have erected in and about the Sheffield district. The Killamarsh School Board have caused a building to be put up for the accommodation of 521 scholars (160 boys, 160 girls, and 201 infants), and this being completed, the building was opened upon the 16th inst. The style of architecture is of an English Domestic type, and stone from the Dunford Bridge and Ancaster quarries have been used. The site is an elevated one, and the grouping is of a picturesque character; the roofs are covered in by Welsh slates, surmounted by Berkshire ridge creases. Each of the three schools has its own especial pair of classrooms, and cloak room and offices, and a master's room is incorporated with them. The schools face towards Belk-lane, and are separated from it by a dwarf wall, and wrought-iron railings. The general planning is excellent, and the fittings are all thoughtfully worked out. The various rooms have a dado of pitch-pine up to the level of their window-sills. The floors of all the larger rooms are laid with wood blocks. The building is warmed by hot water. The contractors were:—Mr. J. Lister, Aston, builder; Mr. Holden, Sheffield, for the warming apparatus; Mr. Harry Hems, Exeter, carver, and Messrs. Redmayne, May, and Co., Sheffield, for the desks and similar fittings. Mr. W. West Mabson acted as clerk of the works.

LONDON.—The City-road Wesleyan Chapel, which was partially burnt in December last, has been reopened after restoration. The fine plaster enriched ceiling, which was 100 years old, has been reproduced from castings of the remaining fragments of the ornament, and decorated and gilded in a very effective manner. The lighting is by two sun-burners, replacing the former plan of a ring of burners round the gallery. The ventilation has been carefully studied. All the interesting monuments have been most religiously restored, precisely as before, including one of the fine ganite monoliths supporting the apse arch which was erected as a monument to the memory of the late Dr. Waddy. The morning or small side-chapel has a new and original roof of panelled pitch-pine with ceiling light, with an outer one glazed with Rendle's glazing. The effect is very good, and acoustically it is perfect. The warming of the whole is by Grundy's system. The architect is Mr. Charles Bell, of Dashwood House, 9, New Broad-street, City, and the builder is Mr. J. D. Hobson, of the Adelphi.

ROSSENDALE, LANCASHIRE.—The prospects of the building trade are reviving in this district. The parish-church of St. Mary's, Rawtenstall, is to be enlarged, and partially restored, from the designs of Mr. L. Booth, of King-street, Manchester. Other works which the same architect has in progress in the neighbourhood, are three large blocks of middle-class dwelling houses, for the Rawtenstall Industrial Society, a Constitutional Hall and Club-house at Stacksteads; schools, &c., for 700 children, in connection with Trinity Church, Stackstead; and schools for 600 children in connection with the new district of St. John, Rawtenstall; the latter to be followed by a church and parsonage-house. All the buildings are being erected of the excellent stone for which the district of Rossendale is noted.

ROTHERHITHE.—The foundation-stone of new baths and warehouses for Rotherhithe was laid on Friday. The building faces the Lower-road, Deptford, and in the centre of front are the entrances to the men's first and second class baths. The first-class swimming-bath is 90ft. by 30ft., and of an average depth of 4ft. 6in.; the sides will be lined with white glazed tiles, and the bottom with white glazed bricks; there will be fifty dressing-boxes inclosed along the sides. The second-class swimming-bath is 84ft. by 30ft., with 47 dressing-boxes of more simple character. There will be 26 first class, and 24 second-class baths, all fitted with hot and cold water. On the first floor of this front are the superintendent's apartments and commissioners' board-room. In Gomm-road are entrances leading to the women's private baths on first floor; seven first class and eight second class, and engineer's apartments on same floor. On the ground floor is the washhouse department, with 24 compartments, a separate landing for the establishment itself, furnished with lifts, and in basement are the boiler-room, engine-room, workshop, coal and other stores. The buildings, externally, will be faced with white Suffolk bricks, with stone and terra-cotta dressings. The floors throughout will be fireproof, Messrs. George Ellington and Sons, of Cannon-street, City, are the architects. Mr. William Shepherd, of Bermondsey New-road, the contractor for building tanks (taken at £10,735), and for engineering works, Messrs. J. and F. May, of High Holborn, whose contract amounts to £3,260.

SCHOOLS OF ART.

KING'S COLLEGE, LONDON.—The new Schools of Art will be formally inaugurated and the prizes distributed to the students of the General and Applied Science Departments by the Duke of Connaught on Saturday, July 3, at 4 p.m. There are two schools of art recently started—one a school of practical art, under the direction of Professor Glenny, in connection with the department at South Kensington; the other a special school, under the direction of Professor Delamitte, endowed by a grant from "the City and Guilds Institute," as a school of "Practical Fine Art," dealing with the application of the artistic principles to various forms of design and manufacture. The instructions given in these schools is independent of the regular course of training for the students of the Applied Science Department. The schools, which are large and spacious, will accommodate about 120 students, and are to be open both morning and evening.

The City Commissioners of Sewers accepted on Tuesday the tender of Messrs. Jakes, Coulston, Stokes, and Co., for the supply of cast-iron work for three years. The salary of Dr. Sedgwick Saunders, medical officer of health for the city, was increased from £700 to £900 per annum.

The first stone of a school-church (St. Mark's), for the populous district adjoining the railway-station, Wimbledon, was laid on Wednesday evening last. The part to be built first will accommodate 300 persons. The architect is Mr. Charles G. Maylard, of 67, Strand, and the builder, Mr. Mark Manley, of St. George's-road, Regent's Park.

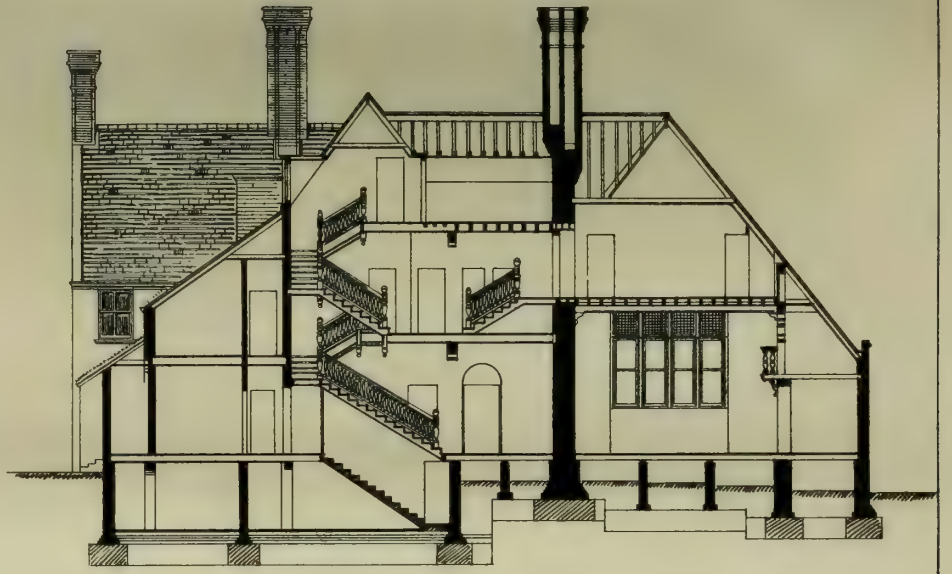
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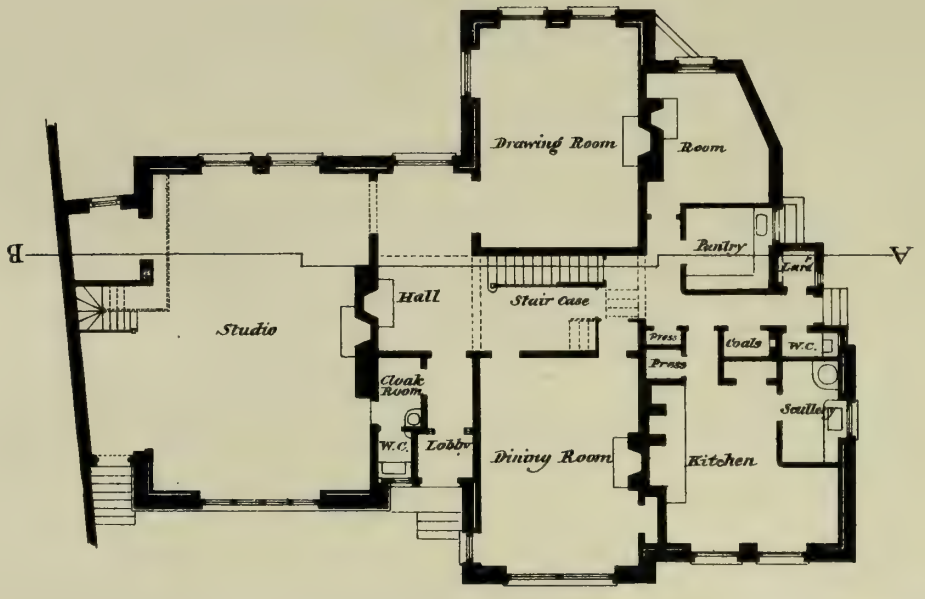
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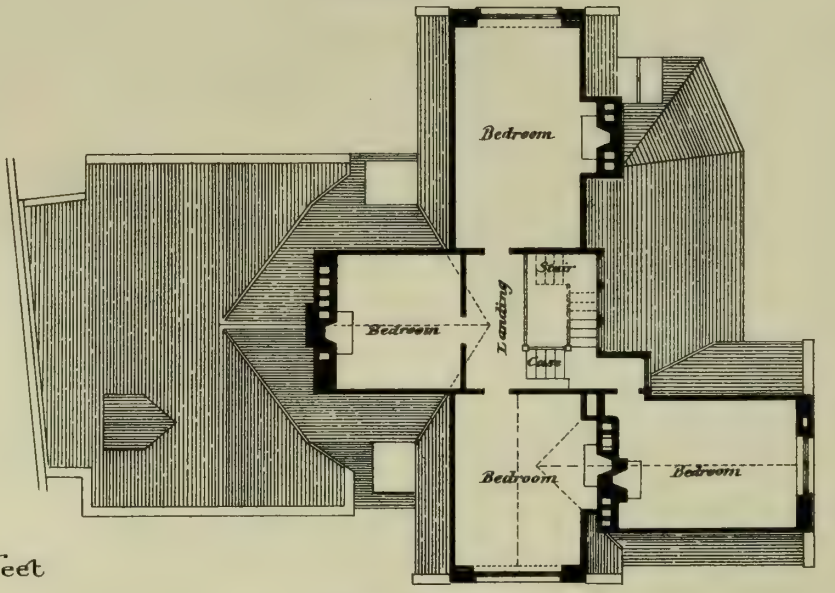
First Floor Plan



Section on line A·B·



Ground Floor Plan



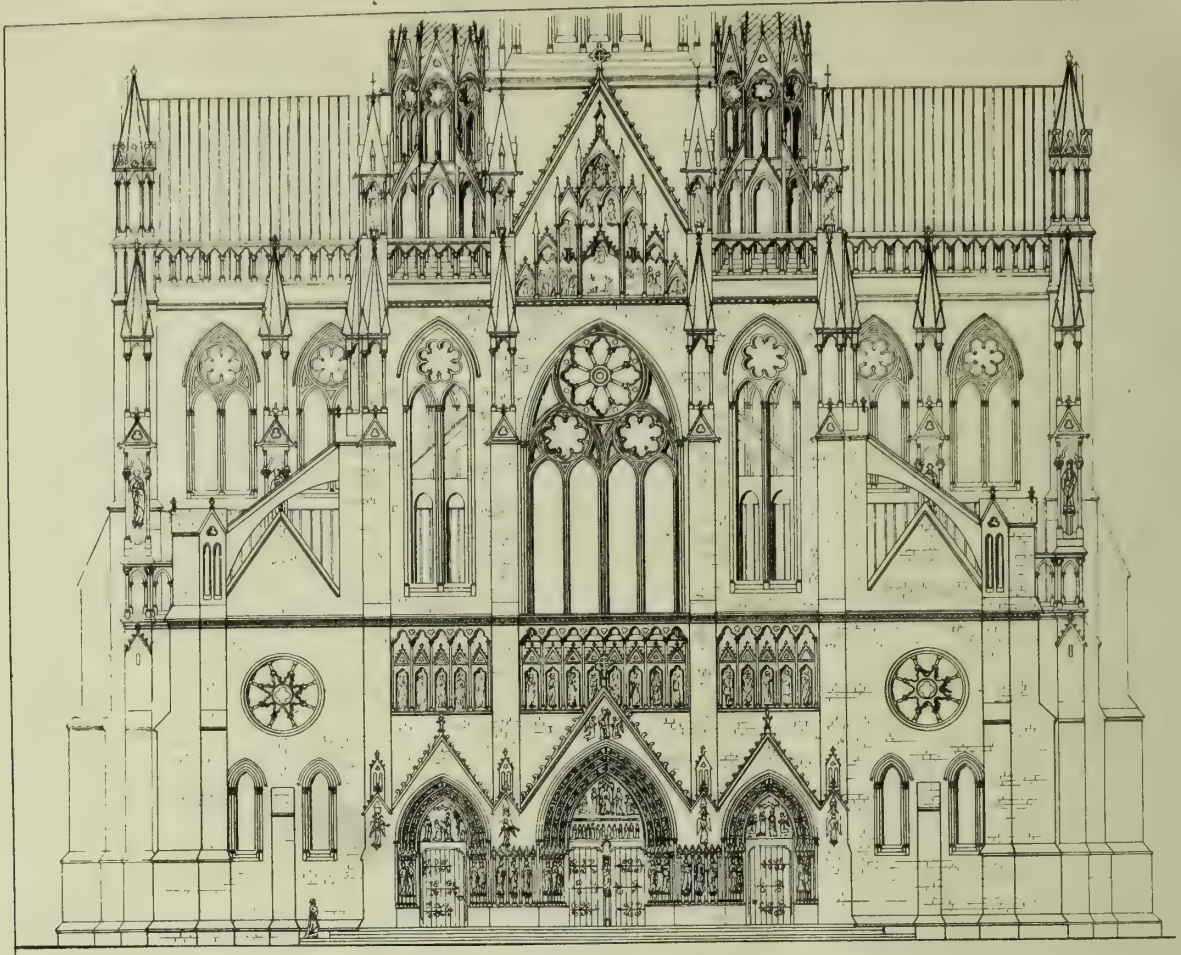
Attic Floor Plan

Scale of feet



MAURICE B ADAMS DELT

ARTISTS' HOMES · No 4 · Lugar Lodge · KENSINGTON · Mr Colin · Hunter's · House & · Studio ❋ *John J · Stevenson Architect*





DESIGN FOR A 13TH CENTURY

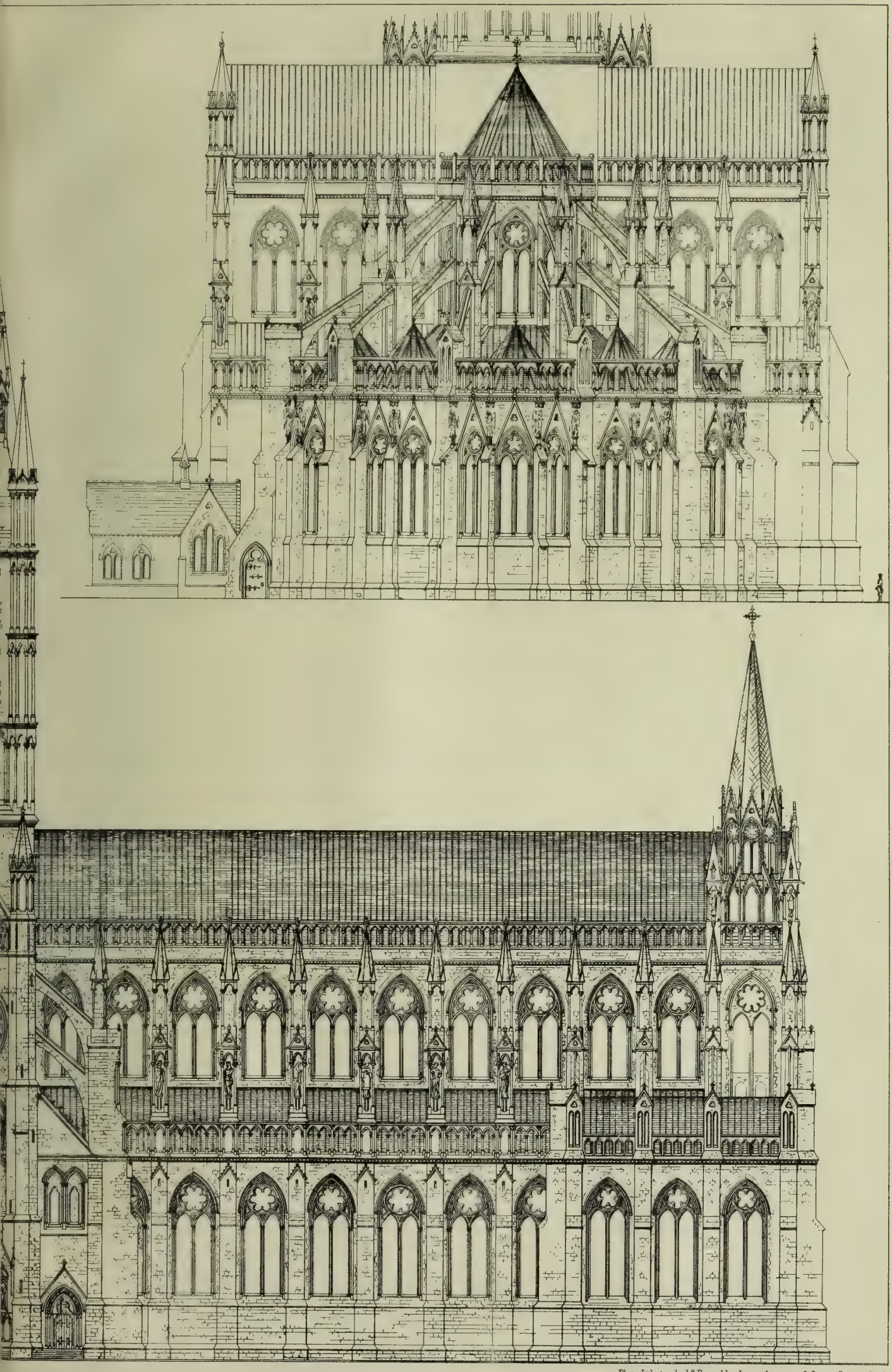
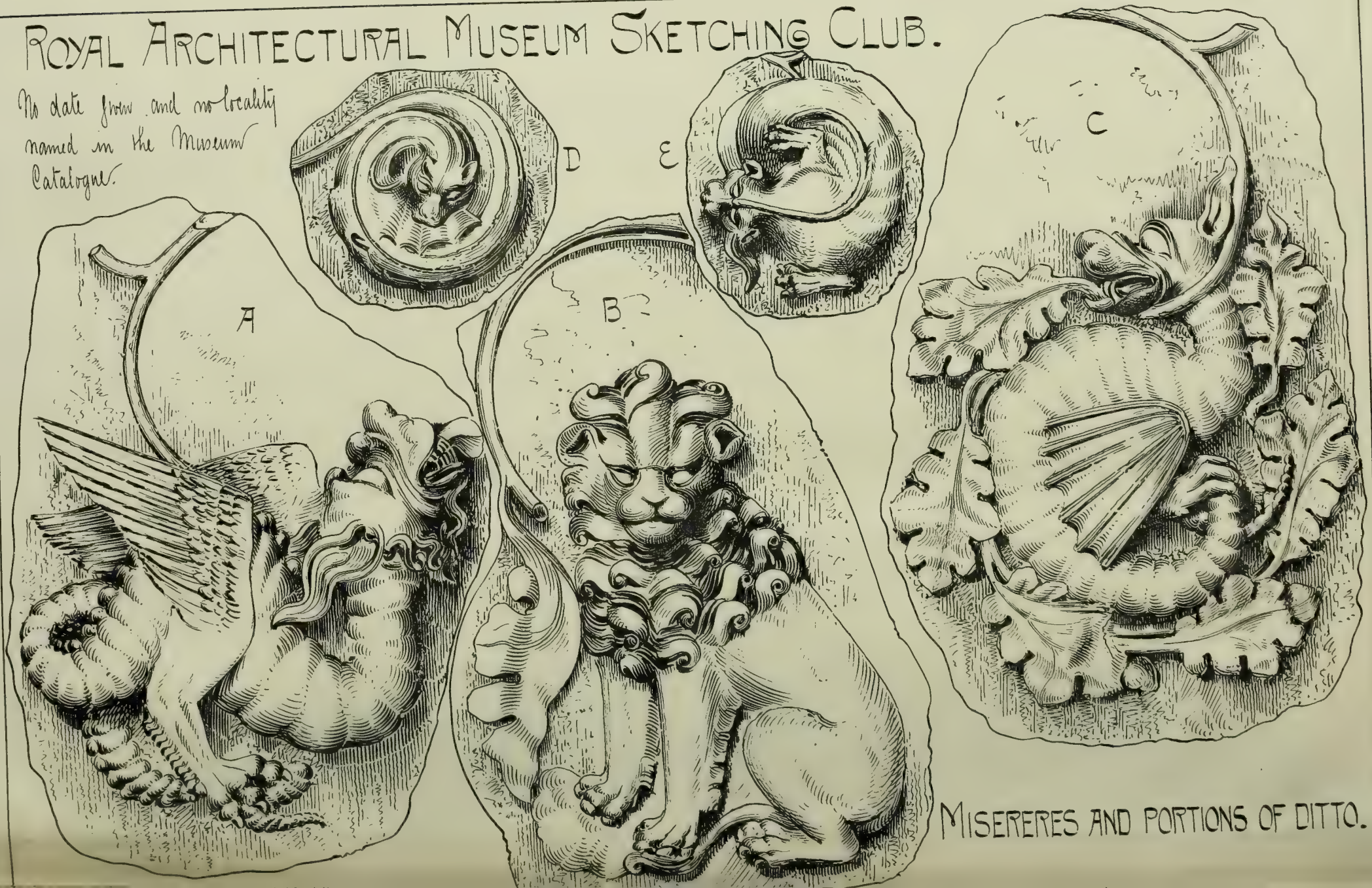


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HEDRAL. R. P. PULLAN. ARCHITECT.

ROYAL ARCHITECTURAL MUSEUM SKETCHING CLUB.

No date given and no locality named in the Museum Catalogue.

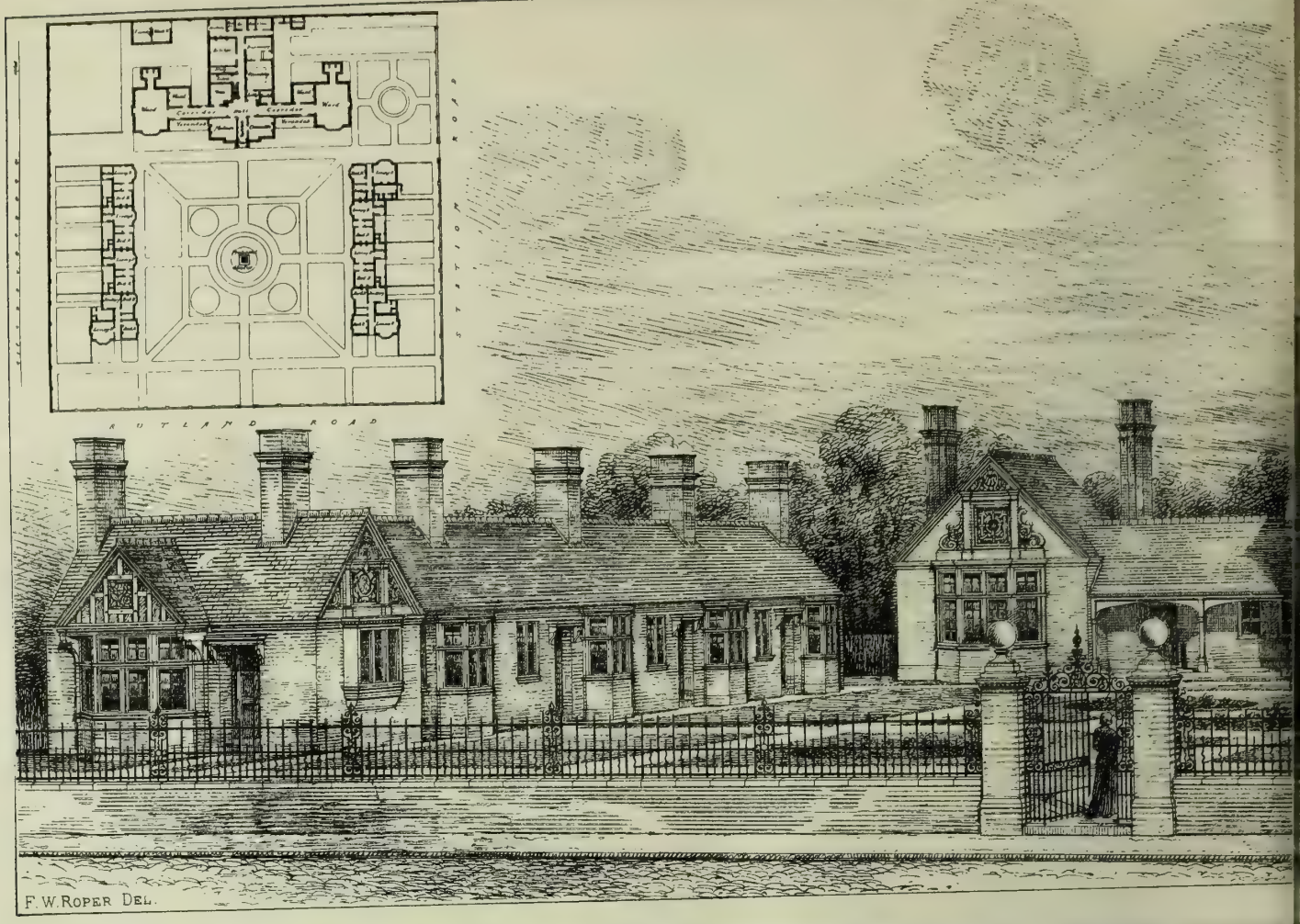


MISERERES AND PORTIONS OF DITTO.



J. Frost. Pennington
del: March 1880.

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SKELDERGATE · BRIDGE · and Approaches YORK

THE "ROUS MEMORIAL" BUILDINGS : NEWMARKET :

FREDERICK · W · ROPER : ARCHITECT :



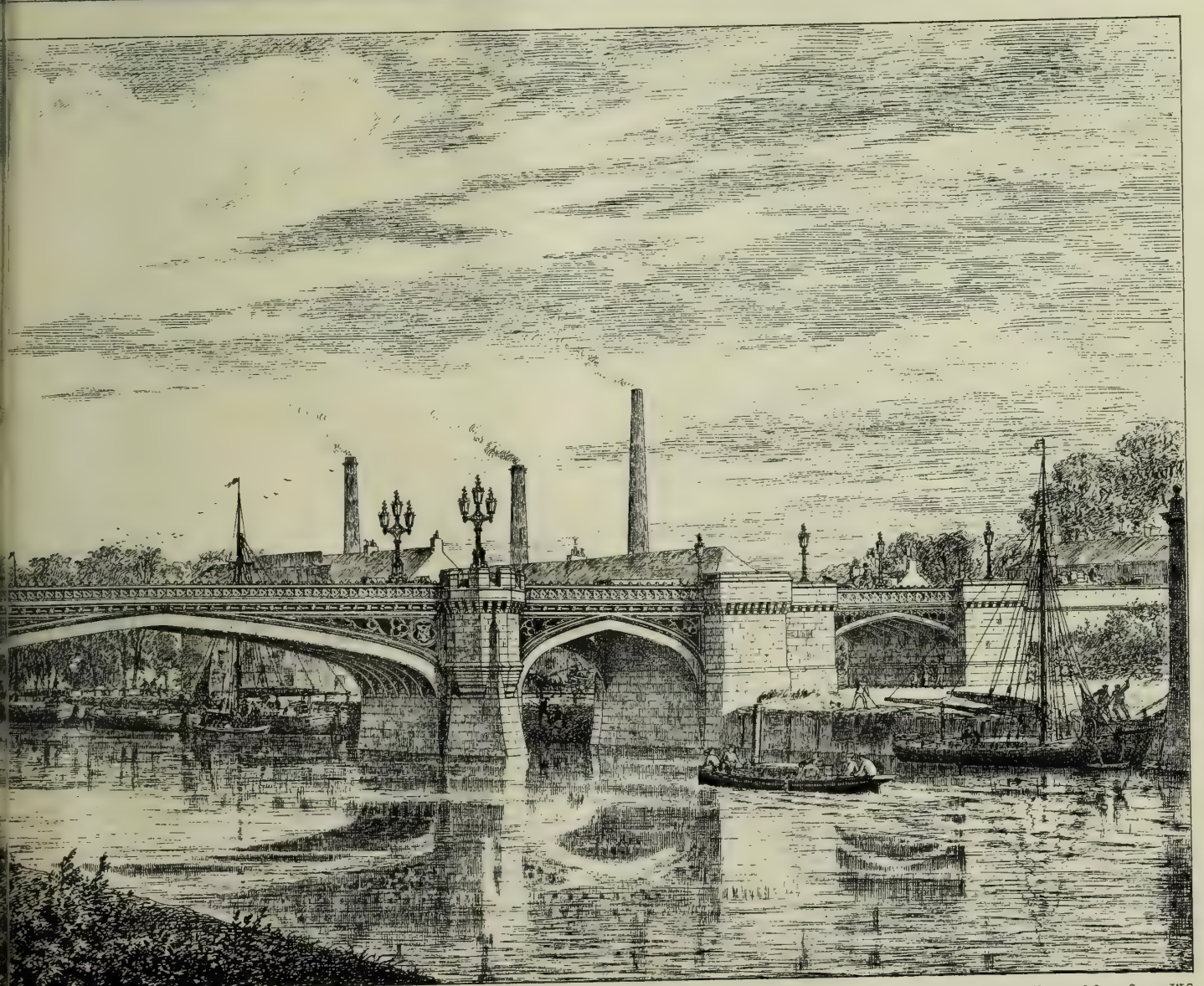
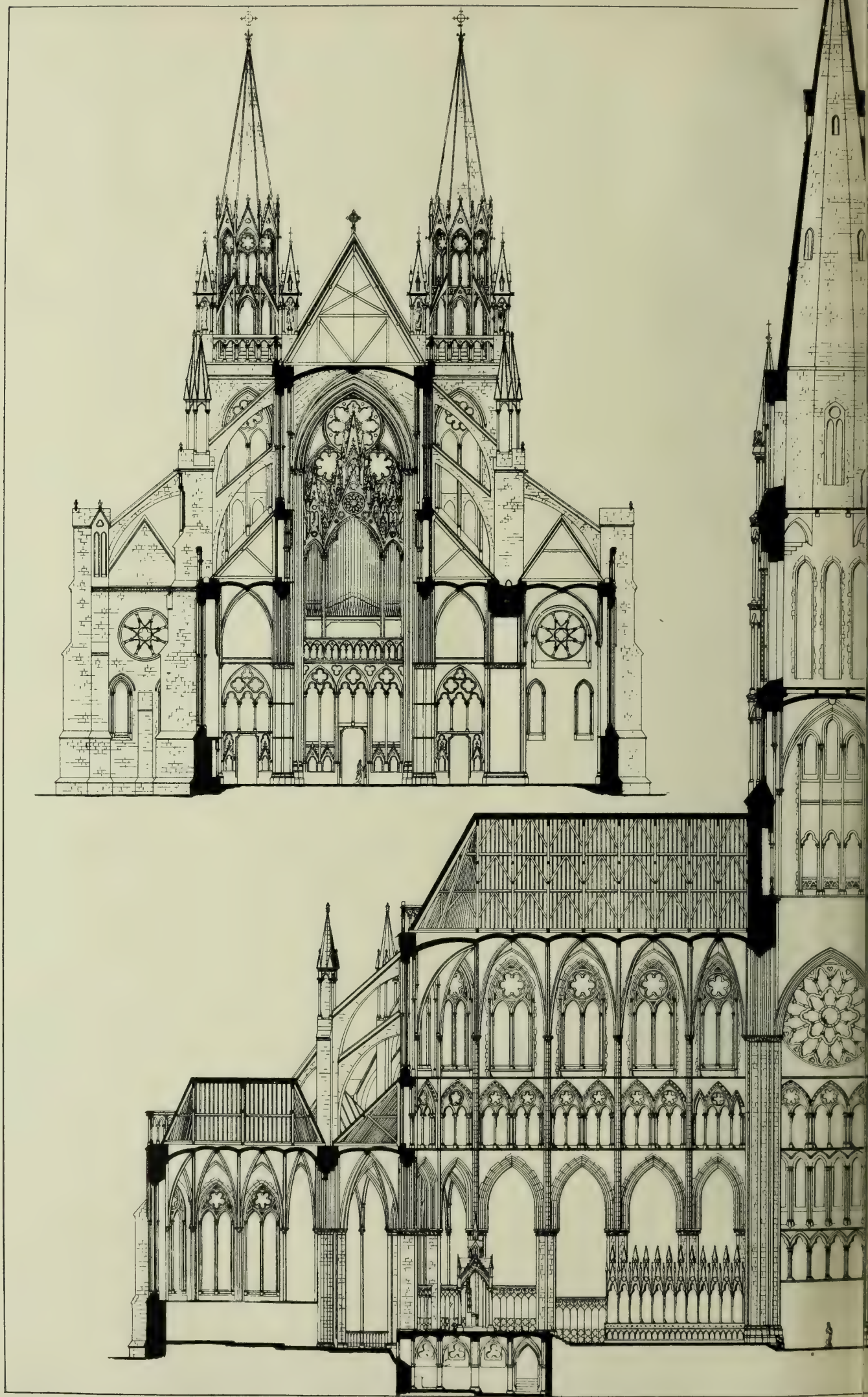


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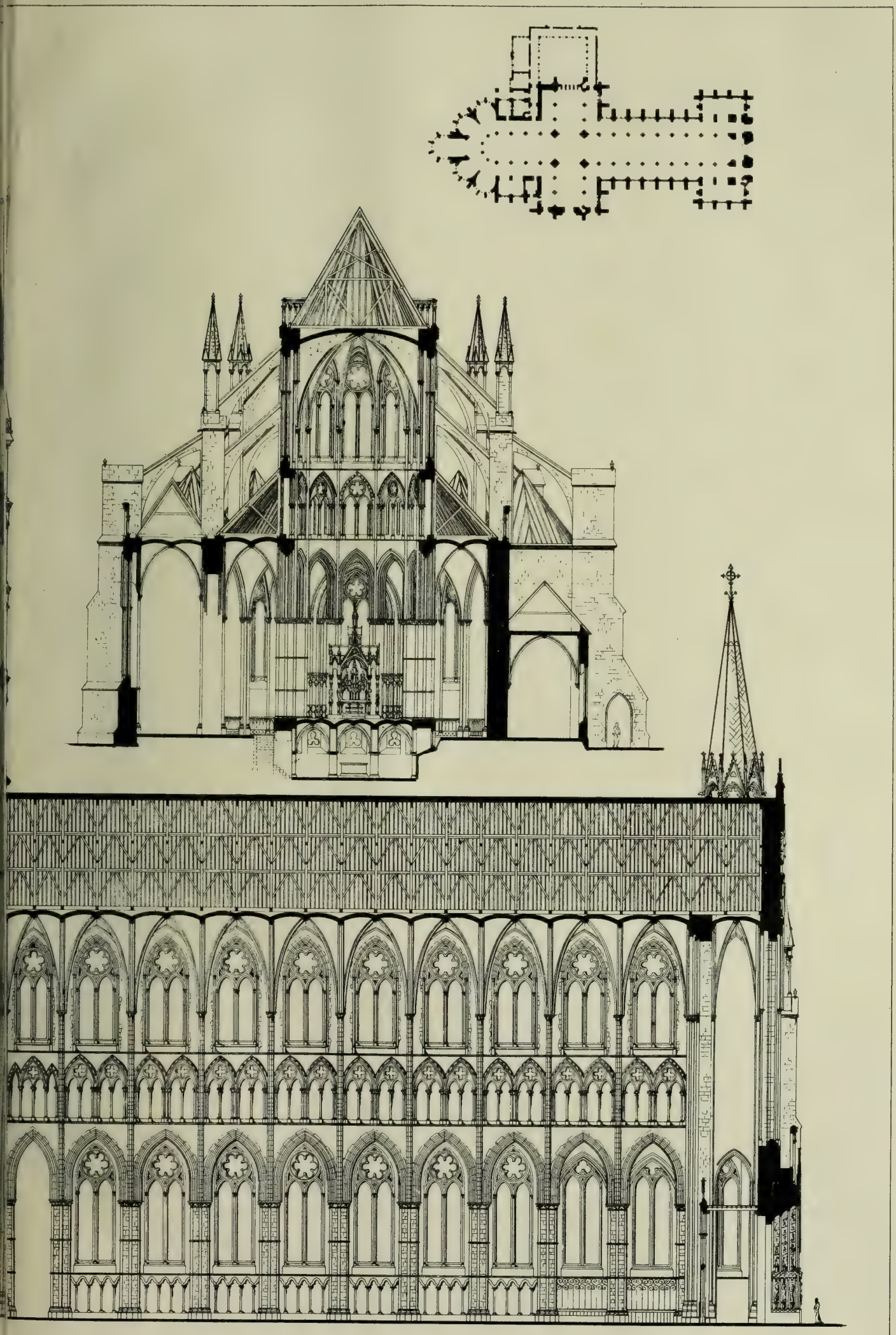
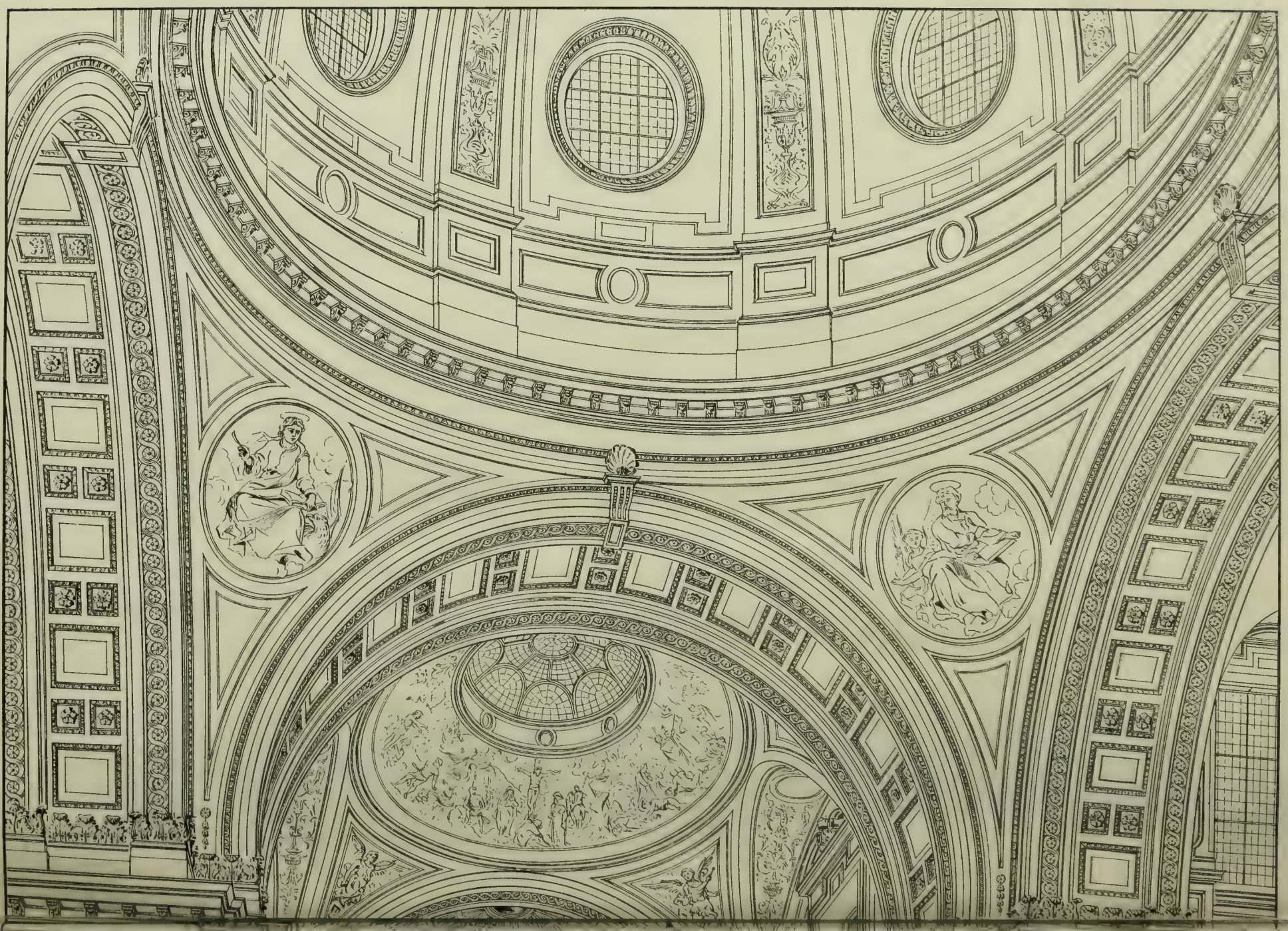


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ATHEDRAL. R. P. PULLAN. ARCHITECT.



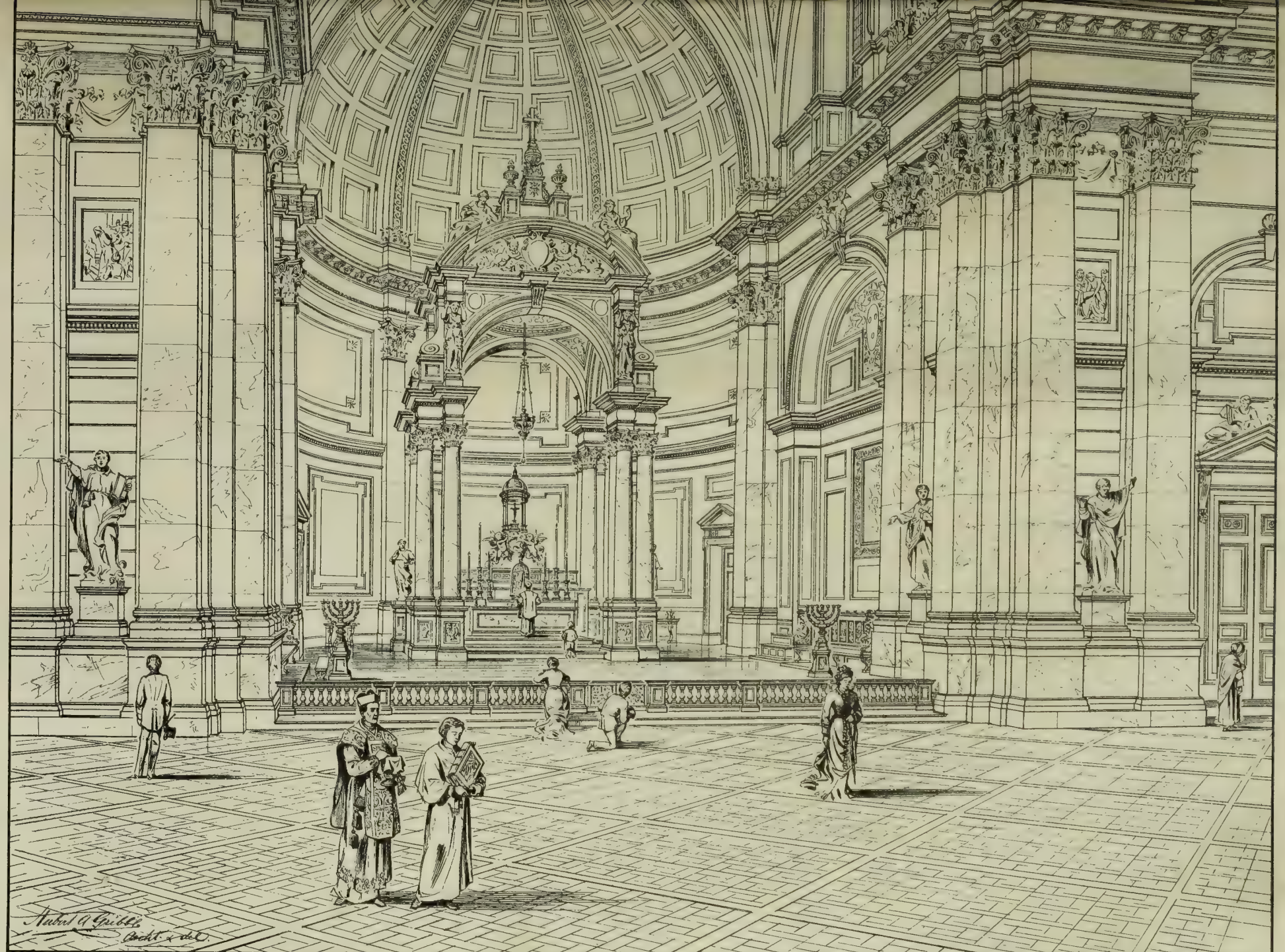


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NEW CHURCH OF THE ORATORY S. KENSINGTON . VIEW OF THE SANCTUARY

HERBERT A GRIBBLE A.R.I.B.A. ARCHITECT

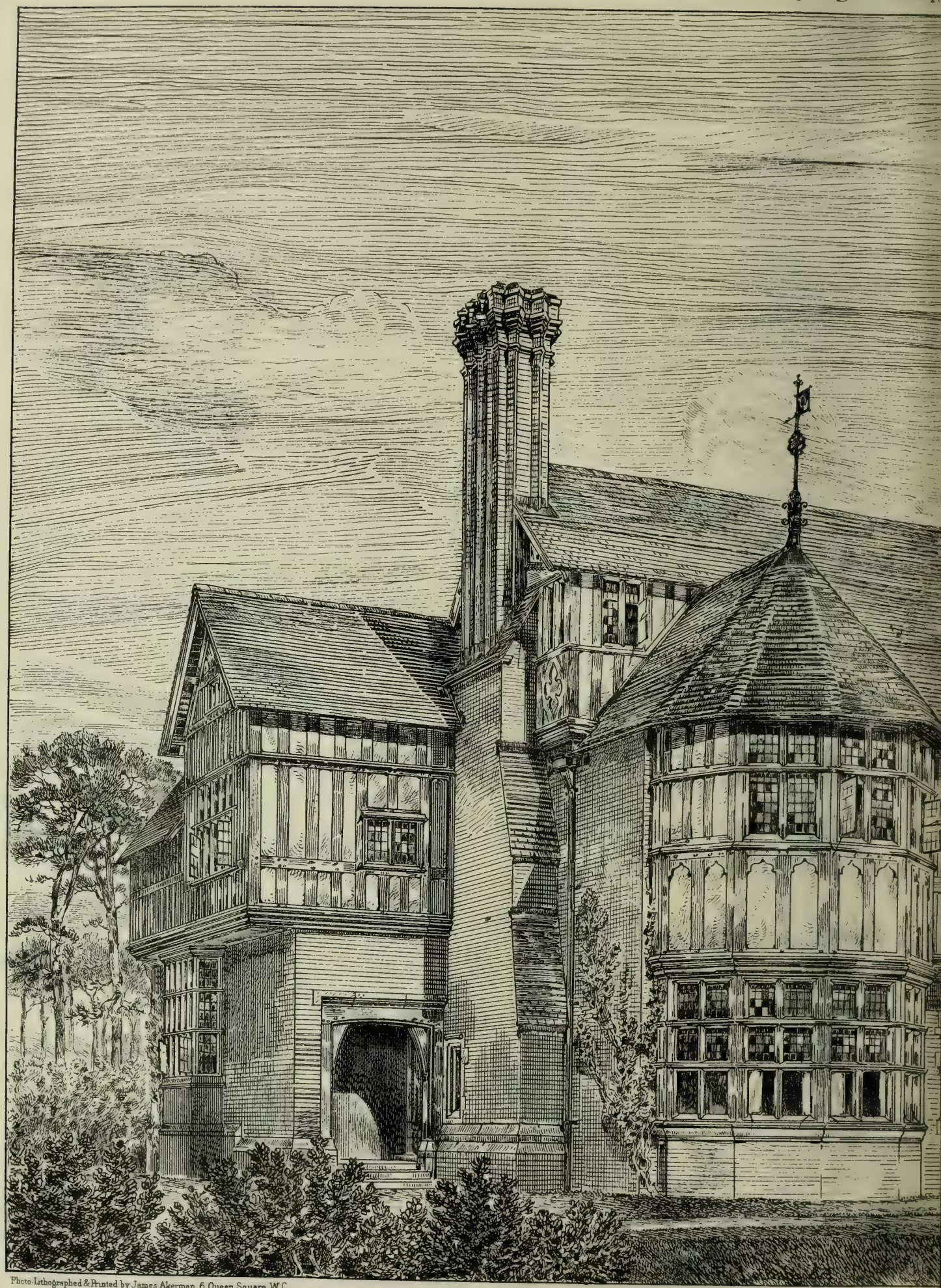
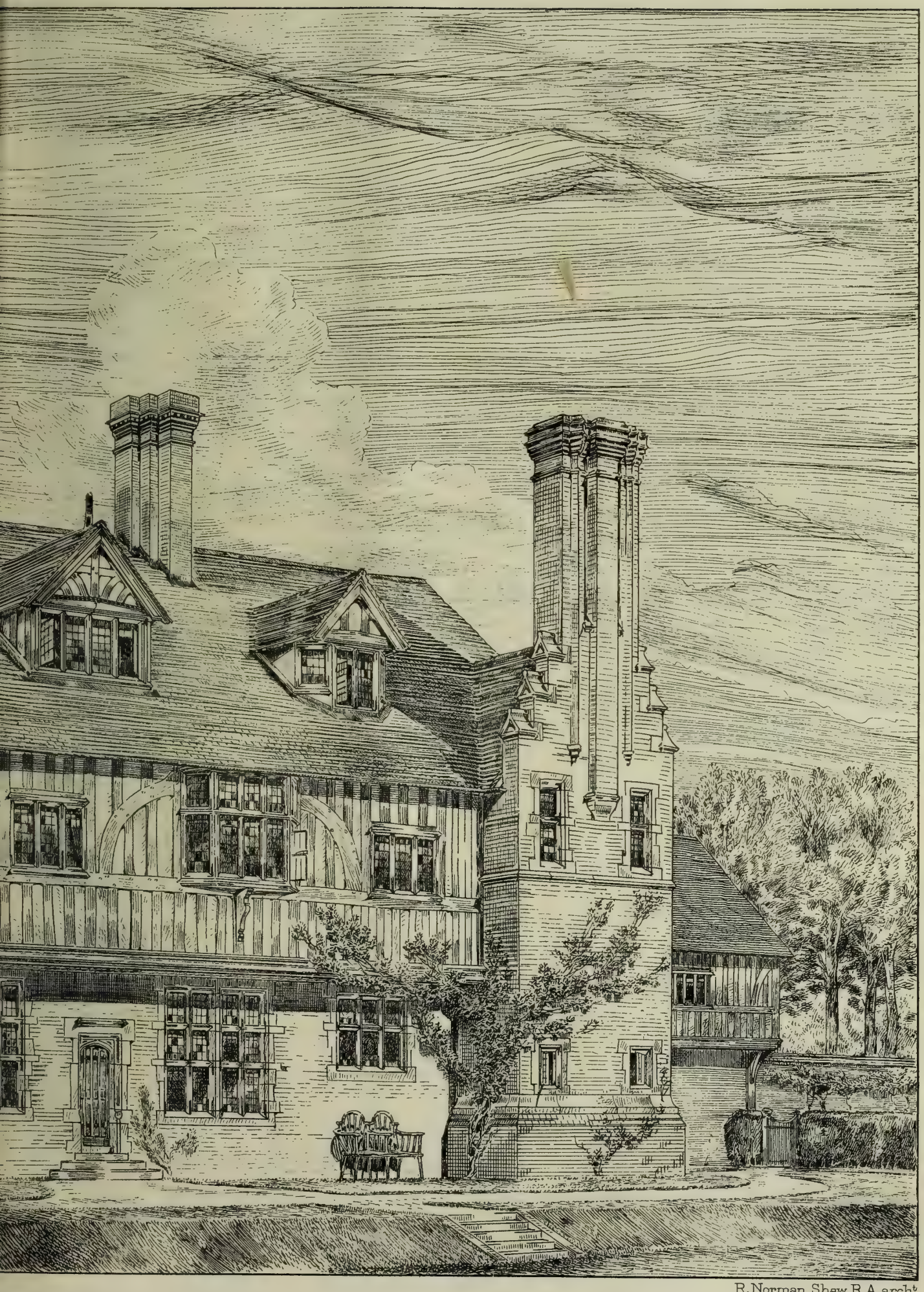


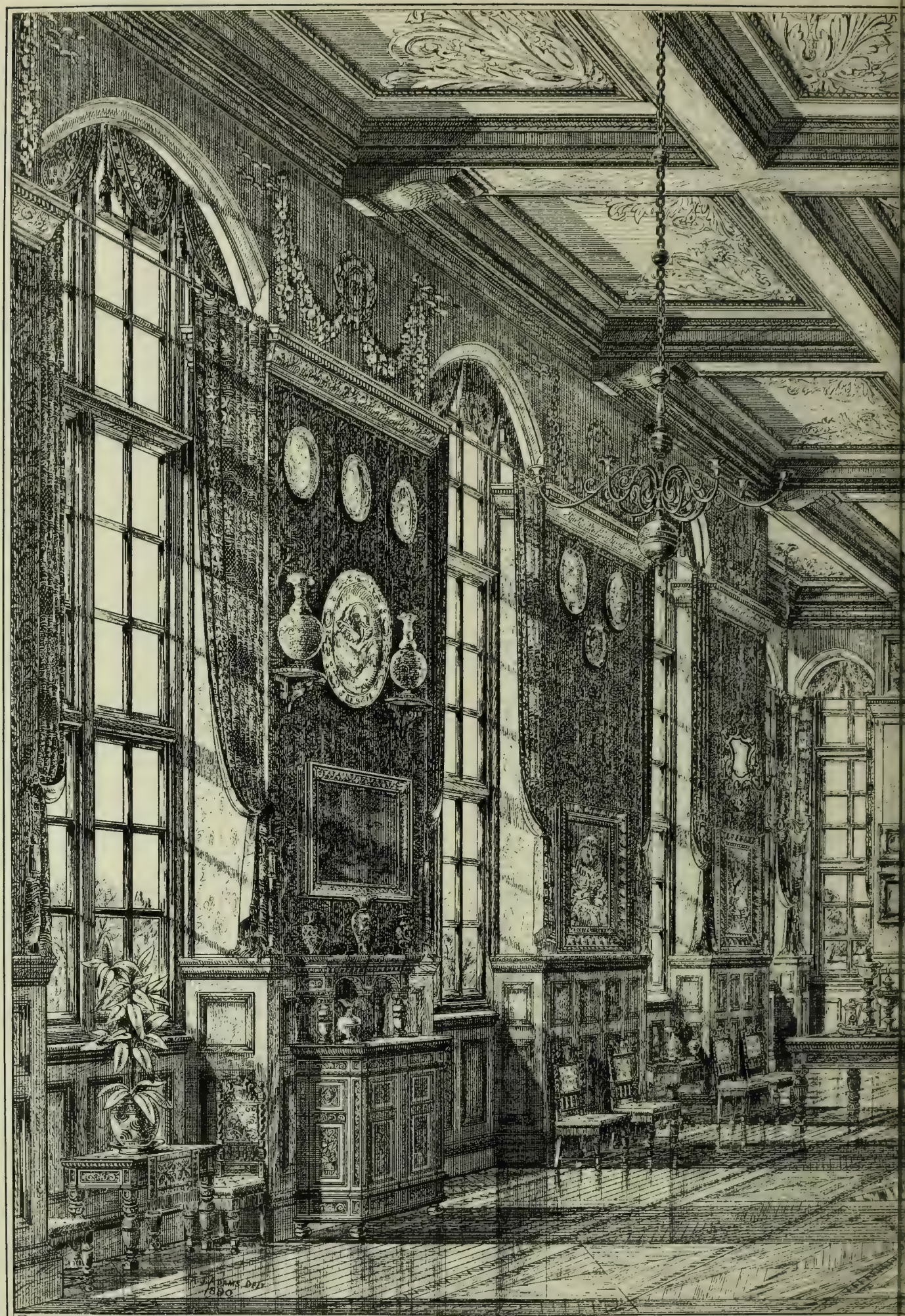
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House at



R. Norman Shaw R.A. archt

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KENHILL : NORFOLK .
EDWARD GREEN ESQUIRE

GRAND



SALOON

J. J. STEVENSON. F.R.I.B.A. ARCHITECT.

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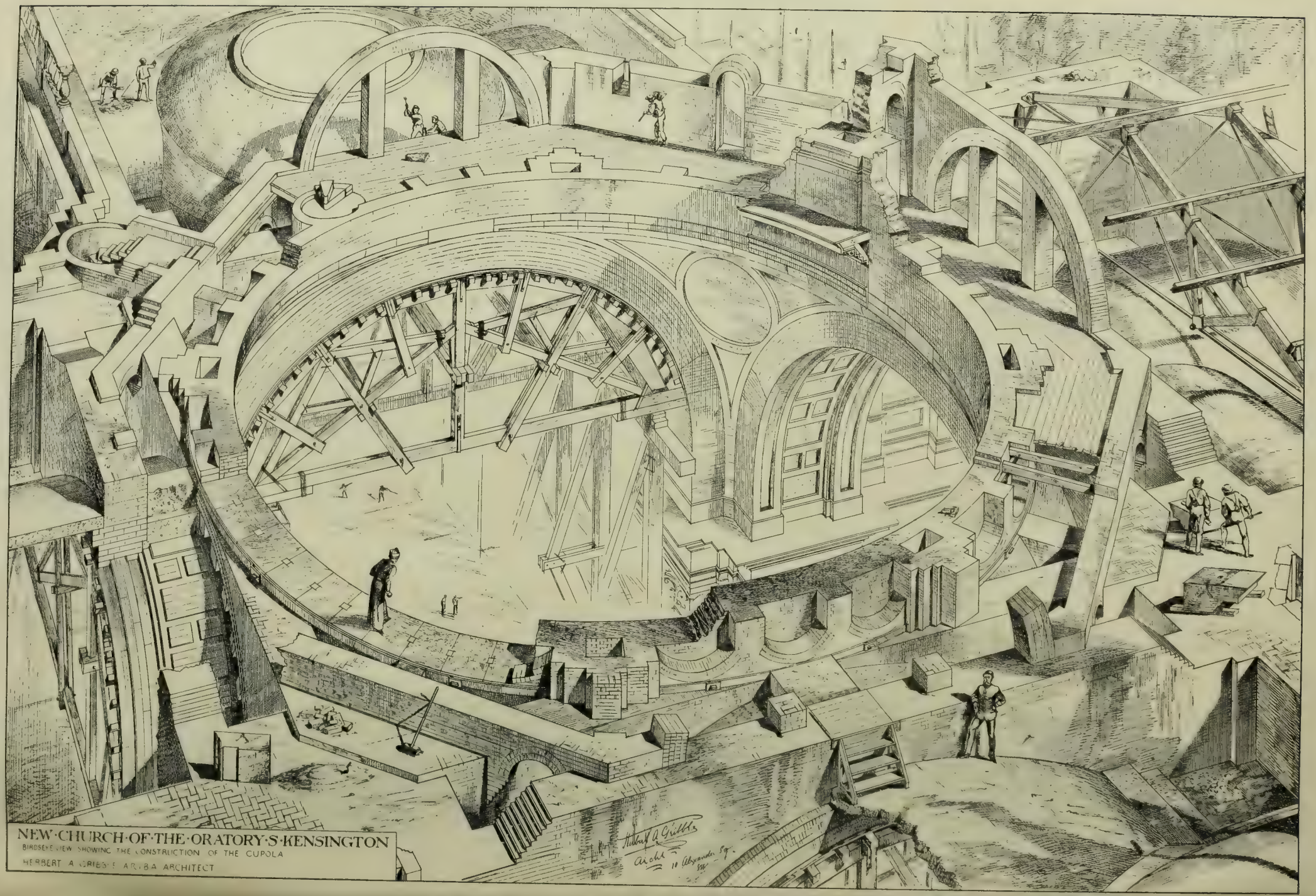


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Little Morcton Hall Cheshire.

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OUR LITHOGRAPHIC ILLUSTRATIONS.

ROYAL ARCHITECTURAL MUSEUM SKETCHING CLUB—MISERERES AND FIGURE-CARVINGS.

THIS double-page of sketches, from casts and examples in the Royal Architectural Museum, Westminster, forms another of the series of drawings contributed from month to month by members of the Sketching Club, held in connection with that Institution, under the direction of the Visitor, Mr. Maurice B. Adams, one of the hon. secs. Of these sketches it may be said that they are the work of Mr. T. Frederick Pennington, whose former contributions, like these, have ever been marked with a spirited touch, and keen appreciation of the subject shown. The misereres bear neither date nor locality in the Museum Catalogue, but this fact is of minor importance in the present instance, while it detracts in no degree from the value of the carvings represented. The studies of the Lion and Griffin bearing shields must be useful, and Mr. Pennington has done well to show them from back and front points of view as well as in side elevation. The club's sketching Saturday afternoon trips are held every third Saturday throughout the summer, two of these excursions having this year already taken place. The first was made to Hayes, in Middlesex, when the interesting old church, with its rich south porch and rare lych-gate, were the subjects from which sketches were obtained; and for the second trip Cobham Hall, in Kent, was chosen, special permission to view the house and private grounds having been kindly given the party by Earl Darnley. The old red brick Early Elizabethan mansion stands in a charming glen within the magnificently-wooded park, for which Cobham has always been famous. The church, and almshouses with their row of windmills beyond the churchyard, with the chimneys behind, form a good water-colour subject, and the old cut-brick "Queen Anne" tablets on the cottages in Cobham-street cannot but attract attention. To those who propose a visit to this place, it may be of service to know that Sole-street station, on the Dover and Chatham line, is the nearest by four miles, Cobham-hall from thence being but about two miles distance. From Gravesend it is nearly six. It is proposed to visit Hatfield House during the summer, on permission being obtained.

"ROUS MEMORIAL" BUILDINGS, NEWMARKET.

WE this week give an illustration of these buildings, which are now completed and will shortly be opened. We gave a full description of the hospital and almshouses in our number for December 20th, 1878, founded on an examination of the drawings, from which no deviation has been made in carrying out the works. The hospital will accommodate ten patients and the almhouses ten aged persons. The buildings occupy a position at the junction of the Rutland and Station roads, near the railway-station at Newmarket, and are prominently seen on entering the town. It is intended to erect a full-length statue of Admiral Rous in the centre of the quadrangle where shown on the plan, and indicated by a tree in the view. Until this statue is erected the memorial cannot be deemed complete. The works have been carried out by Messrs. J. and G. M. Bates, builders, of Stevenage, and Mr. D. Fulcher has acted as clerk of the works. Mr. McCulloch, of Kennington-road, carved the brickwork to the gables and panels, which contain the heraldic bearings and monogram of Admiral Rous, and other devices from special designs by the architect, Mr. Fred. W. Roper, of 9, Adam-street, Adelphi, whose design was selected in competition, and under whose supervision the works have been carried out.

SKELDERGATE BRIDGE, YORK.

THE foundation-stone of the bridge, which we illustrate from the picture in the Royal Academy, was laid on the 12th June, 1878, by the Right Hon. William Varey, Lord Mayor of York. The project of erecting a bridge was first mooted about six years ago, and after careful consideration of the advantages to be derived from carrying out such a scheme, the Corporation pronounced in its favour and took the necessary steps to secure its completion. Application was made to Parliament in due course, and on the 14th June, 1875, an Act was obtained empowering the Corporation to construct the bridge. Designs were submitted for their consideration by Mr. Thos. Page, who had been called in as consulting engineer. Mr. Page, however, died before a final selection was made, but the committee obtained the services of his son, Mr. Geo. Gordon Page, with whom they had many consultations before finally adopting a design. The new bridge consists of five arches, three of which cross the river, the two others being land arches for the waterside traffic. The centre arch has a span of 90ft; the two side arches have spans of 30ft. each, and the two land arches have spans of 24ft. each. The 30ft. span next the Lodge is what is termed a Bascule or opening bridge, and is so constructed that it can be easily raised and lowered by hydraulic machinery. Beneath this opening bridge is an invert, 10ft. 6in. below the summer level, formed of brick in cement, 2ft. 6in. deep, supported on a deep bed of concrete on piles. The Bascule bridge is formed with eight wrought-iron girders, affixed to a shaft 10in. in diameter, on which they turn. These eight girders are each 53ft. 6in. long. The portion of the girders overhanging the opening span is about 35ft. The tail ends support the counter-balance weights, and it is at the tail ends that the hydraulic machinery takes its pull. The hydraulic machinery now being fixed is supplied by Sir William Armstrong and Company. It consists of two hydraulic cylinders placed side by side, one for opening and one for closing the bridge. The diameter of each cylinder is 12in., and the stroke 5ft. 6in. The multiplying power is 4 to 1, giving a travel of 22ft. to the chains. The hydraulic force-pump, adapted to work up to a pressure of 7001b. per square inch, is worked directly from the crank-shaft of an "Otto's Silent Gas Engine." The accumulator has a ram 15in. diameter and 7ft. 6in. stroke, with cast-iron weights, &c., and a self-acting apparatus for cutting off the pressure from the pumps when fully charged. The machinery is placed in the abutment behind the lodge. The total length of the bridge, including the abutments of the land arches, is 308ft. 8in. The total length, including the longest retaining-walls of the approach, is 861ft. 8in. The width is 40ft. The foundations of the piers and abutments consist of Memel piles, driven deep into the bed of the river to a depth of 28ft. below summer level; the river-bed was excavated to a depth of about 15ft. below summer level, and the intervening spaces between the piles filled in with Portland cement concrete. The piles were sawn off 10ft. below summer level, and upon them are bedded two layers of York landings, each 9in. in thickness; upon these are built the masonry and brickwork. The whole of the work is faced with Bramley Fall stone, and large bond-stones of the same material are embedded, vertically and horizontally, in the brick core. Both the stone and the bricks were obtained from the old House of Correction, which stood on the site of the ancient prison of the Archbishops of York, adjoining Bail Hill. The piers, 7ft. below summer level, are 17ft. thick, and measure, from point to point of cutwater, 62ft.; the abutments at this level are 52ft. by 14ft. The piers are carried up solid to the underside of the roadway pavement. The springing line of all the river arches is 9ft. 5in. above the summer level. The soffit of the centre arch is 13ft. 1in. above the springing line. The gradient of roadway of the river arches is 1 in 108. The centre arch is composed of 7 main ribs; the 5 internal being 6ft. apart from centre to centre, and the face rib being 8ft. from the centre of the one adjoining the roadway. The whole of these ribs, springing from cast-iron skewbacks, are of wrought iron. The cross-bracings are of wrought iron, and the roadway-floors are composed of corrugated wrought-iron. The label-mouldings, spandrels, shields, cornice, parapet, bosses, and pateræ are of cast iron. The 24ft. land-arches are entirely of cast iron, with the exception of the corrugated roadway-flooring. There are wrought-iron trams for heavy traffic, going from end to end of the bridge. The roadway of the bridge is 24ft. wide between curbs, and will be paved with wood blocks set in bitumen. The footpaths, 8ft. wide on either side, will be covered with asphalte. The details of the bridge as originally designed were illustrated, together with general sketch of the first proposal, in the BUILDING NEWS of May 24, 1878. The corporation originally invited tenders for the construction of the bridge, but ultimately decided to divide the work, intrusting the iron-work to Messrs. Handyside and Co., of Derby, and doing the foundations and masonry by its own workmen under the direction of Mr. Hyan, the city surveyor; Mr. George Gordon Page, M. Inst. C.E., of London, is the engineer; and Mr. Robert Nunn, the resident engineer. It is anticipated that the works will be completed at about the end of August, 1880. The approaches have involved a considerable amount of work. The total cost of bridge and approaches will be about £50,000.

ARTISTS' HOMES, NO. IV.—MR. COLIN HUNTER'S HOUSE, KENSINGTON.

THE subject of our illustration to-day is located in a retired part of Kensington, in the Melbury-road, Holland-park, and has all the characteristics of a suburban dwelling, with an unprotected frontage closely arranged with reference to the public road. "Lugar Lodge" is in immediate command of a true north light, and this has been skilfully made the most of by Mr. J. J. Stevenson, the architect, in designing Mr. Hunter's studio, the chief window of which is seen to the left hand of our perspective view. By this drawing, executed as it is from sketches on the spot, aided by a good photograph by Messrs. Bedford Lemere, the architectural treatment chosen by the architect at once proves the wisdom of the change which was made, after the contract drawings were signed, from a more cottage-like style of building that had first been determined upon. The external walls are of red brick, having cut-brick jambs, reveals, and arches, the carved panels and gables being executed in the same material. Stone moulded sills are used to all openings, and with much success, in a manner quite in harmony with the style chosen. This is a point of considerable interest and importance, inasmuch as cut-brick sills are always more or less faulty, while lead aprons are very frequently objected to for more reasons than that of appearance, and Portland cement, with tiles as a finish, over cut-brick sills, cannot in any way be considered a good or neat method. The roofs here are covered with red tiles, and the external sashes and frames are finished in white, the doors and side-lights being painted a dark bronze green. The chimney in the centre of the right end gable, immediately over bedroom window, does not come at all happily, and the angle window of the day nursery, projecting simply from a recessed wall, is by some found fault with for this very reason, that the main wall seems to be set back only to bring the window forward. Entering by a well-sheltered porch, through a good-sized lobby, which protects the hall from north winds, the visitor cannot help observing how nicely the fittings and joinery details are executed in the hall vestibule of

the house. At the end a conservatory is screened by a trellis from the glass-house studio adjoining, the former opening into the drawing-room by its side window. The colour of the hall and staircase wall is salmon red, the woodwork being throughout these parts a very dark green with cornices in drab, and ceilings in blue. The balustrade to the stairs from top to bottom is of walnut, finished in a dead polish. The dining-room may be described first, it being nearest to the hall-entrance, as will be seen by our plan. The scheme of decoration has a quiet and thoroughly artistic effect, though for a north aspect it might be thought rather too cold in colouring. The walls above the leather-paper dado, which is of a dark green colour, are hung up to the frieze with tightly-strained tapestry fabric, rather Dutch in pattern, and of an admirable design. The greyish-blue groundwork is relieved with bold ornament in dark green in small masses, with gold threadings sparingly, but throughout evenly, used. The woodwork in this room is a dark bronzy green, and the ceiling is finished in a flatting of solid greenish-blue, in harmony with the rest. The frieze, about 15in. deep, is of embossed apple and vine foliage, in green-gold on a quiet pale blue ground, and the cornice, which is of good, massive proportions, has a greeny chrome for its final coat. The floor is stained a dark brown, and varnished. The mantel is of walnut, the firegrate being a hob stove, having the cheeks of the hobs filled with sunflower-scroll tiles, like the upper back and sides. A good, Talbert-like buffet, bearing the date of 1873, stands between the doors at the end of the room, and a fine portrait of Mr. Hunter, by J. Pettie, R.A., dated 1878, hangs at the side. An unsigned likeness, in oil, of Mr. Hunter's eldest child, graces an old gilt carved frame, of good Italian design, over the fireplace. The serving-door and kitchens are conveniently planned. The drawing-room is at the back of the house, and commands the nicely-wooded garden. It is a very interesting and richly-furnished apartment, having a dado of sienna leather-paper, with a warmer tone of the same colour for the walls, on which are hung several large pieces of old needlework, in frames. The frieze is exceptionally rich and deserving of praise. It is embossed with thickly-arranged foliage in conventional forms, finished in green gold. The cornice is deep in section, having a second frieze ornamented with incised plaster-work, which looks very well, and the whole of this part is coloured a warm buff, the ceiling being in sky blue. The furniture is draped with an elegant and delicately designed patterned stuff in greenish blue and white, by Morris and Co., and the woodwork of the joinery is painted a lemon-cream white. The grand piano here in black is another instance which shows how difficult such a piece of furniture is to design. The most interesting object in this room has yet to be mentioned, viz., the Italian-like hooded fireplace. The upper part, which seems to be old, projects boldly into the room, and is of richly carved stone, having massively-treated consoles and delicately-moulded and carved pilasters, which, together, bring the horizontal hood some six feet six inches from the floor. Brass candelabra branch out on either angle, and the central recess of the upper part is filled with silvered glass, the soffit being in gold embossed leather. Three large old blue tiles of rare merit are set in the deep marble frieze immediately over the basket-grate fire opening, and the whole composition is very suitable and pleasing, though for a drawing-room, perhaps, unusual. We now arrive at the studio, which, of course, is the main room in the house, both on account of size and position, having a gallery arranged over the retiring-room at one corner, as shown. The woodwork seems rather dark for a studio, being painted a chocolate brown. The ceiling timbers are of oak, stained like walnut, of which latter material the gallery and staircase to it are made. The walls are painted in a brick-red flat, and the south windows are shut off by a large hanging of old tapestry. The sanctum already referred to is cut off by a curtain, the material of which forms a wall-hanging for the adjoining wall. Several interesting seascapes, by Mr. Colin Hunter's well-known hand, graced an easel or two, while studies in charcoal and oil stood on end and about the room on the occasion of our visit. In the glasshouse a fisher's basket, with "sou'westers" and smocks indicated a recent foreground study from the life. Some good old bits of furniture are arranged round the studio, including a German cabinet in oak, nearly like one in the South Kensington Museum. The drawings in other particulars explain themselves.

THE ORATORY, SOUTH KENSINGTON.

THIS week we give a further addition to our illustrations of this church—one a view of the sanctuary, and the other showing the dome in course of erection. The sanctuary measures 70ft. in length by 50ft. in width, and 72ft. to the underside of the chancel arch. The groining, like that of the cupola itself, is formed in cement concrete, crowned with a lunette 18ft. in diameter. The panels in the apse, together with those in the arches, &c., are formed in the concrete by means of coffers, shown in the bird's-eye view; while the whole of the ornamental members in the ceiling, arches, &c., are in carton pierre. The surface decoration of the pendentives, dome, cupola, &c., is intended to be executed in mosaic; while the massive pilasters shown in the view, together with the rest of the marble-work throughout the church, are in Devon marble, from the quarries of Mr. John Goad, of Plymouth, the contractor for this branch of the structure. According to existing arrangements, the pilasters are to be executed in Radford red, which is a mixture of grey beautifully flashed with a rich transparent red, their bases in green flashed with crimson and yellow. The capping of the dado in mottled chocolate, die in pink on a dark ground, while the plinth next the floor is in jet black veined with white. The baldacchino shown in the drawing is not included in the present contract, but when carried out will in all probability be executed in Italian marble with bronze auxiliaries. The bird's-eye view of the dome our readers must translate for themselves, who will readily notice the method adopted for counteracting the pressure on the pendentives, which is by transmuting the force, through the medium of concrete keys, to the vaulting on the four sides of the dome. At a future date Mr. Gribble hopes to place at our disposal other drawings, showing the interior of the sacristy and some of the chapels. The ceremony of laying the foundation-stone, which is of black polished marble, weighing four tons, will take place on the 29th inst.

HOUSE AT SUNNINGHILL.

OF the double-page view of Sunninghill House, which we give to-day from Mr. Norman Shaw's second Royal Academy drawing this year, we have nothing to say, beyond the fact that on May 7th last we published a fine view of the entrance front with a copy of the ground-plan. Its author only speaks of it as "quite the regulation thing," requiring no description, as it looks what it is and explains itself in consequence. No one can question this as an advantage, but a few particulars of a building when it is illustrated can but add to the interest of the drawing, and we regret their absence.

LITTLE MORETON HALL, CHESHIRE.

THE old Hall at Little Moreton is justly considered one of the best examples of the timber framing of Cheshire, called locally, "magpie" work from the startling contrast of its black tarred timbers with the whitened plaster. Its being surrounded by a moat, and having moreover two circular mounds, points to the belief that it occupies the site of an earlier building of a fortified character. The approach is on the south side (shown in the sketch) by a stone bridge and quaintly-carved gateway, leading to a charming little quadrangle in one corner of which two octagonal bays project from each side, so near together that the upper projecting stones are actually connected, while a passage is left below. On the cornice of one of these bays the following quaint inscription is carved:—"God is Al in Al Thing. This windows whir made by William Moreton in the Yeare of Oure Lord, MDLIX. Richard Dale, carpender, made this widow by the Grac of God." The glazing throughout is of excellent design, being of varied geometrical patterns of clear glass with occasional heraldic panels of painted glass. The upper story of the south front forms a gallery 68ft. by 12ft. It is windowed on both sides from end to end. The roof between the principals is divided into squares and quatrefoils, filled in flush with plaster. The tympana at each end are filled in with plaster scroll-work, in one of which is a figure with a globe, entitled, "The Speare of Destiny whose rule is knowledge." Most of the principal rooms have elaborate plaster chimney-pieces. Little Moreton Hall has been from an early period and still remains in the possession of the Moreton family although not used as a residence. A small part is occupied by a farmer. J. LANGHAM.

On July 25, 1879, we reproduced a sketch of this Hall from Mr. Walford's "Pleasant Days in Pleasant Places."

GRAND SALOON, KEN HILL, NORFOLK.

OUR drawing gives a view of the Saloon or Great Hall, in a house recently built by Mr. Edward Green, on his estate at Snettisham in Norfolk. The house is situated on Ken Hill, a flat-topped wooded elevation overlooking the Wash. The plan is a practical example of a recommendation which the architect, Mr. Stevenson, makes in his book on House Architecture, which we lately reviewed, to return for country-houses to the old mediæval plan of a great hall, suitable for large assemblages of guests for any purpose, as well as for daily use; but with some modifications necessitated by modern habits. It does not, for instance, like these, open directly by a porch from the open air and form the only entrance to the other parts of the house. Heating by hot-water pipes is provided. The ceiling is of ornamental plaster-work, supported on oak beams resting on oak corbels. The high-panelled dado and the floor are of oak. The chimney-piece is of oak and Italian griotte marble. The dimensions of the room are 42ft. by 22ft. and 18ft. high. The work has been well executed by Messrs. Holland and Hannen, of London.

A DESIGN FOR A THIRTEENTH-CENTURY CATHEDRAL.

THIS design was submitted to the Committee for Truro Cathedral, together with another specially designed to suit the site, which has already appeared amongst our illustrations. Both sets of drawings were upon systems of triangulation, which Mr. Pullan maintains were employed in the middle ages, and should, therefore, be used by architects in the present day who have occasion to design Gothic edifices. An explanation of one of these systems, with its application to the present design, is given in a small volume, entitled, "Lectures on Christian Architecture," published last year by Stanford. It has been denied that any such principle was employed, but Viollet le Duc's essay on "Proportion" in the "Dictionnaire," conclusively proves the fact that mediæval architects worked on the lines afforded by certain triangles. To use a vulgar proverb, "the proof of the pudding is in the eating," and if in the accompanying design the proportions recall to mind the symmetry visible in the finest buildings of the 13th century in England and France, all that we can say is that in this case there must be some ground for Mr. Pullan's theory.

PARLIAMENTARY NOTES.

THE NEW LAW COURTS.—In answer to Sir John Holker, Mr. Adam said, on Monday: Plans for the ventilation and warming of the New Law Courts have been adopted. These plans can be seen at the architect's office. They are very voluminous, and there is only one copy. Tenders are now being invited for carrying out the work, and, pending the acceptance of any of these tenders, it would be manifestly inconvenient that copies of the plans should be placed in the Library for general inspection.

THE TAY BRIDGE DISASTER.—In reply to Mr. Henderson, Mr. Chamberlain said, on Tuesday:—As my hon. friend is aware, the evidence in the case of the inquiry into the Tay Bridge disaster is very voluminous, and also raises many important and complicated questions. I am, however, informed that the preparation of the report is far advanced; and although I cannot state the precise date when it will be issued, I hope it will be in the hands of members before many days.

RAILWAY EXTENSION IN LONDON.—A Bill is now before a Committee of the House of Commons, by which the Metropolitan District Railway seek for powers to extend their line from Ealing to Uxbridge, a distance of about eight and three-quarter miles. The parishes to which it is proposed to run are Ealing, Hanwell, New Brentford, Hayes, Greenford, Northolt, Hurlington, Hillington, and Cowley, terminating near the Townhall at Uxbridge. The time asked for in the Bill to construct it is five years, and powers are sought by which the company will be authorised to raise £300,000 additional capital. The average cost of the line will be £33,000 a mile.

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TO CORRESPONDENTS.

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L. H. (We don't know of any published examples of lettering suitable for cutting in stone.)

Correspondence.

IRON-FILINGS IN PORTLAND CEMENT.

To the Editor of the BUILDING NEWS.

SIR,—"Magnet's" letter in yesterday's number is not at all surprising to me, and, from an examination of the iron fragments he has sent you, I can readily account for their presence in the Portland cement referred to. That is to say, unless your correspondent is playing off a joke upon yourself and your readers. I hope, however, that he is serious, and upon that understanding I shall seriously observe.

First.—That the iron he sent you has been undoubtedly passed through some crushing or grinding machine, and from that fact I assume that its mixture with the cement was an accident due to carelessness on the part of the cement-makers. It would never pay to grind metal to mix with Portland cement, and the ground iron must have been produced from a bolt or nut or some other detached piece of machinery either in the kiln or during its passage through the machinery of reduction.

Second.—A cement-dealer would not use such a quality of adulterants if he were disposed to be dishonest, for I do not know where he could obtain the quality in question. Iron-filings of the finest grain would be more easily obtained, but they are worth more than the best Portland cement, and could not therefore be used with profit or advantage. For the "patent iron cement," such an ingredient would be useful, but I rather think that excuse was another addition to the dishonesty of the dealer (who allowed such cement to be upon his premises) who had full confidence in "Magnet's" credulity.

I cannot understand why "Magnet" could not feel, by his touch, the large pieces of iron in the cement. Why, even with a thick glove on, it could be instantly detected.

I have too much faith in the honesty of cement-makers to believe that they would allow such a mixture to leave their premises intentionally. Cement-consumers have themselves to blame for such a state of things, and if your correspondent had submitted the cement he bought to any one member of the triple test, he could not by any possibility have encountered the difficulties (I hope he will pardon my saying) he courted.

Iron, in even the mildest and least objectionable form, in Portland cement is more or less dangerous, but even the iron "aggregate" in question would not have been so completely useless if the cement with which it was associated had been good. I would have no faith, however, in anyone who could be so careless as to allow the quality of cement used by your correspondent to leave his works, and I would advise "Magnet" to use a testing machine and trust to himself alone for safety under such circumstance.—I am, &c.,

HENRY REID.

21, Arundel-street, Strand, W.C., June 19.

ST. MATTHIAS' CHURCH, UPPER TULSE HILL, BRIXTON, COMPETITION.

SIR,—This competition would scarcely be worth further notice were it not for the fact that as there are two architects on the committee, one would have expected more liberal treatment, and that a limited competition would at all events, have been adopted. There is not much to find fault with in the manner in which the regulations are drawn up. The drawings are to be in line—not coloured—and perspectives are not required, though evidently they will be received. It would perhaps have been better to interdict perspectives altogether, as unnecessary trouble and expense to the competitors.

Looking at the amount proposed to be expended, namely, £7,000, out of this sum, it may, I think, safely be assumed that £1,000 will be required for the boundary walls (over 500ft. long), the foundations, which will be costly on account of the nature of the soil and the fall of the ground, 7ft. 9in. from west to east; temporary roofs or inclosures to the two sections of the church first built; this leaves £6,000 for the church with tower and spire. Now, deducting £1,000 as the cost of the tower and spire, such as is usually put to a second-rate chapel, there remains the munificent sum of £5,000 at the architect's disposal for the church, to seat 800 persons, including chancel, fittings for heating and lighting, and his own commission.

The question arises, Can there be any scope in designing such a church that the committee should open the competition to the whole profession? Would it not be wiser for the committee to commission one of the architects who belongs to their body, and who probably well knows their requirements, to submit a few sketches for the church, from which they might select one to their taste, and save themselves from the ridicule and complaints of injustice which inevitably will attend the competition?

From the ambitious requirements of St. Matthias' committee, one can only expect that another dull, uninteresting, meretricious church will be added to those already abounding in Brixton, Dulwich, and Peckham.—I am, &c.,

ALERT.

THE R.I.B.A. COMPETITION MEMORIALISTS, AND THE WESTMINSTER VESTRY-HALL COMPETITION.

SIR,—The President of the R.I.B.A., when speaking at the A.A. dinner, on Tuesday last, enlarged upon the importance of the memorial with reference to the reform of competitions, presented, the other day, by Mr. G. E. Street, R.A., to the R.I.B.A., on behalf of some 1,474 architects; and no doubt the memorial, as far as it goes, is in every way admirable. Of what value, however, can it possibly be, if those who readily signed it are found, on the earliest occasion, to number among those who are willing to compete without any assurance on the part of promoters of competitions that a professional referee shall be employed to report on the submitted designs? This was the object of the memorial, I thought, and yet I now see the names of Messrs. J. P. Seddon, Ed. Power, I. W. Walton, and Messrs. Lee and Smith figuring as competitors for the new Vestry-hall at Westminster. Mr. Charles Barry was invited to compete, but honestly declined, for the very reason above described, he having signed the memorial. Why did not the above competitors do the same? If they really desire the reform prayed for, surely they would have done so.—I am, &c.,

A WESTMINSTER ARCHITECT.

WESTERN DOORWAYS AT ST. PIERRE, LISIEUX.

SIR,—On first reading Mr. Pratt's letter I was filled with the uncomfortable fear that, although I am not conscious of being a somnambulist, still I must have made the sketch he refers to whilst asleep. I am glad to say, however, that I can offer a more satisfactory explanation, although I must plead guilty to a slip I was not aware of, and which I am sorry has happened.

The door in question is the *north*-west, and not the *south*-west, as I have accidentally named it, which explains the variation. With the exception of part of the carving, which I am not sure of (owing to the sketch being enlarged from a small one made without any idea of reproduction), I believe the drawing to be substantially accurate, and cannot detect anything wrong on referring to a photograph I have of the west front. On comparing the two doorways, I must say I am struck with Mr. Pratt's largeness of heart if he could seriously imagine that my sketch was intended for the door he drew, and am only sorry that his estimate of professional sketching is sufficiently low for it to have been possible so to imagine.—I am, &c.,

A. L. TATE.

SIR,—Since you published my letter in your last issue, it has been suggested to me that Mr. Tate has, by mistake or oversight, appended south-west instead of north-west, to his sketch of the doorway at St. Pierre, Lisieux (no longer a cathedral), and on referring to a photograph of the west front, I think this is evidently the case. While the S.W. entrance is the finer, best-known, and, happily, "unrestored," the N.W. doorway has not escaped the hand of man.

I much regret that, through Mr. Tate's evident mistake, I was led to call in question the accuracy of his sketch, and shall be obliged, therefore, by your giving equal publicity to this explanation.—I am, &c.,

HAMPDEN W. PRATT.

SIR,—Having happily come across the inclosed photograph, I see one west doorway is caricatured in reality!!! So the sketch was right, after all. Only compassion, therefore, can be left for your contributor, that he should have sketched the new work instead of the old.—I am, &c.,

W. H. WOOLER.

LISIEUX.

SIR,—A careful geometrical drawing of this exquisite doorway is given by Mr. Frederick Rogers, in his "Detail Drawings and Sketches in England and France," and a perspective drawing of it in the "Architectural Publication Society's Illustrations, Part X. 1861." which is a reduction from a careful drawing of it, made by Mr. John P. Seddon.—I am, &c.,

A READER.

Rochester Cathedral nave has just been fitted with new stalls for the chapter and choir, for the services held therein, from the designs and under the superintendence of Mr. John P. Seddon, architect, of No. 1, Queen Anne's Gate, Westminster. A stall for the bishop of the diocese, by the same architect, will also be shortly added by the Dean and Chapter of Rochester. They have been executed in pitch-pine, at a cost of about £300, by Messrs. Belham, builders, of 115, Buckingham Palace-road, London.

The fourth annual fine-art exhibition was opened at the Albert Institute buildings, Dundee, on Saturday, by Mr. Robert Herdman, R.S.A. The present is by far the largest exhibition which has been held, including many works by leading members of the Royal Academy of London and the Royal Scottish Academy, and, in point of merit, is considered the best with the exception of the first, which was confined to works on loan. The present exhibition is solely one of artists' pictures.

Intercommunication.

QUESTIONS.

[6156.]—**Decoration of Distemper Ceiling.**—Having to decorate with distemper and stenciling the ceiling of a small Gothic church (that is ceiled up to collar beam), would any of your kind readers, accustomed to such decoration, inform me of the most appropriate colours to use that would harmonise best together, or favour me with any other information on the subject, and oblige?—PAINT-BRUSH.

[6157.]—**Tainted Water.**—A cast metal pipe 2½in. in diameter, coated inside with a patent solution, has been laid for a period of two years for water supply to a mansion. Water tastes of the solution yet. Could any correspondent suggest any remedy and oblige?—J. O. C.

[6158.]—**Window Lights.**—A client pulls down an old building having ancient windows therein, and erects a new building with windows in similar positions. Can he prevent the building of a wall on the adjoining property, which would diminish the light of the new windows?—X. Y.

[6159.]—**Tinted Plastering.**—I require the plastering of ceilings and walls to be finished in different tints. Will an experienced reader kindly inform me what ingredients I may with safety use so as not to deaden the lime? Of course, all the tints must be perfectly uniform.—J. N. H.

[6160.]—**Treatise on Light and Shade.**—Will one of your correspondents kindly recommend some cheap publication on shading and shadows applied to architectural perspectives and to sketches from Nature? If there is no work published in which both subjects are treated I should prefer one on light and shade applied to architectural perspectives.—A. B. C.

REPLIES.

[6147.]—**Science and Art Examinations, South Kensington.**—The text-books for this subject are "Fergusson's History," 4 vols., and Fairholt's "Dictionary of Terms in Art." I have also found Wornum's "Analysis of Ornament," and Parker's "Glossary" useful. Both replies to this question in last week's issue were wrong; one answered for building construction and the other for elementary architecture.—CERTIFICATED IN ALL THREE.

[6153.]—**Sea-Sand.**—"C. F. M." cannot use a better material than "Linoleum Muralis," the Sunbury wall decoration. Some thousands of yards have lately been fixed upon the walls of the Scarboro' Spa Saloon, in consequence of its being found to be the only wall decoration capable of resisting damp arising from sea-sand or other causes. It is impermeable to moisture, and is almost indestructible.—GEORGE MASON.

CHIPS.

The foundation-stone of the new Catholic Church at Caterham, Surrey, was yesterday laid by the Right Rev. Dr. Danell, the Roman Catholic Bishop of the diocese. Mr. Wm. Carruthers is the contractor, and the architect is Mr. E. Ingress Bell.

The Bishop of Chichester reopened, on Monday, the parish-church of South Bersted, after the rebuilding of the chancel. The new chancel is Early English in style, and is extended both to north and east, and an organ-chamber and vestry added. An open roof of Memel timber replaces the former flat plaster ceiling. The lighting is by lancet windows, and oak seats are provided for the choir. Mr. William Pratt, of Bognor, was the contractor for the work, which has cost about £500.

At a meeting held at Beverley on Saturday, Mr. Treadwell, of Bromley, Kent, was appointed surveyor to the drainage commissioners of Holderness, in place of the late Mr. Harker. There were more than 120 applicants for the appointment.

In the description of Mr. Philip J. Marvin's design for a house, published last week, we incorrectly stated that the drawing was in the Royal Academy Exhibition.

Additions and alterations on an extensive scale are about to be made to the Glamorganshire pauper lunatic county asylum at Bridgend. Messrs. Martin and Chamberlain, of Ann-street, Birmingham, are the architects.

The local authority of West Calder, N.B., have adopted plans and specifications prepared by Mr. James Tait, C.E., of Wishaw, for the sewerage of the district.

The New Catholic Church of St. Mary Immaculate at Clonakilty will be opened on the 25th July. It has been built at a cost of £27,000, from the plans of Mr. G. Cashlin, of Dublin.

Two memorial windows are about to be placed in the parish-church of St. Mary and Nicholas at Leatherhead, in memory of the late Bishop Utterton.

A new schoolroom and vestry just added to Clermont Congregational Church, Preston, next Brighton, were opened on Monday by the Rev. Dr. Clemance, of Camberwell. The schoolroom seats 180 persons, and has been built at a cost of £770. Messrs. Woolgar and Sons, of Horsham, were the contractors, and Mr. J. G. Gibbons, of Brighton, was the architect.

Our Office Table.

It is rumoured that the vacancy caused in the ranks of the Royal Academy Associates by the promotion of Mr. J. L. Pearson to full membership as an R.A., will shortly be filled by the election of one of the three following architects, viz:—William Burges, G. F. Bodley, and Arthur Blomfield. Of the fitness of either of these gentlemen there can be but little doubt, but we sincerely hope that it is not true that the two former gentlemen or, at any rate, the first-named are not to be elected because of their somewhat advanced years. Mr. Burges' claim to election has long been indisputable, and it is no discredit to several able members of the profession who have already become Royal Academicians to say that his admission ought to have preceded theirs.

The death of Mr. John Webb, which took place on the 14th inst., removes a connoisseur and collector of works of fine art, in whose critical judgment the State and many private individuals placed the highest confidence. In the early days of the South Kensington Museum Mr. Webb acted as agent to that institution and to the British Museum. In the course of his frequent journeys abroad Mr. John Webb purchased some precious works of art. His precise appreciation of genuine workmanship of different periods, together with his knowledge of how, when, and where remarkable works were to be obtained, enabled him to bring together many rare *objets d'art*. For some years his collections were exhibited on loan at the South Kensington Museum. They include ivory carvings—some of the earliest Byzantine times, and of a character to lie by the side of the famous Diptychs in the Vatican at Rome—ancient glass, metal works for ecclesiastical purposes, such as chalices, reliquaries, crucifixes and shrines, specimens of 14th and 15th-century enamel work, choice little ornaments and *articles de luxe*, onyx cups, &c. When, however, Mr. John Webb retired from business and took up his residence at his villa at Cannes, where his absence will be much felt, this valuable series of art objects was bought by the South Kensington Museum authorities.

A definite decision has been come to respecting the position of the Central Institution of the City and Guilds of London Institute for the Advancement of Technical Education. The Commissioners for the Exhibition of 1851 offered a site on their estate at South Kensington some time ago. This has now been accepted by the Institute. It lies between the temporary French and Belgian Courts, is 300ft. long, and possesses the great advantage of being near to the museums, libraries, science and art schools of South Kensington. Here the central institution will be erected, and will form a normal school providing the highest technical instruction and training teachers. The students who enter will already have obtained such a knowledge of the elements of science as is acquired at the School of Mines and other institutions where science rather than technical knowledge is the staple of instruction.

The death is announced of Mr. W. W. E. Wynne, the well-known Welsh archæologist. He was the inheritor of the historical library partly formed by Robert Vaughan, of Hengurt, in the 17th century. This Vaughan was the contemporary and intimate friend of another great collector, John Jones, of Gellilyfdy. The two made a bargain that whichever should die first should leave to the other his collection. John Jones pre-deceased Robert Vaughan, and faithfully carried out the compact. Thus a collection already good was much enriched, and through two centuries it remained in the possession of his descendants at Hengwrt, near Dolgelly, until in 1859 it found an enthusiastic custodian at Peniarth. Some years ago Mr. Wynne published in the *Archæologia Cambrensis* an exhaustive catalogue of his collection. In 1873 he contributed to "Kalendars of Gwynedd," compiled by Mr. E. Breese, notes of considerable genealogical value and interest (*Athen.* No. 2408). He had done the same for Sir Samuel Rush Meyrick, when the latter, in 1846, edited for the Welsh MSS. Society the Heraldic Visitations of Lewis Dwnn. Two of his latest contributions to literature were a history of his own parish of Llanegryn, published in the *Archæologia Cambrensis* last year, and notes to a new edition of the "History of the Gwydir Family," published by Mr. Askew Roberts in 1878. Mr. Wynne was born at Pickhill Hall, Denbighshire, on December 23rd, 1801. He represented Merioneth in Parliament from 1852 to 1865.

At the meeting of the Court of Common Council last week, a report was brought up by Mr. H. A. Isaacs from the Markets Committee, submitting for the approval of the Court the plans and drawings for the works connected with the new Leadenhall Market. It stated that the markets and gangways will cover an area of about 26,900 square feet and form the shape of a cross, the passage being 30ft. wide. There will be four entrances, with twenty-nine shops in the principal thoroughfares, which are 30ft. in width, and ten shops in the subsidiary block. Each shop will have a basement, ground and two upper floors, and vary in size from about 240ft. to 540ft. superficial, and 16ft. high. The arcade will be 45ft. high and 30ft. wide, and will be, while thoroughly well lit and ventilated, protected from the weather. Where the four ways meet, there will be a dome 60ft. high. The general principle of construction will be similar to that of the Poultry Market in Smithfield. The basement will be well adapted to the storage of provisions. The cost is estimated at £30,000; the shops would probably produce a revenue of £8,000 a year, or, after the payment of interest on the cost of construction and maintenance, between £3,000 and £4,000. The City architect (Mr. Horace Jones), from whose plan and designs the market will be built, anticipated that it will be completed in eighteen months.

A Conference of representatives of building societies and solicitors took place on Tuesday, at Westminster Palace Hotel, for the purpose of considering the Leases Bill, Middlesex Land Registry Bill, Lord Cairn's Conveyancing Bill, and the Solicitors' Remuneration Bill.—Mr. W. T. M'C. Torrens, M.P., presided.—Mr. Addison moved, "That it is desirable to give power to the High Court of Justice to restrain the enforcement of provisions of forfeiture and re-entry in leases, and that the Bill introduced by Mr. Warton should pass into law during the present Session and should not be delayed during the period which must be required for the consideration of any comprehensive measure dealing with the laws of property."—The resolution was passed.—Mr. Leroy spoke in reference to the Middlesex Land Registry Bill, and moved—"That this meeting cordially concurs in the recommendation of the Committee of last session on land tithes and transfer in favour of the establishment of registers of assurance throughout England and Wales; and, having regard to the special and urgent necessity that exists for giving immediate effect to the recommendation without waiting for more comprehensive legislation on the subject, expresses its earnest approval of the Bill now before Parliament to improve the constitution and extend the district of the Middlesex Land Registry, and it is hoped that that Bill may become law during the present session."—Mr. Green seconded the resolution which was adopted unanimously.—The next question was the Conveyancing Bill and the Solicitors' Remuneration Bill, introduced by Lord Cairns.—Mr. Higham, who introduced the question, said that the Government sought to defer some of the measures until they could introduce a comprehensive scheme dealing with the whole. He thought this was inadvisable, as it might be some years before the Government could deal with the matter, and it was therefore desirable that they should be passed without delay.—Mr. Berry supported the Bill of Lord Cairns, and, after a short discussion, the proceedings closed with a vote of thanks to Mr. Torrens for presiding.

Though the Sunday Society does not intend to press its claims in Parliament this session, the objects it has in view are being vigorously prosecuted. On Sunday last, the members of the Society visited the Hanover and Graphic galleries, in large numbers, and the public were again admitted to the exhibition at the Albert Hall. About 6,000 persons, altogether, visited the three exhibitions. At the Hanover Gallery, the greatest interest was taken in Makart's picture of the entry of Charles V. into Antwerp, and from three o'clock till half-past nine, the space before it was covered with admiring gazers, who, but for the opening

of the gallery on Sunday night, might never have seen this work of art, which is shortly to be permanently placed in one of the public buildings of the city of Hamburg. It is interesting to note, in connection with these Sunday art exhibitions, that the Grosvenor Gallery was, on the same Sunday, visited by a distinguished company, including the Princess of Wales and her family, the Duke and Duchess of Connaught, and the King of Greece.

THE annual dinner of the Architectural Association, which came off at the Holborn Restaurant on Tuesday evening, was numerously attended, including an unusually large proportion of the seniors in the profession. Amongst those present we noticed Messrs. T. Hayter Lewis, A. Cates, H. Currey, Wm. White, F.S.A., T. Roger Smith, — Mathews, sen., J. D. Mathews, and R. W. Edis. Mr. S. Flint Clarkson presided, and was supported on the right by Mr. Whichcord, who, in replying to the health of the President of the Institute, spoke at considerable length and in terms of approval of the architectural examination to be enforced by the Institute next year. He also referred in favourable terms to the memorial as to Architectural competitions recently presented to the Institute by Mr. Street; it had, he believed, a great likelihood of being adopted, because it dealt only with one feature of competitions, whereas previous attempts at remedies had been too drastic in their suggestions. The cordial feeling which existed between the Institute and the Association was never warmer than at the present time; the Association would benefit by the alterations just effected in the premises, and he hoped that the lending library would soon be rendered more accessible. Toasts, songs, speeches, and music pleasantly varied the evening. In the lobby of the restaurant were hung drawings and plans of the alterations about to be effected from the designs and under the superintendence of Messrs. Archer and Green, of Buckingham-street, Adelphi. These include a new frontage to Holborn, which will be a florid and well balanced treatment of a Modern French style, in which granite and marble will be extensively employed.

ON Wednesday evening Mr. Barlow, the president of the Institution of Civil Engineers, and Mrs. Barlow, received between two and three thousand guests at a conversazione held, by permission of the Lords of the Committee of Council on Education, in the South Kensington Museum. The guests entered by a temporary door in Cromwell-road leading into the court of architecture, and after crossing the central passage were presented to Mr. and Mrs. Barlow in the part of the building containing the magnificent collection of ancient and modern ironwork, and having as a kind of scenic background, the striking diagram of architectural edifices grouped so as to show the comparative heights of the principal great buildings of Europe. Passing into the South Court the visitors found it and its mosiac portraits of artists, its loan collection of works of art, and its examples of Oriental pottery strikingly illuminated by the electric light. In the North Court there was during the evening a brilliant throng, for here were the musical attractions of the evening, the part songs, the serenades, and selections of instrumental music from the repertory of the band of the Royal Artillery. The picture galleries were thrown open to all the visitors, and Sir F. Leighton's fresco of the Arts of War, in the South Gallery, was the object of fresh interest, as seen under the strong light of the electric lamp. The guests commencing to arrive at nine o'clock, continued to come in till after 11, and the museum was not cleared till some time after midnight.

THE Commons Preservation Society held a meeting at Willis's Rooms on Wednesday, when speeches were delivered by Mr. Fawcett, Sir C. Dilke, Mr. Shaw-Lefevre, and other gentlemen, on the objects of the Society. The Postmaster General related the history of the efforts made during the last century to inclose the commons of this country, and how they had succeeded until 1869, when, in opposition to a proposal to enclose nearly 7,000 acres of common land, he obtained the passing of a Resolution by the House of Commons which stopped enclosure pending further legislation.

A Methodist chapel is to be erected near Chippenham, from plans by Mr. Hicks, architect.

CHIPS.

On Saturday, at a meeting of the newly-constituted county board for Clackmannanshire, held at Alloa, Mr. Anderson was appointed surveyor of county roads, at a salary of £150 per annum.

The French senatorial committee on the restoration of the Tuileries Palace has adopted the conclusions of its reporter, which are in favour of its restoration. It is proposed to transfer the Luxembourg collection to the rebuilt palace.

The foundation-stone of a new Catholic church was laid at Termathfeckin, near Drogheda, on the 17th inst.

The reopening of the English Wesleyan Chapel at Brecon was celebrated on Sunday. The chapel, which has a horse-shoe gallery at one end, will now seat 400 persons. The whole of the building has been reseated with varnished pitch-pine benches, by Mr. John Griffiths, of Brecon, and has been decorated by Mr. John Thomas, of the same town.

The Archbishop of Canterbury on Monday morning consecrated the new church of Holy Trinity, Lamorbey, Kent. Mr. Ewan Christian is the architect. The church, which seats 400 persons, is built of Kentish rag, and is in the Early English style. It cost £5,000.

New Board schools in Webb-street, Bermondsey-new-road, were opened by the Chairman of the London School Board on Saturday. They have been built from the designs of Mr. E. R. Robson, F.S.A., architect to the Board.

The tender of Messrs. J. Barnsley and Sons, builders, Birmingham, has been accepted for the erection of the new County Court Offices, Birmingham, and we understand the works will be commenced immediately. The contract for the building amounts to about £17,000.

Cornish folk seem to have taken heart from the recent rise in the price of tin. At Redruth—the centre of the mining industry—they have erected and just opened a mining exchange, and buildings are contemplated to a much larger extent than has been the case for many years. Contracts have just been let for the erection of suites of mining offices. A new road, half a mile long, forming a new entrance to the town from Falmouth, has been opened, and several villas and a terrace are about to be erected, from plans by Mr. Hicks, at an estimated cost of about £10,000.

The memorial-stones of a new Baptist chapel were laid at Totterdown, near Bristol, on Monday week. The chapel will measure 75ft. by 40ft., seating 520 persons, and at the rear will be vestry, two classrooms and schoolrooms for 280 children. The style is Conventionalised Italian; the facing materials are Pennant stone with Bath dressings, and the cost will be about £2,200.

At a vestry meeting held at Chard, Somerset, it was decided to open an account for restoring and enlarging the parish-church of St. Mary.

A chapel of ease is about to be built at Marden-Ash, a hamlet of High Ongar, from the design of Mr. Joseph Clarke, F.S.A., at an estimated cost of £2,500.

A new church is being completed at Milland, and will be opened on Wednesday, the 21st July. The architect is Mr. William C. Street, and the contractor is Mr. W. Pink, of Godalming.

A luggage-train passing over a bridge on the Hay and Brecon Railway was precipitated the other night into the river below, through the structure giving way. The bridge consisted of three arches, and was about 40ft. long, and 20ft. high. The river had been greatly flooded by the late continuous rains, and it is thought the bridge either went down under the weight of the train or a few seconds before its passage.

A new list of members of the Institution of Civil Engineers has just been issued, from which it appears that there are now on the books 1,217 members, 1,299 associate members, 579 associates, 18 honorary members, and 657 students, together, 3,770 of all classes. At the same period last year, the numbers of the several classes were 1,148, 1,200, 622, 17, and 591, making a total of 3,578, showing an increase at the rate of nearly 5½ per cent. During the past session, the elections have comprised 2 honorary members, 43 members, 129 associate members, and 15 associates, and 160 students have been admitted.

A committee for erecting a new church of St. John the Evangelist, at Hastings, have accepted the tender of Messrs. Dove Brothers, at £2,895, for building a section of the church, which is to be completed within six months.

We are asked to state that the chairs copied from the old ones of Queen Mary, mentioned in our notice of the Kensington School of Art-needlework on p. 675, were made by Messrs. Alexander and Howell, of St. Vincent-street, Glasgow.

A stained-glass window of three lights, with subjects taken from the Book of Jeremiah, has just been erected in the Cathedral of Cork, to the memory of Lieut. Coghill, V.C. No less than sixty-six memorial windows have been placed in this cathedral during the past five years, and three others are about to be added.

At the last meeting of the board of guardians for Bedminster, next Bristol, the death was announced of Mr. John Foster, of the firm of Foster and Wood, who had been for many years connected with the board as their architect, and a vote of condolence was ordered to be sent to the widow.

The parish-church of South Berstead, near Bognor, a 14th-century edifice on Norman foundations, was reopened on Monday, after the rebuilding of the chancel, and the addition on the north side thereof of an organ-chamber and a vestry. The works have been carried out by Mr. W. Pratt, builder, of Bognor, under the supervision of Mr. Ewan Christian, architect to the Ecclesiastical Commissioners. The restoration of the nave, which is in a very dilapidated condition, will shortly be undertaken.

The town council of Guildford last week raised the salary of Mr. Lowe, the inspector of nuisances, from £25 to £50 per annum.

An Industrial and Fine Art Exhibition will be opened at the Bow and Bromley Institute on the 30th inst., by the Lord Mayor, the Lady Mayoress, and Sheriffs of London. Upwards of 500 exhibitors, chiefly of the working classes, have entered exhibits for competition.

New tramway stables have just been erected at Newcastle-on-Tyne, from the designs of Mr. E. Shewbrooks, architect, of that city.

A stained-glass memorial-window has just been placed in the west end of Duncton parish-church, Sussex. It is in five lights, and contains incidents in the life of St. John the Baptist. Messrs. Ward and Hughes, of London, who have also erected three other windows in the church during the last few years, are the artists.

Lamplough's Pyretic Saline is refreshing, most agreeable, and the preventive of FEVERS, BILIOUSNESS, SMALL POX, SKIN DISEASES, and many other spring and summer ailments. Sold by chemists throughout the world, and the Maker, 113, Holborn Hill. *Use no substitute* —[ADVT.]

Holloway's Ointment should be well rubbed upon the pit of the stomach and region of the heart in that particular form of indigestion which gives rise to palpitation, shortness of breath, and a suffocating sensation. Every distressing symptom soon yields, digestion becomes easy, the spirits light, and good health returns.—[ADVT.]

MEETINGS FOR THE ENSUING WEEK.

SATURDAY.—St. Paul's Ecclesiological Society. Day excursion to Canterbury. Leave Victoria (L.C. and D.R.) station 10.10 a m.

CINDER-SIFTING ASH CLOSETS.

Superior to Earth Closets. For Gentlemen's Houses, Cottages, Schools, &c.

NO DRIED EARTH REQUIRED.

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[ADVT.

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CHARLES TRASK,

Norton-sub-Hamdon, Ilminster, Somerset.

—[ADVT.]

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Designs and Estimates.

General Repairs and Alterations Executed.

Experienced Workmen always in readiness, and sent to any part of the country.—[ADVT.]

To Builders and Others.—Large open space, and nearly new buildings, standing on an area of upwards of 13,000 square feet; eight minutes from the Bank of England, to be Let on Lease.—Apply to E. S. Henshaw, 27a, King-street, Covent-garden.

TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender—it adds to the value of the information.

Bangor.—For new chapel, schoolroom, vestry, and boundary walls, for Pendref Congregational Church, Bangor. Mr. Owen Williams, architect:—

William, J.	£3,415 0 0
Williams, R. and J.	3,356 0 0
Williams, E.	3,120 0 0
Jones and Owens (accepted)	2,448 0 0

[Different trades tendered for separately, and added together, £3,227.]

Bermondsey.—For erection of Public Hall and Offices in the Spa-road, Bermondsey, for the Vestry of Bermondsey. Messrs. George Elkington and Son, architects, 95, Cannon-street, E.C. Quantities prepared by Mr. H. Smith, 8, John-street, Adelphi:—

Joslyne, W. T.	£27,476 0 0
Tongue, W.	26,474 0 0
Battley, R. G.	24,837 0 0
Thompson, J.	24,775 0 0
Tarrant and Son	24,625 0 0
Crockett, W.	24,619 0 0
Quinn and Co.	24,000 0 0
Little, T.	23,878 0 0
Rider and Son	23,756 0 0
Howell and Son	23,695 0 0
Greenwood, G. and J.	23,620 0 0
Messom, T. J.	23,416 0 0
Nightingale, B. E.	23,384 0 0
Harper, J.	23,365 0 0
Cass, W. H.	22,940 0 0
Dickinson, C.	22,900 0 0
Taylor, J.	22,836 0 0
Stephenson, G.	22,723 0 0
Braid and Co.	22,614 0 0
Perry and Co (accepted)	21,220 0 0

Blackheath, S.E.—For constructing a sewer in Charlton-road, Blackheath, for the Greenwich District Board of Works:—

Simmonds, Sidcup (accepted)	£849 0 0

Birkenhead.—For the erection of two shops in Price-street, Birkenhead, for J. J. Hill, Esq., Joseph Brattan, architect:—

Bleakley, Birkenhead	£1,145 0 0
Legge, Birkenhead	1,134 0 0
Snape, Birkenhead	1,130 0 0
Marks, Birkenhead	1,100 0 0

Brighton.—For alterations to No. 19, Norfolk-road. Mr. Henry Hawes, architect:—

Warner	£197 0 0
Nash and Co.	186 0 0
Hackman	168 0 0
Watts	146 0 0
Bruton	140 0 0
Spreadborough (accepted)	137 0 0

Bristol.—For new church, for the Bristol and County Lunatic Asylum. In the competition amongst architects for the above a few months since, the Committee of the Asylum selected the plans prepared and submitted by Mr. Edward Henry Edwards, architect, of 5, Clare-street, Bristol. The following is a list of tenders. The total amounts include an extra bay to chancel, subsequently suggested by the architect:—

	1st Estimate.	Extension of Chancel.	Total.
Beaver, H.	—	—	£3,352 0 0
Church	£2,999 0 0	£196 0 0	3,195 0 0
Eastabrook	2,980 0 0	194 0 0	3,174 0 0
Davis	2,980 0 0	190 0 0	3,170 0 0
Baker and Son	2,980 0 0	190 0 0	3,170 0 0
Lewis and Son	2,973 0 0	193 0 0	3,166 0 0
Humphreys	2,946 0 0	182 0 0	3,129 0 0
Beaven, A. J.	2,820 0 0	190 0 0	3,010 0 0
Walters	2,817 0 0	188 0 0	3,005 0 0
Cowlin	2,769 0 0	186 0 0	2,955 0 0
Banner and Co.	2,793 0 0	160 0 0	2,953 0 0
Gray	2,748 0 0	190 0 0	2,938 0 0
Hatherley	2,735 0 0	175 0 0	2,910 0 0
Crocker	2,667 0 0	146 0 0	2,813 0 0
Howell and Son	2,595 0 0	170 0 0	2,765 0 0
Yalland	2,615 0 0	126 0 0	2,741 0 0
Pugsley	—	—	2,698 0 0
Veales	2,443 0 0	154 0 0	2,597 0 0
Force & Ashley*	—	—	2,565 0 0

* Accepted.

Burslem.—For twelve houses and shop, Sant street, Burslem, for Mr. J. P. Guy. Mr. A. Wood, architect, Tunstall and Burslem:—

Scales, J.	£1,844 0 0
Bennett, N.	1,480 0 0
Cartlidge, S.	1,480 0 0
Proctor, J.	1,422 0 0
Cope, T.	1,407 0 0
Pemberton and Chorley	1,350 0 0
Grosvenor, J.	1,340 0 0
Bennett, N. J.	1,193 0 0
Caulcott, J.	1,175 0 0
Woolrich, J. (accepted)	1,150 0 0
Foster, G. A.	1,120 0 0

Burslem.—For villa residence on the Cobridge Estate, Burslem, for F. J. Jones, Esq. Quantities supplied. Mr. A. R. Wood, architect, Tunstall and Burslem:—

Bennett, N.	£715 0 0
Rodgers, S. (accepted)	705 0 0

Burslem.—For two villa residences on the Cobridge Estate, Burslem, for Messrs. Lawton and Bennett. Quantities supplied. Mr. A. R. Wood, architect, Tunstall and Burslem.

Grant, W.	£1,944 0 0
Cooke, W.	1,931 0 0
Watkin, J.	1,866 0 0
Yorke, J.	1,768 0 0
Proctor, J.	1,763 0 0
Bennett, N.	1,734 0 0
Bennett, J.	1,721 0 0
Rodgers, S. (accepted)	1,720 0 0

Burslem.—For alterations and additions to Swan-buildings, Burslem, for Wm. Eley, Esq. Quantities supplied. Mr. A. R. Wood, architect, Tunstall and Burslem.

Cooke, Wm.	£758 0 0
Brindley, J.	750 0 0
Walker and Bambridge	733 0 0
Bennett, N.	694 11 0
Cope, T.	650 0 0
Yorke (accepted)	649 0 0

Chelsea.—For coach-houses, Pont-street Mews, for the Cadogan and Hans-place Estate (Limited). Mr. T. Heygate Vernon, architect, 21, Abingdon-street, Westminster:—

Burningham	£607 0 0
Martin, Wells, and Co.	590 0 0
Pink, T. and Co.	555 0 0
Scrivener and Co.	553 0 0
Shaw, G. (accepted)	512 0 0

Cork.—For the erection of a clothes-store and kitchen, for the Cork Board of Guardians. Mr. M'Mullen, engineer:—

Four received, ranging from that of E. Burke, of Cork, £395, to £480. Engineer's estimate, £275.

Derby.—For drainage works at the cemetery, Nottingham-road, Derby. Messrs. Popplewell and Clarke, engineers and surveyors:—

Tomlinson	£1,148 0 0
Walker	906 10 0
Harpen	866 13 5
Todd (accepted)	665 15 0

Derby.—For the erection of boundary walls at the cemetery, Nottingham-road, Derby. Messrs. Popplewell and Clarke, architects and surveyors:—

Wood	£803 10 0
Tomlinson	747 16 1
Walker	679 0 0
Todd	657 11 4
Walkerdine	638 16 0

Falmouth.—For the extension of the pier at Falmouth. Mr. Lang, surveyor:—

Olver, Falmouth	£1,790 0 0
Sharp, Falmouth*	1,695 0 0

* Accepted on revised plans at £1,364.

Hastings.—For building the first section of the chancel of St. John the Evangelist:—

Dove, Bros. (accepted)	£2,895 0 0

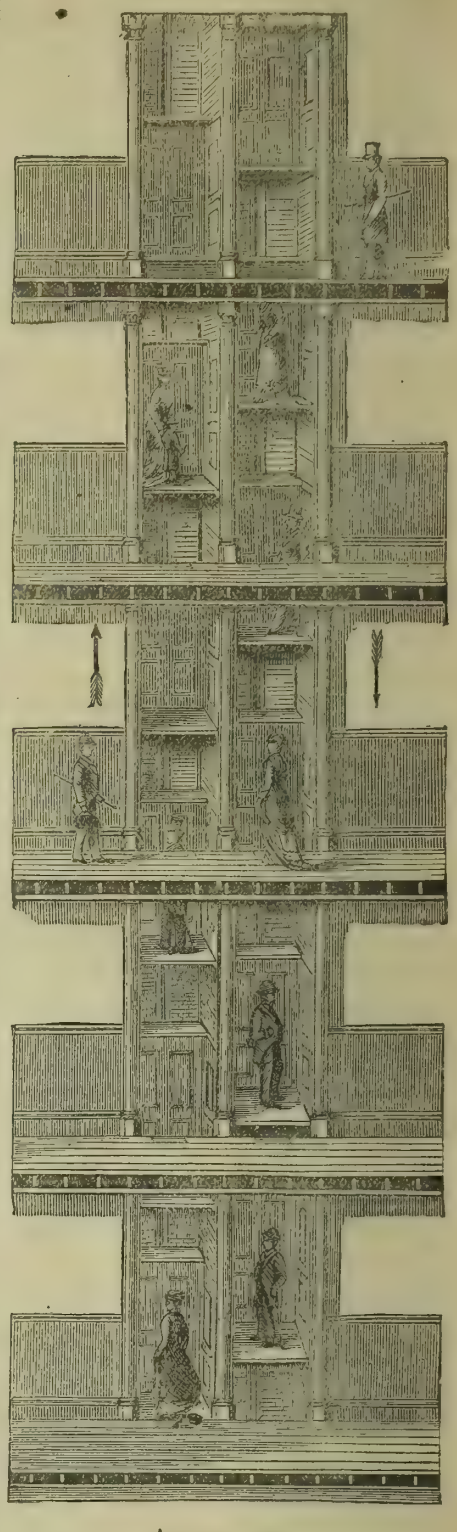
Highgate.—For residence and offices, &c., at Highgate, for W. L. Hetherington, Esq. Messrs. Hetherington and Oliver, of Carlisle, architects; quantities by Mr. R. C. Gleed:—

	House and Offices.	Boundary walls, &c.	Total.
Ebbage	£3,912	£187	£4,099
Southcott & Co.	3,740	202	3,942
Toms	3,559	185	3,744
Wheeler	3,500	210	3,710
Richard Conder	3,457	195	3,652
Downs & Co.	3,390	158	3,548
Morter	3,339	185	3,524
Lawrence	3,260	169	3,429
Green	2,989	167	3,156

Hope.—For the construction and erection, with all necessary seating and flues, of three Lancashire high-pressure boilers, each 24ft. long and 6ft. diameter; a horizontal steam-engine, 8½in. cylinder and 16in. stroke, with steam-pipes from boilers and bed for engine, and a platform weighing-machine, 12ft. by 6ft. 6in., to weigh up to 10 tons, with foundations to same, for the new hospital being erected at Hope, near Eccles, in Lancashire, for the Guardians of the Salford Union. Mr. Lawrence Booth, F.R.I.B.A., architect, 88, King-street, Manchester:—

Boilers with seating, &c.:	
Bland, W. & Sons (Limited), Bury	£1,075 0 0
Fernihough & Sons, Stalybridge	1,046 0 0
Adamson & Co., Hyde Junction	1,040 0 0
Grierson and Co., Manchester (Cornish boiler)	987 0 0
Chapman, Salford	960 0 0
Goodbrand & Holland, Manchester	937 0 0
Heywood & Duckworth, Radcliffe	930 0 0
Galloway, W. and J., Manchester	930 0 0
Ditto ("1875 Patent") (accepted)	900 0 0
Bradford and Co., Salford	917 9 6
Tangye, Bros., Birmingham	898 10 0
Adamson and Co., Hyde	886 0 0
Goodfellow, Hyde	885 0 0
Nichols, Salford	850 0 0
Cadderton Ironworks Co. (Limited)	845 0 0
Hamilton, Wood, & Co., Salford (Duplex-flued steam boiler)	840 0 0
Pollit, Bolton	840 0 0
Wilde and Co., Openshaw	820 0 0
Barlow, J. & W., Rochdale	770 0 0
Ellis, H. and J., Salford	720 0 0
Howarth, Rochdale	710 0 0
Tank & Boiler Co., Wolverhmptn	657 0 0
Silvester, Newcastle, Staffordshire (no boiler, seating, or flues)	576 0 0
Hutchinson and Sons, Elton	550 0 0
Engine with steam pipes, &c.:	
Hamilton, Woods, & Co., Salford	£165 0 0
Grierson & Co., Manchester	163 0 0
Bland & Sons (Limited) Bury	150 0 0
Goodfellow, Hyde	125 0 0
Howarth, Rochdale	120 0 0
Goodbrand & Holland, Manchester	107 0 0
Barker & Co., Stalybridge	95 0 0
Chadderton Ironworks Co. (Limited)	92 0 0
Adamson & Co., Hyde Junction	90 10 0
Ellis, H. and J., Salford	90 0 0
Nichols, Salford	87 10 0
Bradford & Co., Salford (accepted)	84 11 6
Tangye, Bros., Birmingham	78 0 0
Silvester, Newcastle, Staffordshire (no bed included)	51 0 0
Lees, Hollinwood £40 and	50 0 0
Bates, Newcastle, Staffordshire (no bed, or steam pipes, or delivery included)	35 0 0
Weighing-machine and foundations:	
Dennison & Sons, Leeds £63 and	68 0 0
Hodgson & Stead, Salford* £66 and	71 0 0
Spencer & Co., Hollinwood £53 and	58 0 0

HART'S PATENT CYCLIC ELEVATOR.



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